SUL ROSS STATE UNIVERSITY
Syllabus for General Chemistry II-(CRN:21621)
CHEM 1312-2V1
Summer II 2026

General Chemistry II: Lecture (3 credits)
Room: Online Class (Blackboard)
Time: M, T, W, Th, F: 10:00-11:40 am
Date: 7/6/2026 to 8/12/2026

Instructor: Dr. Hong Young Chang
Office: WSB 219
Email: hxc19tv@sulross.edu
Office Hours: M-Th 3:00-4:30 pm
(via appointment and Zoom)

OBJECTIVES

Student Learning Objectives (SLO):

A student graduating with the ***chemistry major*** is expected to demonstrate that (s)he is able to do the following:

1. **Organic Chemistry**—Students will be able to draw organic molecular structures and explain organic reactions, stereochemistry, structural analysis and reactions in biological systems.

2. **Inorganic Chemistry**—The student will be able to demonstrate understanding of coordination chemistry, valence theory, elementary actions and advanced molecular theory.

3. **Analytical Chemistry**—The student will be able to demonstrate an understanding of theory of analytical chemistry and conduct analytical analysis, including data analysis and calibration, equilibrium chemistry, gravimetric analysis, titrimetric analysis, spectroscopic analysis, and electrochemical analysis.

4. **Physical Chemistry**—The student will be able to demonstrate an understanding of the application and theory of physical chemistry, including topics such as atomic structure, electrochemistry, surface chemistry, solid-state chemistry, and thermodynamics.

5. **Research**—The student will collect and analyze published chemical literature and undertake a chemistry research project.

BSc in Chemistry Marketable Skills

1. Students will become good at punctuality and time management.
2. Students will analyze &/or synthesize molecules and perform spectroscopic characterization and interpret their results scientifically.
3. Students will become proficient at writing scientific papers and identifying appropriate references for their papers.
4. Students will become proficient at orally presenting scientific topics including the use of visual aids.

General Chemistry II Learning Objectives:

At the end of this course, a student should have a good understanding of:

1. The basic concepts of intermolecular forces
2. Physical properties of solutions
3. The basic concepts of chemical kinetics and equilibrium
4. The concepts of acid and bases
5. Chemical equilibrium in acid-base reactions
6. Laws of thermodynamics: Gibbs free energy and reaction spontaneity
7. Redox reactions
8. Organic molecules and hydrocarbons

The following chapters will be covered in General Chemistry II:

Chapter 6: Energy Relationships in Chemical Reactions
Chapter 11: Introduction to Organic Chemistry
Chapter 12: Intermolecular Forces and Liquids and Solids

Chapter 13: Physical Properties of Solutions

Chapter 14: Chemical Kinetics

Chapter 15: Chemical Equilibrium

Chapter 16: Acids and Bases

Chapter 17: Acid-Base Equilibria and Solubility Equilibria

Chapter 18: Entropy, Free Energy, and Equilibrium

Core Objectives (CO):

1. **Critical Thinking Skills** – Students will gain/improve their critical thinking ability by solving real life chemistry problems through inquiry, analysis, and evaluation of available information. Students will be tested on their critical thinking ability in exams and through lab experiments.

2. **Communication Skills** – Students will have the opportunity of improving communication skills through oral discussion and writing reports (i.e. observation, explanation, and conclusion, etc.) on the experiments done in the lab sessions.

3. **Empirical and Quantitative Skills** – Students will use the mathematical skills needed to manipulate and analyze numerical data obtained through experimentation in order to form conclusions.

4. **Teamwork** – Students will use team spirit and consider different points of view to work effectively while conducting experiments as a team working toward a shared purpose or goal.

Textbook: "***General Chemistry: The Essential Concepts 14th Edition***" by Raymond Chang and Kenneth A. Goldsby, McGraw-Hill, New York, United States of America, **2023**. (Older editions, such as the 6th and 7th editions, are ok)

The SRSU library has one copy of the textbook of General Chemistry in the "Textbook Collection" section. Please ask at the library front desk if you need help finding this textbook.

Suggested Reading and References:

1. "***OpenStax Chemistry 2e***" https://openstax.org/details/books/chemistry-2e by Paul Flowers, Klaus Theopold, Richard Langley, etc.

2. "***Chemistry LibreTexts***" (Beginning Chemistry (Ball), Introductory, Conceptual, and GOB Chemistry - Chemistry LibreTexts

Web Availability: This course will be taught online. You also need to do your homework ***by "Blackboard" of SRSU.*** In addition, homework & assignments, and announcements, will be uploaded on the blackboard or by email.

Calculator: A scientific calculator is required for this course.

Cell phones, including **Earphones and Headsets, ARE NOT** permitted for use in exams and should be turned off during class time.

