

Sul Ross State University

Syllabus for General Chemistry I: CHEM 1311-001, CRN: 11590 (Fall 2023)

Class: General Chemistry I
Room: WSB101
Time: MWF: 10:00 to 10:50 AM
Date: Aug. 28 to Dec. 13, 2023

Instructor: Dr. Hong Young Chang
Office: WSB 219
Office Hours: M-R 3:00-5:00 pm
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Learning Objectives and Expected Outcomes for General Chemistry I Lecture and Lab:

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

1. The basic concepts and terms used in chemistry: Metric System, Mole, Matter, Energy in chemical process, application of the conservation of mass law, Chemical Formula, Ions and Molecules, etc.
2. The electronic structures of atoms and the periodic table trends
3. The basic concepts of chemical bonding (Covalent Bonding and ionic Bonding)
4. Chemical reactions in aqueous solutions; Evidence of chemical reactions, how to write chemical equations, and how to balance chemical equations.
5. The ideal gas equation; relations between volume, mass, and pressure

Text Book:

“[General Chemistry: The Essential Concepts 7th Edition](#)” by Raymond Chang and Kenneth A. Goldsby, McGraw-Hill, New York, United States of America, **2014**. (Older editions such as the 5th and 6th editions are ok to use).

Reference Book:

“[OpenStax Chemistry 2e](#)” <https://openstax.org/details/books/chemistry-2e> by Paul Flowers, Klaus Theopold, Richard Langley, etc.

“[Introductory Chemistry Concepts and Critical Thinking](#)” by Charles H. Corwin

The SRSU library has one copy of the textbook General Chemistry in the “Textbook Collection” section. Please ask the library front desk if you need help finding this textbook. For the “OpenStax Chemistry 2e”, you can free download the book file as a PDF. Among the two books described above, you can choose one.

Calculator: A scientific calculator is required for this course.

Web Availability: This course will be taught by face-to-face. However, you need to do your homework *by* “**Blackboard**” of **SRSU**. In addition, Homework & Assignments, and Announcements, will be uploaded on the blackboard or by email.

The following chapters will be covered in General Chemistry I:

Chapter 1: Basic Concepts: Classification of Matter; Physical and Chemical Properties of Matter

Chapter 2: Atoms, Molecules, and Ions

Chapter 3: Stoichiometry

Chapter 4: Reactions in Aqueous Solutions

Chapter 5: The Ideal Gas Equation

Chapter 7: The Electronic Structure of Atoms

Chapter 8: The Periodic Table

Chapters 9 and 10: Chemical Bonding

Homework & Assignments:

Homework will be assigned after learning one chapter. *The homework will be solved in the SRSU Blackboard (multiple choice homework). You may try to solve the problem sets several times to attain your highest score. You need to keep the due day for each chapter. The due date for each chapter will be notified.*

Examinations:

There will be *three midterm* examinations and *a final* examination. The final is mandatory and comprehensive. All exams will be taken on face to face.

NO MAKE-UP EXAMS WILL BE GIVEN.

NOTE: All exams MUST be completed in face to face with your pen!!

ATTENDANCE PREREQUISITE: BEING ABSENT FROM MORE THAN 9 LECTURES WILL RESULT IN FAILING THIS COURSE.

Percentage Breakdown of Marks:

Homework: 30% (Blackboard multiple-choice homework)

Each Midterm Exam (16.67%): 50%

Final Exam: 20%

Midterm Exam I: Wednesday, September 27 (it covers chapters 1 & 2)

Midterm Exam II: Monday, October 23 (it covers chapters 3, 4 & 5)

Midterm Exam III: Monday, November 13 (it covers chapters 7 & 8)

Final Exam: Friday, December 8 from 10:15 am -12:15 am as face-to-face in WSB 101

Academic Integrity:

Academic dishonesty hurts everyone and reduces the value of college degrees. Doing someone else's work, presenting the ideas and work of others as your own, submitting the same paper for multiple classes, and/or failing to cite your sources when you utilize the ideas of others, are all examples of academic dishonesty. It is your responsibility to read and understand the university's policy on academic dishonesty in the SRSU Student Handbook, as all violations will be taken seriously and handled through the appropriate university process. The Student Handbook can be found at: <https://www.sulross.edu/catalog/undergraduate-academic-regulations-2/#1605412215143-c8b265dc-3e01>

Course Calendar and Brief Description:

The following pages include the course calendar. You need to focus on the date, lecture number, chapter number, topics, homework due date, and examination days. This course calendar could be changed. Before one week, your professor will let you know the changes.

