

# Sul Ross State University

## Syllabus for General Chemistry II:

### CHEM 1312 2W1- 31251 (Summer II, 2021)

**Class:** General Chemistry II  
Room: only web based Blackboard  
Time: 9:50 AM to 11:50

**Instructor:** Dr. Hong Young Chang  
Office: WSB 219  
Office Hours: M-R 3:00-5:00pm via  
Zoom or phone  
Email: hong.young.chang@sulross.edu  
Office Phone: (432) 837-8113

**Date:** July 7 to August 9, 2021

#### 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 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. Laws of thermodynamics
6. Redox reactions

***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 5<sup>th</sup> and 6<sup>th</sup> 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, online multiple choice homework, and all exams will be done by the blackboard.

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

The following chapters will be covered in General Chemistry II:

**Chapter 6:** Energy Relationships in Chemical Reactions

**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:** Thermodynamics

**Chapter 19:** Redox Reactions and Electrochemistry

**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. 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. All multiple choice style examinations will be given and students will take these examinations from 1:00PM to 9:00PM (not class time).* **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 would be check-out. *There is no face-to-face attendance.*

**PERCENTAGE BREAKDOWN OF MARKS:**

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

**Attendance (10%)** (Every day, your attendance will be checked.)

**Midterm Exams (13.3% each): 40%**

**Final Exam: 20%**

**Midterm Exam I: Tuesday, July 20<sup>th</sup> (covers Ch6, Ch12 & Ch13)**  
(70 minutes, by CDT: 1:00 pm to 9:00pm)

**Midterm Exam II: Tuesday, July 27<sup>th</sup> (covers Ch14 & Ch15)**  
(90 minutes, by CDT: 1:00 pm to 9:00pm)

**Midterm Exam III: Wednesday, August 4<sup>th</sup> (covers Ch16 & Ch17)**  
(70 minutes, by CDT: 1:00pm to 9:00pm)

**Final Exam: Monday, August 9<sup>th</sup> (covers all chapters, but Ch15, Ch16, Ch17, Ch18 & Ch19 will be mainly covered.)**  
(90 minutes, by CDT: 1:00pm to 9:00pm)

All Exams will be exposed on the blackboard. (Based on CDT, from 1:00 pm to 9:00 pm) You can choose your convenient time. **All Exams will be done in non-class time.**

**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.*

**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> In addition, please note that plagiarism detection software will be used in this class for written assignments.*

**Course Calendar:** The following pages includes the course calendar. You need to focus on date, lecture number, chapter number, topics, homework due day and examination days. This course calendar could be changed.

Date	Lecture #	Chapter #	Topic	Due work	Exam day
7-Jul	Lecture 1	Ch6	Discussion on Syllabus; Importance of chemistry; types of energy, energy changes in chemical reactions Thermochemistry		
8-Jul	Lecture 2		The first law of thermodynamics, enthalpy of chemical reactions, and calorimetry		
9-Jul	Lecture 3		Standard enthalpy of reaction and Hess's law Standard enthalpy of solution		
12-Jul	Lecture 4	Ch12	Types of intermolecular forces and properties of liquids	Due HW of Ch6	
13-Jul	Lecture 5		Crystal structure Bonding in solids		
14-Jul	Lecture 6		Phase changes, Liquid-vapor equilibrium, Critical temperature and Pressure, and phase diagrams		
15-Jul	Lecture 7	Ch13	types of solutions and concentration units Effect of temperature on solubility Effect of pressure on the solubility of gases	Due HW of Ch12	
16-Jul	Lecture 8		Colligative properties		
19-Jul	Lecture 9	Ch14	Chemical kinetics and its terminology related to rate laws	Due HW of Ch13	
20-Jul	Lecture 10		First & second order reactions and experimental determination of rate laws		Exam I
21-Jul	Lecture 11		Activation energy and temperature dependence of rate constants, elementary reactions, reaction mechanism, and catalysis		
22-Jul	Lecture 12	Ch15	the concepts of chemical equilibrium, and equilibrium constants Reaction quotients, calculation of equilibrium concentrations, and factors affecting chemical equilibrium	Due HW of Ch14	
23-Jul	Lecture 13		Le Chatelier's principle and the effect of catalyst		
26-Jul	Lecture 14	Ch16	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	Due HW of Ch15	

27-Jul	Lecture 15		Ionization constants of conjugate acids-bases, determination of pH for weak acids and bases using ICE tables		<b>Exam II</b>
28-Jul	Lecture 16		acid-base properties of salts, Acidic, basic, and amphoteric oxides Lewis acids and bases		
29-Jul	Lecture 17	Ch17	Solution equilibria and Buffer solution	Due HW of Ch16	
30-Jul	Lecture 18		a closer look at titration and acid-base indicators		
2-Aug	Lecture 19		Solubility equilibria and common ion effect and solubility		
3-Aug	Lecture 20	Ch18	The 3rd laws of thermodynamics and spontaneous processes and entropy	Due HW of Ch17	
4-Aug	Lecture 21		The 2nd laws of thermodynamics and Gibbs free energy Relations between Gibbs free energy and chemical equilibrium		<b>Exam III</b>
5-Aug	Lecture 22	Ch19	Redox reactions and galvanic cells Standard reaction potentials and thermodynamics of redox reactions	Due HW of Ch9	
6-Aug	Lecture 23		Concentration cells and batteries Corrosion and electrolysis	Due HW of Ch10	
9-Aug	Lecture 24		Final Exam day (via Blackboard), 2hrs		<b>Final Exam</b>