General Chemistry II

CHEM-1220-001

Class Meeting Times/Location

Tuesday and Thursday: 5:00 PM - 6:50 PM

Science and Industry Building Room 092 (SI 092)

Instructor Information

Phone: 801-957-3894
Email: Use Canvas for email correspondences.
Office Location:
Office Hours:

Course Description

Chemical kinetics, equilibria, acids and bases, entropy and free energy, precipitation reactions, electrochemistry, main group chemistry, nuclear chemistry, metallic bonding theories, hybridization, intro to organic chemistry. It is recommended that students take CHEM 1225 in the same semester as this course.

Prereq: CHEM 1210
Semester: All

College-Wide Learning Outcomes

The Core Themes of SLCC's Mission focus on Access and Success, Transfer Education, Workforce Education and Community Engagement. As such, all courses and programs address one or more of the below College-Wide Learning Outcomes. Upon successful completion of any program at SLCC, students should:

1. Acquire substantive knowledge in the discipline of their choice sufficient for further study, and/or demonstrate competencies required by employers to be hired and succeed in the workplace.

2. Learn to communicate effectively.

3. Develop quantitative literacies necessary for their chosen field of study.

4. Learn to think critically.

5. Develop the knowledge and skills to be civically engaged, and/or to work with others in a professional and constructive manner.

Communication Plan

Example language:

I will respond to email within 24 hours.

You will receive immediate feedback via the associated online management system when you submit Canvas quizzes and Mastering Chemistry assignments.

I will return exams approximately one-week after the test date.

The best way to contact me is via the Canvas Inbox, as I will prioritize this email over other modes of communication.

Course Student Learning Outcomes

- Prereq: CHEM 1210. Recommended coreq: CHEM 1225.
- Chemical kinetics, equilibria, acids and bases, entropy and free energy, precipitation reactions, electrochemistry, main group chemistry, nuclear chemistry, metallic bonding theories, hybridization, intro to organic chemistry

CHEM 1220 Student Learning Outcomes

Students will understand and demonstrate the ability to explain and/or use the following concepts in chemical problems:

Chapter 14 - Chemical Kinetics

A. Describe the basic factors that affect reaction rates B. Write the rate law for a reaction C. Use the initial rates method to determine reactant orders and rate constants D. Be able to use integrated rate laws to determine reactant concentrations as functions of time and reaction half-lives E. Articulate the basic concepts of collision theory and transition state theory F. Use the Arrhenius equation to find such things as the activation energy of a reaction, rate constants, etc. G. Write rate laws and overall reactions from simple reaction mechanisms H. Catalysis

Chapter 15 - Chemical Equilibrium

A. Understand the concept and relevance of equilibrium constants and what they convey in a general sense about chemical reactions B. Be able to write equilibrium constant expressions for any reaction C. Calculate equilibrium constants, and use equilibrium constants to calculate equilibrium concentrations of reactants and products D. Calculate reaction quotients and predict whether or not a system is at equilibrium. E. LeChatelier's principle and predicting the effects of changes in concentration, temperature, pressure, and catalysts on a system at equilibrium

Chapter 16 - Acid-Base Equilibrium

A. Describe Arrhenius, Brönsted-Lowry, and Lewis acid-base theories and identify substances belonging to the various acid-base families B. Identify acids and bases as strong or weak, and explain these behaviors (strong and weak) as they pertain to aqueous solutions of ionic compounds C. Calculate the pH and pOH of solutions of strong and weak acids and bases; calculate percent ionization of acid solutions D. Calculate the acid and base dissociation constants of solutions of weak acids and bases E. Calculate the pH of salt solutions F. Factors that affect acid strength on a molecular level

Chapter 17 - Additional Aspects of Equilibrium

A. The common-ion effect, buffers, properties of buffer solutions, and the Henderson-Hasselbach equation B. Solubility product equations, the calculation of molar solubility and solubility product constant values C. Solubility calculations and the common-ion effect, other factors affecting solubility such as pH and etc. D. Using the reaction quotient Q to predict whether or not precipitation will occur when two or more solutions are mixed E. The fundamental theory of complex ions, and the application of equilibrium theory with respect to the formation and dissociation of complex ions