Date	Lecture #	Chapter #	Topic	Due work
Aug. 28	Lecture 1	Ch 1	Discussion on Syllabus, the importance of chemistry	
Aug.30	Lecture 2		Classifications of matter, an overview of states and properties of matter, physicals, and chemical changes, units of measurements (length, volume, density, temperature, etc.)	
Sep. 1	Lecture 3		Scientific notation and significant figures, precision and accuracy	
Sep. 6	Lecture 4		Discussion on selective questions and problems on chapter 1	
Sep. 8	Lecture 5	Ch 2	Dalton's atomic theory, discoveries of subatomic particles (electron, proton, and neutron), Rutherford's atomic model	Ch1 HW due
Sep. 11	Lecture 6		Atomic number, mass number, isotopes, molecules, compounds, ions, molecular formula, empirical formula	
Sep. 13	Lecture 7		Chemical nomenclature, naming of compounds, acids, bases, oxides, and oxoacids	
Sep. 15	Lecture 8		Discussion on selective questions and problems on chapter 2	
Sep. 18	Lecture 9	Ch 3	Molecular mass, mole, molar mass, atomic mass, formula mass and their relations	
Sep. 20	Lecture 10		Mole concept and mole calculation	Ch2 HW due

Sep. 22	Lecture 11		Chemical equations and balancing chemical equations	
Sep. 25	Lecture 12	Review & Test	Exam revision on chapter 1 & 2	
Sep. 27	Lecture 13		Exam 1 day (it covers ch1 and ch2)	
Sep. 29	Lecture 14	Ch 3	Calculations of product/reactant amounts using balanced	
Oct. 2	Lecture 15		Chemical equations, limiting reagents, and percent yields	
Oct. 4	Lecture 16		Discussion on selective questions and problems on chapter 3	
Oct. 6	Lecture 17	Ch 4	Terminologies related to solutions, electrolytes, non-electrolytes, precipitation reactions, writing balanced ionic equations	Ch3 HW Due
Oct. 9	Lecture 18		Acid-base reactions and oxidation numbers; oxidation-reduction reactions – types with examples	
Oct. 11	Lecture 19		Solution stoichiometry, concentration units, and gravimetric analysis	
Oct. 13	Lecture 20	Ch 5	Calculation of reactant/product amounts in gaseous reactions using ideal gas equation	Ch4 HW Due
Oct. 16	Lecture 21		Deviation of ideal gas properties, modification ideal gas law for real gases	
Oct. 18	Lecture 22		Discussion on selective questions and problems on chapter 5	
Oct. 20	Lecture 23	Review & Test	Exam Revision on chapter 3, 4, & 5	Ch5 HW due
Oct. 23	Lecture 24		Exam 2 day (it covers ch3, ch4, and ch5)	
Oct. 25	Lecture 25	Ch 7	Properties of light, black-body radiation and the photo-electric effect, Atomic spectra and Bohr atomic theory	
Oct. 27	Lecture 26		De Broglie equation, dual nature of particles, Schrodinger wave equation and orbital concept by 4 quantum numbers	
Oct. 30	Lecture 27		Electronic configuration-Aufbau principle, Hund's rule, Pauli exclusion principle	
Nov. 1	Lecture 28		Discussion on selective questions and problems on chapter 7	
Nov. 3	Lecture 29	Ch 8	Introductory discussion on periodic table, classification of elements and electronic configuration of ions	Ch7 HW due

Nov. 6	Lecture 30		Periodic variation of properties of elements, Group properties of elements	
Nov. 8	Lecture 31		Discussion on selective questions and problems on chapter 8	
Nov. 10	Lecture 32	Review & Test	Exam Revision on chapters 7 & 8	Ch8 HW due
Nov. 13	Lecture 33		Exam 3 day (it covers chapters 7 & 8)	
Nov. 15	Lecture 34	Ch 9	Basic concepts of chemical bonding, ionic bonds, lattice energy, covalent bonds, polar covalent bonds, and polarity	
Nov. 17	Lecture 35		Lewis structures of molecules, formal charge calculation, resonance structures and bond energy	
Nov. 20	Lecture 36		Discussion on selective questions and problems on chapter 9	
Nov. 27	Lecture 37	Ch 10	Molecular geometry – Valence shell electron repulsion theory	Ch9 HW due
Nov. 29	Lecture 38		Prediction of molecular geometry and polarity	
Dec. 1	Lecture 39		Discussion on selective questions and problems on chapter 10	
Dec. 4	Lecture 40	Review & Test	Review on final exam_1	
Dec. 6	Lecture 41		Review on final exam_2	
Dec. 8	Lecture 42		Final Exam day, Friday, 10:15AM to 12:15PM, WSB 101	

SLO, CO, Marketable Skills, ADA, Libraries, Counselling, etc. are also described in the next pages.

Student Learning Outcomes (SLO) by SACSCOC:

A student graduating with a *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 an 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 the 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 to identify appropriate references for their paper.
4. Students will be become proficient at orally presenting scientific topics including the use of visual aids.

The SLOs as Core Curriculum Courses:

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. In addition, students will have opportunities for simple self-assessments on critical thinking.
2. Communication Skills – Students will have the opportunity to improve communication skills through oral discussion and writing reports (i.e., observation, explanation, conclusion, etc.) on the experiments done in the lab sessions. In addition, students will have opportunities for simple self-assessments on communication skills.
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.

SRSU Disability Services: ADA (Americans with Disabilities Act):

Sul Ross State University (SRSU) is committed to equal access in compliance with the 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 each semester for each class. Students seeking accessibility/accommodations services must contact Mrs. Mary Schwartz Grisham, LPC, SRSU's Accessibility Services Director at 432-837-8203 or email mschwartz@sulross.edu. Our office is located on the first floor of Ferguson Hall, room 112, and our mailing address is P.O. Box C122, Sul Ross State University, Alpine, Texas, 79832.

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 LoboID 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 Fall 2023: Mike Fernandez, SRSU Librarian, is based in Eagle Pass (Building D-129) to offer 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 the 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 in 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 a student complaint are located in the student handbook.