

# Sul Ross State University

## Syllabus for General Chemistry I: CHEM 1311-1V1, CRN: 31246 (Summer Section I 2024)

**Class:** General Chemistry I  
**Room:** SRSU Blackboard  
**Time:** MTWRF: 9:00 to 10:40 AM  
**Date:** May. 29 to July. 3, 2024

**Instructor:** Dr. Hong Young Chang  
**Office:** WSB 219  
**Office Hours:** after appointment  
**Email:** hong.young.chang@sulross.edu

### 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 7<sup>th</sup> Edition](#)” by Raymond Chang and Kenneth A. Goldsby, McGraw-Hill, New York, United States of America, **2014**. (Older editions such as the 5<sup>th</sup> and 6<sup>th</sup> 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 freely 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 online. However, you need to do your homework *on the “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 online.

**NO MAKE-UP EXAMS WILL BE GIVEN.**

**ATTENDANCE PREREQUISITE: BEING ABSENT FROM MORE THAN 4 LECTURES WILL RESULT IN FAILING THIS COURSE.**

### **Percentage Breakdown of Marks:**

Homework: 40 % (Blackboard multiple-choice homework)

Each Midterm Exam (13.3 %): 40%

Final Exam: 20%

**Midterm Exam I: Friday, June 7<sup>th</sup> (covers Ch1 & Ch2)**

(1hr, by CDT: 1:00 pm to 8:00 pm)

**Midterm Exam II: Monday, June 17<sup>th</sup> (covers Ch3 & Ch4)**

(1hr, by CDT: 1:00 pm to 8:00pm)

**Midterm Exam III: Tuesday, June 26<sup>th</sup> (covers Ch5, Ch7 & Ch8)**

(1hr, by CDT: 1:00pm to 8:00pm)

**Final Exam: Wednesday, July 3<sup>rd</sup> (covers all chapters, but Ch3, Ch4, Ch9 & Ch10 mainly occupies)**  
(1:30 hours, by CDT: 1:00pm to 8:00pm)

**All Exams will be exposed on the blackboard. (Based on CDT, from 1:00 pm to 8:00 pm) You can choose your convenient time. All Exams will be done in non-class time.**

### 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          |
|--------|-----------|-----------|--|-------------------|
| 29-May | Lecture 1 | Ch 1      | Discussion on Syllabus, the importance of chemistry<br>Classifications of matter, an overview of states and properties of matter, physicals, and chemical changes, |                   |
| 30-May | Lecture 2 |           | Units of measurements (length, volume, density, temperature, etc.) scientific notation and significant figures, precision and accuracy                             |                   |
| 31-May | Lecture 3 | Ch 2      | Discussion on selective questions and problems in Chapter 1<br>Dalton's atomic theory, discoveries of subatomic particles (electron, proton, and neutron)          |                   |
| 3-Jun  | Lecture 4 |           | Rutherford's atomic model, atomic number, mass number, isotopes, molecules   | <b>Ch1 HW Due</b> |
| 4-Jun  | Lecture 5 |           | Compounds, ions, molecular formula, empirical formula<br>Chemical nomenclature, naming of compounds, acids, bases, oxides, and oxoacids                            |                   |
| 5-Jun  | Lecture 6 | Ch 3      | Discussion on selective questions and problems on chapter 2<br>Molecular mass and mole   |                   |
| 6-Jun  | Lecture 7 |           | Molar mass, atomic mass, formula mass and mole concepts with their relations<br><b>Review of Exam 1</b>  | <b>Ch2 HW Due</b> |

|        |            |      |   |                   |
|--------|------------|------|---|-------------------|
| 7-Jun  | Lecture 8  |      | <b>Exam 1 (It covers Ch1 &amp; 2)</b><br>Mole calculation exercise  |                   |
| 10-Jun | Lecture 9  |      | Chemical equations and balancing chemical equations with exercise   |                   |
| 11-Jun | Lecture 10 |      | Determination of a limiting reagent and calculation of percent yield. Discussion on selective questions and problems in Chapter 3   |                   |
| 12-Jun | Lecture 11 | Ch 4 | Terminologies related to solutions, electrolytes, non-electrolytes, precipitation reactions, writing balanced ionic equations   | <b>Ch3 HW Due</b> |
| 13-Jun | Lecture 12 |      | Acid-base reactions and oxidation numbers; oxidation-reduction reactions – types with examples  |                   |
| 14-Jun | Lecture 13 |      | Solution stoichiometry, concentration units, and gravimetric analysis. Discussion on selective questions and problems in Chapter 4<br><b>Review of Exam 2</b>   |                   |
| 17-Jun | Lecture 14 | Ch 5 | <b>Exam 2 (It covers Ch3 &amp; Ch4)</b><br>Ideal gas laws and ideal gas equation  | <b>Ch4 HW Due</b> |
| 18-Jun | Lecture 15 |      | Calculation of reactant/product amounts in gaseous reactions using the ideal gas equation. Deviation of ideal gas properties, modification of ideal gas law for real gases  |                   |
| 19-Jun | Lecture 16 | Ch 7 | Discussion on selective questions and problems in Chapter 5<br>Properties of light, black-body radiation and the photo-electric effect, atomic spectra, and Bohr atomic theory, De Broglie equation, dual nature of particles, Schrodinger wave equation, and orbital concept by four quantum numbers | <b>Ch5 HW Due</b> |
| 20-Jun | Lecture 17 |      | Electronic configuration-Aufbau principle, Hund's rule, Pauli exclusion principle   |                   |
| 21-Jun | Lecture 18 | Ch 8 | Discussion on selective questions and problems on chapter 7<br>Introductory on periodic table, Classification of elements and electronic configuration of ions  |                   |
| 24-Jun | Lecture 19 |      | Periodic variation of properties of elements, Group properties of elements. Discussion on selective questions and problems in Chapter 8   | <b>Ch7 HW Due</b> |
| 25-Jun | Lecture 20 | Ch 9 | Basic concepts of chemical bonding, ionic bonds, lattice energy, covalent bonds, polar covalent bonds, and polarity<br><b>Review of Exam 3</b>  |                   |

|        |            |        |   |                   |
|--------|------------|--------|---|-------------------|
| 26-Jun | Lecture 21 |        | <b>Exam 3 (It covers Ch5, Ch7, &amp; Ch8)</b>   |                   |
| 27-Jun | Lecture 22 |        | Lewis structures of molecules, formal charge calculation, resonance structures and bond energy  | <b>Ch8 HW Due</b> |
| 28-Jun | Lecture 23 |        | Exercise of drawing Lewis's structure and VSEPR theory, Valence electrons, Lewis's dot structures, Octet rules, ionic bonds, lattice energy (U), covalent bonds, covalent bond lengths, double bond and triple bond, polar covalent bonds and electronegativity |                   |
| 1-Jul  | Lecture 24 |        | Prediction of molecular geometries by VSEPR theory  |                   |
| 2-Jul  | Lecture 25 | Review | <b>Review of Final Exam</b>   |                   |
| 3-Jul  | Lecture 26 | Test   | <b>Final Exam (It covers Ch1, 2, 3, 4, 5, 7, 8, &amp; 9)</b>  |                   |

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 can 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](mailto: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/](http://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](mailto: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/](http://library.sulross.edu/find-and-borrow/texshare/) or ask a librarian by emailing [srsulibrary@sulross.edu](mailto: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 about 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.