

**Sul Ross State University**  
**Syllabus for Organic Chemistry I: CHEM 2423 001 (Fall 2022)**  
**(CRN: 11393)**

**Class:** Organic Chemistry I  
**Room:** WSB 307  
**Time:** MWF 9:00-9:50am

**Instructor:** Dr. Hong Young Chang  
**Office:** WSB 219  
**Email:** hong.young.chang@sulross.edu  
**Office Phone:** (432) 837-8113  
**Office Hour:** M-R 2:00-4:30 pm

**OBJECTIVES:**

*Student Learning Objectives (SLO):*

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 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.

### ***Organic Chemistry Learning Objectives:***

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

1. The language of aliphatic-based organic chemistry
2. The major functional groups in organic compounds
3. Retrosynthetic analysis to design simple and complex organic molecules
4. Applications of thermodynamic and kinetic principles to predict regiochemical and stereochemical outcomes of organic reactions
5. Infrared (IR), nuclear magnetic resonance (NMR), and mass spectroscopy (MS)

### **REQUIRED RESOURCES AND TEXTS:**

#### ***TEXT BOOK:***

“Organic Chemistry” by T. W. Solomons, C. B. Fryle and S.A. Snyder (11<sup>th</sup> ed.), 2014, John Wiley & Sons

**The SRSU library has one copy of this textbook in the “Textbook Collection” section. Please ask the library front desk if you need help finding this textbook.**

Suggested reading: “Survival guide to organic chemistry: bridging the gap from general chemistry” by Patrick E. McMahan, Bohdan B. Khomtchouk, and Claes Wahlestedt, 2017, CRC Press, Taylor & Francis Group.

**SRSU Library Services: The Sul Ross Library 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 your LoboID and password. Check out materials using your photo ID. Librarians are a tremendous resource for your coursework and can be reached in person, by email ([srsulibrary@sulross.edu](mailto:srsulibrary@sulross.edu)), or phone (432-837-8123).

***Electronic Tool to Draw Chemical Structures:***

ACD/ChemSketch is a computer program that you can use to draw organic structures, organic reactions, etc. You can download ACD/ChemSketch) onto your own personal computer (PC or Mac): [ChemSketch Download for Academic and Personal Use | ACD/Labs \(acdlabs.com\)](http://www.acdlabs.com)

Make sure you follow the requirements for the password and use your SRSU email address to register.

The following chapters will be covered:

**Chapter 1: The Basics:** Bonding and Molecular Structure

**Chapter 2: Families of Carbon Compounds:** Functional Groups and Intermolecular Forces

**Chapter 3: Acids and Bases:** Introduction to Organic Reactions and Their Mechanisms

**Chapter 4: Nomenclature and Conformations of Alkanes and Cycloalkanes**

**Chapter 5: Stereochemistry:** Chiral Molecules Determination

**Chapter 6: Ionic Reactions:** Nucleophilic Substitution and Elimination Reactions  
of Alkyl Halides

## Chapter 7: Alkenes and Alkynes I: Properties & Synthesis

## Chapter 8: Alkenes and Alkynes II Addition Reactions

## Chapter 2.15: Infrared Spectroscopy & Chapter 9: Nuclear Magnetic Resonance (NMR) and Mass Spectrometry (MS): Tools for Structure

## Chapter 10: Radical Reactions

### ***HOMEWORK:***

There are two kinds of homework, Multiple Choice Homework (MCH) and Handy Homework (HH). All homework will be assigned for each chapter covered. MCH has to be done via the Blackboard of SRSU and HH has to be completed in pen. **NO LATE HOMEWORK WILL BE ACCEPTED.** HH homework has to be submitted into a paper using the given PDF. It is not accepted by email.

**NOTE: HH (Handy Homework) and Exams MUST be completed in pen!**

### ***EXAMINATIONS:***

There will be *three in-course* examinations and *a final* examination. **NO MAKE-UP EXAMS WILL BE GIVEN.** All examinations will be completed by **face-to-face**. The final exam is mandatory and comprehensive.

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

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

HH (Handy Homework): 10%  
MCH (Multiple Choice Homework): 15%  
Each Midterm Exam (18.3 %): 55%  
Final Exam: 20%

**Midterm Exam I:** Wednesday, September 21<sup>st</sup>

**Midterm Exam II:** Friday, October 21<sup>st</sup>

**Midterm Exam III:** Friday, November 18<sup>th</sup>

**Final Exam:** Tuesday, December 6<sup>th</sup> (8:00-10:00 am), WSB307

**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 each semester for each class. Students seeking accessibility/accommodations services must contact Rebecca Greathouse Wren, LPC-S, SRSU's Accessibility Services Coordinator at 432-837-8203 (please leave a message and we'll get back to you as soon as we can during working hours), or email [rebecca.wren@sulross.edu](mailto:rebecca.wren@sulross.edu). Their office is located on the first floor of Ferguson Hall (Room 112), and our mailing address is P.O. Box C-122, Sul Ross State University, Alpine, Texas, 79832.*