Chapter 19 - Chemical Thermodynamics

A. Familiarity with all of the fundamental definitions, terms, and concepts discussed in Chapter 5, "Thermochemistry" B. The three laws of thermodynamics C. Entropy, including calculating the entropy of phase change and calculating the entropy change for a reaction using standard enthalpies D. The relationship between reaction spontaneity, enthalpy, entropy, and temperature E. Gibbs free energy, calculating the free energy change for a reaction using enthalpy and entropy information, or using standard Gibbs free energy of formation values F. The relationship between Gibbs free energy change and the equilibrium constants for reactions G. Gibbs free energy changes under non-standard conditions

Chapter 20 - Electrochemistry

A. Familiarity with all of the fundamental definitions, terms, and concepts that pertain to electron transfer chemistry in discussed in Chapter 4, "Aqueous Reactions and Solution Stoichiometry" B. Balancing redox reactions in acidic and basic solution C. Voltaic cells, including the components of a voltaic cell, standard reduction potentials, and the calculation of standard cell potentials D. The relationship between standard cell potential, Gibbs free energy changes, and equilibrium constants E. Cell potentials under non-standard conditions and the Nernst equation F. Electrolytic cells

Chapter 21 - Nuclear Chemistry

A. Fundamentals of ionizing radiation and radioactive emissions B. Reasons for radioactive decay and radioactive series C. Half-lives

Required Text or Materials

Title: Chemistry: The Central Science
ISBN: ISBN-13: 978-0-321-69672-4
Authors: Brown, Lemay, Bursten, Murphy, Woodward
Edition: 14

For more information on textbook accessibility, contact Accessibility & Disability Services at ads@slcc.edu.

Assignment Schedule

Due Date	Assignment Name	Assignment Type	Points
	Introduce Yourself	Discussion	0
	Introduce Yourself	Discussion	0
	Introduce Yourself	Discussion	0
8/28	Practice Problem Check 1	Assignment	100
9/19	Exam 1: Chapters 14-15 (Placeholder - Not an assignment)	Assignment	100
9/20	Canvas Quiz - Chapter 14	Quiz	100
9/20	Canvas Quiz - Chapter 15	Quiz	100
9/20	Chapter 14: Chemical Kinetics	Assignment	25
9/20	Chapter 15: Chemical Equilibrium	Assignment	21
9/25	Practice Problem Check 2	Assignment	100

Due Date	Assignment Name	Assignment Type	Points
10/29	Exam 2: Chapters 16-17 (Placeholder - Not an assignment)	Assignment	100
10/30	Practice Problem Check 3	Assignment	100
11/1	Canvas Quiz - Chapter 16	Quiz	100
11/1	Canvas Quiz - Chapter 17	Quiz	100
11/1	Chapter 16: Acid-Base Equilibrium	Assignment	16
11/1	Chapter 17: Additional Aspects of Equilibrium	Assignment	15
11/20	Practice Problem Check 4	Assignment	100
11/21	Exam 3: Chapters 19-20 (Placeholder - Not an assignment)	Assignment	100
11/22	Canvas Quiz - Chapter 19	Quiz	100
11/22	Canvas Quiz - Chapter 20	Quiz	100
11/22	Chapter 19: Chemical Thermodynamics	Assignment	13
11/22	Chapter 20: Electrochemistry	Assignment	11

Due Date	Assignment Name	Assignment Type	Points
12/6	Microscopy Summary - AFM (Exam 1-3 Extra Credit)	Assignment	0
12/6	Microscopy Summary - SEM (Exam 1-3 Extra Credit)	Assignment	0
12/6	Microscopy Summary - TEM (Exam 1-3 Extra Credit)	Assignment	0
12/10	Final Exam (Placeholder - Not an assignment)	Assignment	100

Brief Description of Assignments/Exams

Lecture and Assignment Information:

Prerecorded videos, associated PowerPoint lectures, Canvas quizzes, and Mastering Chemistry assignments can be accessed by clicking on the appropriate weekly module.