Homework & Assignments: There is homework for each chapter. ***Homework will be solved in the SRSU Blackboard (multiple-choice homework). You may try to solve the problem several times to attain the highest score. You need to keep the due date for each chapter. Their due date for each chapter will be notified.***

Examinations: There will be ***three midterm*** examinations and ***a final*** examination. The final is mandatory, and the comprehensive style will be published.

NO MAKE-UP EXAMS WILL BE GIVEN.

ATTENDANCE PRERESQUITE: BEING ABSENT FROM MORE THAN 4 LECTURES WILL RESULT IN FAILING THE COURSE.

PERCENTAGE BREAKDOWN OF MARKS:

Homework: 40% (each chapter has 25-35 problem sets)

Midterm Exams (13.3% each): 40%

Final Exam: 20%

Midterm Exam I: Tuesday, July 14th (covers Ch6 & Ch11)

(1hr, by CDT: 12:30 pm to 10:00 pm)

Midterm Exam II: Monday, July 27th (covers Ch12, Ch13 & Ch14)

(2hr, by CDT: 12:30 pm to 10:00 pm)

Midterm Exam III: Wednesday, August 5th (covers Ch15, Ch16 & Ch17)

(1hr, by CDT: 12:30 pm to 10:00 pm)

Final Exam: Wednesday, August 12th (covers all chapters, but Ch6, Ch12, Ch13 & Ch18 mainly occupy) (2 hours, by CDT: 12:30 am to 10:00 pm)

CHEM1312 Course Calendar

* This course calendar could be changed. In one week, your professor will let you know the changes.

Date	Lecture #	Chapter #	Topics	Due work
6-Jul	Lecture 1	Ch 6	Discussion on Syllabus. Importance of chemical energy, types of energy, energy changes in chemical reactions	
7-Jul	Lecture 2		The first law of thermodynamics, enthalpy of chemical reactions, and calorimetry.	
8-Jul	Lecture 3		Hess's law and standard enthalpy of formation & reaction. Discussion on selective questions and problems on Ch.6	
9-Jul	Lecture 4	Ch 11	Classification of organic compounds and aliphatic/aromatic hydrocarbons. Nomenclature on hydrocarbons & their structures and the functional groups of organic compounds	Ch6 HW

10-Jul	Lecture 5		Chirality-hardness of molecules and organic chemical reactions. Discussion on selective questions and problems on Ch. 11	
13-Jul	Lecture 6		**Review on Exam 1**	**Ch11 HW**
14-Jul	Lecture 7	Ch 12	Intermolecular forces act between molecules or between molecules and ions. The "van der Waals" intermolecular forces: dipole-dipole force (polar molecule and polar molecule), ion-dipole force (ion and polar molecule), dispersion force (nonpolar molecules).	
15-Jul	Lecture 8		Hydrogen bonding between N, O, or F and H. Surface tension is to expand a liquid surface area; Strong intermolecular forces lead to greater surface tension. Liquid-solid equilibrium, phase change & phase diagrams, Discussion on selective questions and problems on Ch. 12.	
16-Jul	Lecture 9	Ch 13	Factors affecting solubility, Types of solutions, Concentration units. According to Henry's law, the solubility of a gas in a liquid is propotional to the partial pressure.	**Ch12 HW**
17-Jul	Lecture 10		Raoult's law (PA = XA•PA°) states a partial pressure of a substance A over a solution is related to the mole fraction (XA) of A and the vapor pressure (P_A°)of pure	
20-Jul	Lecture 11		A. Colligative properties: Vapor pressure lowering, Boiling point elevation, Melting point depression, and Osmotic pressure. Discussion on selective questions and problems on Ch.13	
21-Jul	Lecture 12	Ch 14	Understanding of terminologies related to rate laws. Zero, first & second-order reactions	**Ch13 HW**

22-Jul	Lecture 13		Experimental rate laws, activation energy and temperature dependence of rate constant	
23-Jul	Lecture 14		Elementary reactions, reaction mechanisms, and catalysis. Experimental determination of rate laws. Discussion on selective questions and problems on Ch.14	
24-Jul	Lecture 15	Review	**Review on Exam 2**	
27-Jul	Lecture 16	Ch 15	Understanding the concepts of chemical equilibrium, equilibrium constants, reaction quotients, Expression of chemical equilibrium (K) Calculation of K constant by equilibrium concentrations, and factors affecting chemical equilibrium. Characteristics of Chemical Equilibrium Constant (K). Discussion on selective questions and problems on Ch.15	**CH 14 HW**
28-Jul	Lecture 17	Ch 16	Understanding concepts of acids and bases, acid-base properties of water, pH, strength of acids and bases, ionization constants of weak and bases, and percent ionization.	
29-Jul	Lecture 18		Ionization constants of conjugate acids-bases, Determination of pH for weak acids and bases using ICE tables	**CH 15 HW**
30-Jul	Lecture 19		Acid-base properties of salts, Lewis's acids and bases. Discussion on selective questions and problems on Ch. 16	
31-Jul	Lecture 20	Ch 17	Common ion effect in chemical equilibrium, Henderson-Hasselbalch equation. Strong acid-strong base titrations, weak acid-strong base titrations, acid-base indicators	**CH 16 HW**

