

**Sul Ross State University**  
**Syllabus for General Chemistry I:**  
**CHEM 1311 W01- 31030 (Summer I, 2020)**

**Class:** General Chemistry I  
Room: only Web based Blackboard  
Time: TBA

**Instructor:** Dr. Hong Young Chang  
Office: WSB 219  
Office Hours: M-R 3:00-5:00pm via  
Zoom or phone  
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**Date:** May 20 to June 26, 2020

## **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.

### ***General Chemistry I Learning Objectives:***

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

1. The basic concepts and terms used in chemistry
2. The electronic structures of atoms and the periodic table
3. The basic concepts of chemical bonding
4. Chemical reactions in aqueous solutions
5. The ideal gas equation

### ***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.

**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 5th or 6th editions are ok to use).

**Calculator:** A scientific calculator is required for this course.

**Web availability:** This lecture is done *via only online class by “Blackboard” of SRSU*. There is no face-to-face attendance. Therefore, students have to set up their blackboard account to see the lecture video file. Download of Homework & Assignment, Announcements, and all exams will be done by the blackboard.

*The lecture video files will be uploaded on the blackboard after class. Students can see the files.*

The following chapters will be covered in General Chemistry I:

**Chapter 1:** Basic Concepts: Classification of Matter; Physical and Chemical Properties of Matter; Measurement; Handling Numbers; Dimensional Analysis in Solving Problems

**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

**Chapter 9 and 10:** Chemical Bonding

**Homework & Assignments:** There will be the problem-sets assigned for each chapter. In only this class, *Homework is to solve the given problem sets. Students who take this class do solve the problem sets in the blackboard. Multi-attempt will be given to solve the problem sets. The best score of your multi-attempts will be recorded as your final score for homework & assignment. Since all homework for each chapter has its due day, students have to finish their homework in the blackboard with keeping its due day.*

**Announcements:** Students have to keep the announcements from professor. Because the face-to-face approach is not possible, *students have to check their email all the time and they have to access their blackboard accounts frequently.*

**Examinations:** There will be *three midterm* examinations and *a final* examination. The final is mandatory and comprehensive. *All examinations are done inner blackboard of SRSU. In the limited time, the problem sets of all examinations will*

**be seen in the blackboard. Multiple-attempt is not allowed for all examinations.**  
**NO MAKE-UP EXAMS WILL BE GIVEN.**

**NOTE: Homework and Exams MUST be completed in the blackboard of SRSU!**

**ATTENDANCE: in the blackboard, the attendance of students and the access of blackboard will be check-out. There is no face-to-face attendance.**

### **PERCENTAGE BREAKDOWN OF MARKS:**

**Homework & Assignment: 50% (each chapter has 30-35 problem sets)**

**Midterm Exams (10% each): 30%**

**Final Exam: 20%**

**Midterm Exam I: Tuesday, June 2nd**

**Midterm Exam II: Tuesday, June 9th**

**Midterm Exam III: Wednesday, June 17th**

**Final Exam: Friday, June 26th**

### **Course Calendar**

**Lecture 1 (May 20):** Discussion on Syllabus; importance of chemistry; classifications of matter, overview of states and properties of matter, physical and chemical changes, units of measurements (length, volume, density, temperature etc.), scientific notation and significant figures

**Lecture 2 (May 21):** Precision and accuracy, Revision on Chapter 1; Dalton's atomic theory, discoveries of subatomic particles (electron, proton, and neutron), Rutherford's atomic model, atomic number, mass number, and isotopes

**Lecture 3 (May 22):** Molecules, compounds, ions, molecular formula and empirical formulas (**Homework 1 due**)

**NO CLASS on Monday May 25th (Memorial Day)**

**Lecture 4 (May 26):** Chemical nomenclature, naming of compounds, acids, bases, oxides, and oxoacids, review on Chapter 2

**Lecture 5 (May 27):** Molecular mass, mole, molar mass, atomic mass, and formula mass (Homework 2 due)

**Lecture 6 (May 28):** Chemical equations and balancing chemical equations, calculations of product/reactant amounts using balanced chemical equations, limiting reagents, and percent yields

**Lecture 7 (May 29):** Terminologies related to solutions, electrolytes, nonelectrolytes, precipitation reactions, writing balanced ionic equations, acid-base reactions; oxidation numbers; oxidation-reduction reactions- types with examples (Homework 3 due)

**Lecture 8 (June 1):** Solution stoichiometry, concentration units, and gravimetric analysis; revision on Chapter 4, physical properties of gases-relation between temperature, pressure, volume and amount of gases Exam Revision on Chapters 1, 2, and 3

**Lecture 9 (June 2): Exam I, Chapters 1, 2 & 3 (based on CDT, from 10:00 am to 6:00 pm, the exam I will be exposed on the blackboard)**

**Lecture 10 (June 3):** Ideal gas law and its applications, gas stoichiometry- calculation of reactant/product amounts in gaseous reactions using ideal gas equation

**Lecture 11 (June 4):** Kinetic theory of ideal gases, deviation of ideal gas, properties, modification of ideal gas law for real gases; revision on Chapter 5, properties of light, black-body radiation and photo-electric effect (Homework 4 due)

**Lecture 12 (June 5):** Atomic spectra and Bohr atomic theory De Broglie equation, dual nature of particles, Schrodinger wave, equation and orbital concept, electronic configuration-Aufbau principle, Hund's rule, paramagnetism (Homework 5 due)

**Lecture 13 (June 8):** Review on Chapter 7; Exam Revision on Chapters 4 and 5

**Lecture 14 (June 9): Exam II, Chapters 4 and 5 (based on CDT, from 10:00 am to 6:00 pm, the exam II will be exposed on the blackboard.)**

**Lecture 15 (June 10):** Introductory discussion on periodic table, classification of elements, electronic configuration of ions and periodic variation of properties of elements Group properties of elements (Homework 6 Due)

**Lecture 16 (June 11):** Revision on chapter 8; basic concepts of chemical bonding, ionic bonds, lattice energy

**Lecture 17 (June 12):** Calculation of lattice energy, covalent bonds, polar covalent bonds and polarity, Lewis structures of molecules (**Homework 7 due**)

**Lecture 18 (June 15):** Formal charge calculations, resonance structures and bond energy, revision on Chapter 9 (**Homework 8 due**)

**Lecture 19 (June 16):** Exam Revision on Chapters 7, 8 and 9

**Lecture 20 (June 17): Exam III, Chapters 7, 8 & 9 (based on CDT, from 10:00 am to 6:00 pm, the exam III will be exposed on the blackboard.)**

**Lecture 21 (June 18):** Molecular Geometry-Valence shell electron repulsion theory

**Lecture 22 (June 19):** Prediction of molecular geometry and polarity

**Lecture 23 (June 22):** Molecular geometry and valence bond theory

**Lecture 24 (June 23):** Molecular orbital theory, Revision on Chapter 10 (**Homework 9 due**)

**Lecture 25 (June 24):** Exam Revision, Chapters 1-4 (**Homework 10 due**)

**Lecture 26 (June 25):** Exam Revision, Chapters 5, 7, 8, 9, 10

**Final Exam (Friday June 26): Final Exam (based on CDT, from 10:00 am to 6:00 pm, the problem sets of final exam will be exposed on the blackboard)**

**Students with Special Needs:** *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](mailto: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.*