Canvas Quizzes:

All of your quizzes for the course will be administered online through Canvas. I never accept written or e-mail copies of quizzes. There will approximately one quiz for each chapter. You may use any book, including your text and course notes, magazines, or other printed or web-based materials you feel are helpful. You usually have at least a week to work on the quizzes, so the sooner you get started the better. If you have technical problems with the Canvas quizzes, I cannot help you with such difficulties. You will need to contact Computer Support at 801-957-5555 for all non-content related problems with Canvas. While taking quizzes, you may use the textbook , lecture notes, or web-based materials you feel are helpful. To reiterate, this “open book/notes” policy applies to Canvas quizzes and Mastering Chemistry homework. You can access the quizzes by clicking on the appropriate weekly module.

Exams:

There will be three in class exams and a final exam.

Exam 1 covering chapters 14 - 15

Exam 2 covering chapters 16 - 17

Exam 3 covering chapters 19 - 20

Cumulative final exam covering chapters 14 - 17, 19 - 21

A single page of notes (one-sided) is allowed. English language aids may be used by those eligible. A simple scientific calculator will be essential. It must be able to perform simple logarithmic functions.

Exam Make Up: You will be allowed one make-up for each exam that is missed. You will be given one week from the request date to make up the exam unless you have documentation stating extenuating circumstances (medical, legal, etc.). Email me with exam make up in the subject line if you need an assignment opened.

Mastering Chemistry Homework:

This is mandatory and an essential portion of your grade. As with Canvas, the homework must be completed before the posted closing date and time and within the time period allocated. You can access the quizzes by clicking on the appropriate chapter module.

Late Work Policy: You can request two assignment unlocks. You have one week after the due date to request an assignment unlock by email. Assignments will not be unlocked past the one-week request period.

Participation:

Lectures will include guided and independent practice problems worked and discussed in class. You will need to record the problems in a notebook. There will be four, in-class problem set/notebook checks that will count towards your participation grade (10% of your final average).

Grading Scale

In-Class Exams	25 %
Final Exam	25 %
Canvas Quizzes	20 %
Mastering Chemistry Homework Assignments	20 %
Participation	10 %
Total	100 %

Grade Breakdown	
A	93 – 100
A-	90 – 92
B+	87 – 89
B	83 – 86
B-	80 – 82
C+	77 – 79
C	73 - 76
C-	70 - 72
D	61 – 69
E	< 60

How to Navigate to Canvas

Institutional Policies

As members of our academic community, we would like to invite you to review the Institutional Syllabus which covers important policies and procedures. This document contains important links for students on the code of student rights and responsibilities, academic integrity, and grading policies, Title IX and other important acknowledgements. By familiarizing yourself with this information, you can help us create a safe and respectful environment for everyone.

You can access the document by clicking on the following link: https://slcc.instructure.com/courses/530981/pages/institutional-syllabus

Learning Support and Tutoring Services

We are pleased to offer a range of tutoring and learning support services to help you achieve your academic goals. Whether you need assistance with a specific subject or want to improve your study skills, you have many options for tutoring or other support.

To learn more about the services we offer and how to access them, please visit the Institutional Syllabus under the Tutoring and Learning Support tab: https://slcc.instructure.com/courses/530981/pages/institutional-syllabus. We encourage you to take advantage of these resources to help you succeed in your studies. If you have any questions or would like to schedule a tutoring session, please don't hesitate to reach out to us. We are here to support you in any way we can.

Advising and Counseling Support Services

At our institution, we are committed to supporting your academic and personal growth. That's why we offer a range of advising and counseling services to help you navigate the challenges of college life. To learn more about the resources available to you and how to access them, please visit the Institutional Syllabus under the Advising and Counseling Support Services tab: https://slcc.instructure.com/courses/530981/pages/institutional-syllabus. Our advising team and the support centers across campus are here to support you in achieving your goals and overcoming any obstacles you may face.