3-Aug	Lecture 21		Solubility product, molar solubility, Calculation of Solubility Product Constant (Ksp), Discussion on selective questions and problems on Ch. 17	
4-Aug	Lecture 22	Review	**Review on Exam 3**	**CH 17 HW**
7-Aug	Lecture 23	Ch 18	The second law of thermodynamics, entropy changes in systems and surroundings, and the third law of thermodynamics on Chapter 18.	
10-Aug	Lecture 24		Gibbs free energy chemical equilibrium, and discussion on selective questions and problems on Chapter 18.	
11-Aug	Lecture 25	Review	**Review on Final**	**CH 18 HW**
12-Aug	Lecture 26	Exam	**Final Exam (it covers all chapters)**	

Libraries: The Bryan Wildenthal Memorial Library in Alpine offers FREE resources and services to the entire SRSU community. Access and borrow books, articles, and more by visiting the library's website, library.sulross.edu/. Off-campus access requires logging in with your LobolD and password. Librarians are a tremendous resource for your coursework and can be reached in person, by email (srsulibrary@sulross.edu), or by phone (432-837-8123). No matter where you are based, public libraries and many academic and special libraries welcome the general public into their spaces for study. SRSU TexShare Cardholders can access additional services and resources at various libraries across Texas. Learn more about the TexShare program by visiting library.sulross.edu/find-and-borrow/texshare/ or ask a librarian by emailing srsulibrary@sulross.edu.

New for Spring 2026: Mike Fernandez, SRSU Librarian, offers specialized library services to students, faculty, and staff. Utilize free services such as Interlibrary Loan (ILL) and Scant to get materials delivered to you at home or via email.

Academic Integrity: Students in this class are expected to demonstrate scholarly behavior and academic honesty in the use of intellectual property. Students should submit work that is their own and avoid the temptation to engage in behaviors that violate academic integrity, such as turning in work as original that was used in whole or part for another course and/or professor; turning in another person's work as one's own; copying from professional works or internet sites without citation; collaborating on a course assignment, examination, or quiz when collaboration is forbidden. Students should also avoid using open AI sources ***unless permission is expressly given*** for an assignment or course. Violations of academic integrity can result in failing assignments, failing a class, and/or more serious university consequences. These behaviors also erode the value of college degrees and higher education overall.

Counselling: Sul Ross has partnered with TimelyCare where all SR students will have access to nine free counseling sessions. You can learn more about this 24/7/356 support by visiting Timelycare/SRSU. The SR Counseling and Accessibility Services office will continue to offer in-person counseling in Ferguson Hall room 112 (Alpine campus), and telehealth Zoom sessions for remote students and RGC students.

Classroom Climate of Respect: Importantly, this class will foster free expression, critical investigation, and an open discussion of ideas. This means that all of us must help create and sustain an atmosphere of tolerance, civility, and respect for the viewpoints of others. Similarly, we must all learn how to probe, oppose, and disagree without resorting to tactics of intimidation, harassment, or personal attack. No one is entitled to harass, belittle, or discriminate against another on the basis of race, religion, ethnicity, age, gender, national origin, or sexual preference. Still, we will not be silenced by the difficulty of fruitfully discussing politically sensitive issues.

Distance Education: Students should correspond using Sul Ross email accounts and submit online assignments through Blackboard, which requires a secure login. Students enrolled in distance education courses at Sul Ross are expected to adhere to all policies pertaining to academic honesty and appropriate student conduct, as described in the student handbook. Students on web-based courses must maintain appropriate equipment and software, according to the needs and requirements of the course, as outlined on the SRSU website. Directions for filing student complaints are located in the student handbook.

SRSU Disability Services: ADA (Americans with Disabilities Act): *Sul Ross State University (SRSU) is committed to equal access in compliance with Americans with Disabilities Act of 1973. It is SRSU policy to provide reasonable accommodations to students with documented disabilities. It is the student's responsibility to initiate a request for accessibility service. Please contact Ms. Rebecca Greathouse Wren, M.Ed., LPC-S, Director/Counselor, Accessibility Services Coordinator, Ferguson Hall (Suite 112) at 432.837.8203; mailing address is P.O. Box C-122, Sul Ross State University, Alpine, Texas 79832. E-mail: rebecca.wren@sulross.edu Students should then contact the instructor as soon as possible to initiate the recommended accommodations.*

Scholastic Dishonesty: *Students who violate the University rules on scholastic dishonesty are subject to penalties, including the possibility of an **F** in the course and/or dismissal from the University.* ***All assignments (including homework) need to be individually completed and not copied from another student's work.***