Student Academic Calendar

As students you should be aware of all important dates in the semester, such as the day that courses begin and end, as well as the drop date and the last day to withdraw. To learn more about those dates, navigate to the Student Academic Calendar below:

SLCC Student Academic Calendar

Additional Policies

Important Dates:

Please visit the following website for the complete academic calendar. Pay particular attention to add, drop, and withdraw dates.

http://www.slcc.edu/academiccalendar/index.aspx Links to an external site.

Students with Disabilities, Emergency Procedures, and other Relevant College Policies:

Please refer to the Institutional Syllabus page for important information.

https://slcc.instructure.com/courses/530981/pages/institutional-syllabus

Dropping the Course:

If you decide for any reason to discontinue this class, you must go through the process of dropping the class with SLCC. I cannot and will not do it for you. If you stop submitting work and do not drop the class, I am required to give you a grade based on the limited amount of work you have submitted, which could result in an “E”.

Academic Dishonesty:

Academic dishonesty will not be tolerated. Evidence of cheating or plagiarism will result in a score of zero for the assignment. A second offense will result in an E for the course grade. The same penalties will apply to anyone assisting the cheating efforts of others. Possession of outside materials, notes, communication devices, etc. during an exam without permission of the instructor is considered cheating.

Important Resources for Students:

Please review the Institutional Syllabus page for a complete listing of available College resources.

Tutoring - https://www.slcc.edu/tutoring/index.aspxLinks to an external site.

STEM Learning Centers - https://www.slcc.edu/stem/index.aspxLinks to an external site.

Provide free assistance in Math, Science, Accounting, CSIS and Allied Health Classes at 6 campus locations.

Weekly Schedule

Outline: The course will cover material presented in the text as follows:

Chapter Topic

14 Chemical Kinetics

15 Chemical Equilibrium

16 Acid-Base Equilibrium

17 Additional Aspects of Equilibrium

19 Chemical Thermodynamics

20 Electrochemistry

21 Nuclear Chemistry

Timeline:

Week of:	Topic:
August 19th	T: 14.1 - 14.2 Th: 14.3 - 14.4
August 26th	T: 14.5 - 14.7 Th: 15.1 - 15.2
September 2nd	T: 15.3 - 15.4 Th: 15.5
September 9th	T: 15.5 - 15.6 Th: 15.5 - 15.7

September 16th	T: Exam 1 Review Th: Exam 1: Chapters 14 - 15 Mastering Chemistry and Canvas Assignments for Chapters 14-15 Due by 11:59 pm Friday, September 20th Request period for Chapter 14-15 assignment unlocks ends Friday, September 27th,
September 23rd	T: 16.1 - 16.2 Th: 16.3 - 16.4
September 30th	T: 16.5 - 16.6 Th: 16.6
October 7th	T: 16.7 - 16.8 Th: 16.9 - 16.11
October 14th	T: 17.1 - 17.2 Th: 17.3 - 17.4
October 21st	T: 17.5 - 17.6 Th: Exam 2 Review
October 28th	T: Exam 2 Th: 19.1 - 19.3 Mastering Chemistry and Canvas Quizzes for Chapters 16-17 Due by 11:59 pm Friday, November 1st Request period for chapter 16-17 assignment unlocks ends Friday, November 8th
November 4th	T: 19.4 - 19.6 Th: 19.7/20.1 - 20.2
November 11th	T: 20.3 - 20.4

	Th: 20.5 - 20.6
November 18th	T: Exam 3 Review Th: Exam 3: Chapters 19-20 Mastering Chemistry and Canvas Quizzes for Chapters 19-20 Due by 11:59 pm Friday, November 22nd Request period for chapter 19-20 assignment unlocks ends Friday, November 29th
November 25th	T: 21.1 - 21.2 Th: Holiday - No Class
December 2nd	T: 21.3 - 21.4 Th: Final Exam Review
December 9th	Final Exam Scheduled for Tuesday, December 10th - 5:50 pm to 7:50 pm