**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.*

- 1. All assignments and homework (including the multiple-choice homework (MCH)) need to be individually completed and not copied from another student's work.*
- 2. The multiple-choice homework (MCH) will disappear after each due time in the Blackboard of SRSU. Therefore, you need to keep the due day and time.*
- 3. The handy homework must be hand written and submitted to Dr. Chang directly. This handy homework will not be accepted by my email [.pdf format has to be used to submit]*

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

Date	Lecture #	Chapter #	Topics	Due work
Aug. 22	Lecture 1	Ch 1	Discussion on Syllabus, a background in organic chemistry	
Aug. 24	Lecture 2		An overview of chemical bonding Lewis structures and formal charges, resonance structure	
Aug. 26	Lecture 3		Basics of hybridization, bond lengths, geometric isomerism, and three-dimensional formulas	
Aug. 29	Lecture 4		Structural basics of hydrocarbons; revision on Chapter 1	
Aug. 31	Lecture 5	Ch 2	Introduction to functional groups	<b>Ch1 HW due</b>
Sep. 2	Lecture 6		Physical properties and molecular structure	
Sep. 5	Lecture 7		Lab day: Holiday, No Class	
Sep. 7	Lecture 8		Intermolecular forces; revision on Chapter 2	
Sep. 9	Lecture 9	Ch 3	Overview of acid-base theories and reactions	<b>Ch2 HW due</b>
Sep. 12	Lecture 10		Factors affecting acidity of compounds	
Sep. 14	Lecture 11		Introduction to organic acids and bases, acid-base reactions involving organic molecules	
Sep. 16	Lecture 12		Revision on Chapter 3	
Sep. 19	Lecture 13	Review & Test	Exam Revision	<b>Ch3 HW due</b>

Sep. 21	Lecture 14		<b>Exam1 day (it covers ch1, 2, &amp; 3)</b>	
Sep. 23	Lecture 15	Ch 4	Nomenclature and physical properties of alkanes and cycloalkanes and derivatives thereof	
Sep. 26	Lecture 16		Conformational isomerism of alkanes and cycloalkanes	
Sep. 28	Lecture 17		Synthesis of alkanes and index of hydrogen deficiency	
Sep. 30	Lecture 18		Revision on Chapter 4	
Oct. 3	Lecture 19		Isomerism, constitutional and stereoisomers, chiral molecules	<b>Ch4 HW due</b>
Oct. 5	Lecture 20	Ch 5	Nomenclature and physical properties of enantiomers	
Oct. 7	Lecture 21		Introduction to the synthesis of chiral molecules, molecules with more than one stereo-genic center.	
Oct. 10	Lecture 22		Revision on Chapter 5, Introduction to IR Spectroscopy	
Oct. 12	Lecture 23	Ch 2.15 & 9	IR Spectroscopy & NMR Spectroscopy	<b>Ch5 HW due</b>
Oct. 14	Lecture 24		NMR Spectroscopy and Mass Spectroscopy (MS)	
Oct. 17	Lecture 25		Revision on IR, NMR, and MS, Nucleophilic substitution reactions, basic mechanism, kinetics, and examples of S <sub>N</sub> 2	
Oct. 19	Lecture 26		Review & Test	Exam revision
Oct. 21	Lecture 27	<b>Exam 2 day (it covers ch4, 5, &amp; 9)</b>		
Oct. 24	Lecture 28	Ch 6	S <sub>N</sub> 1 reaction mechanism and stereochemistry of nucleophilic, factors affecting the rate of S <sub>N</sub> 1 and S <sub>N</sub> 2 reactions substitution reactions	

Oct. 26	Lecture 29		Functional group transformation using S <sub>N</sub> 2 reactions; Revision on Chapter 6	
Oct. 28	Lecture 30	Ch 7	Introduction to elimination reactions, E2 and E1 mechanisms and examples, and substitution vs elimination	<b>Ch6 HW due</b>
Oct. 31	Lecture 31		Synthesis of alkenes and alkynes by elimination reactions and acidity of terminal hydrogen of alkynes, hydrogenation of alkenes and alkynes	
Nov. 2	Lecture 32		Introduction to retrosynthetic analysis & addition reactions to alkenes; Chapter 7 Revision	
Nov. 4	Lecture 33	Ch 8	Addition of hydrogen halides to alkenes & synthesis of an alcohol from alkenes via addition reactions	<b>Ch7 HW due</b>
Nov. 7	Lecture 34		Addition of halogens to alkenes and alkynes, oxidation of alkenes and alkynes	
Nov. 9	Lecture 35		Revision on Chapter 8, free radical reactions of alkanes	
Nov. 11	Lecture 36		<b>Veterans' day, Holiday</b>	
Nov. 14	Lecture 37	Ch 10	Free radical reactions of alkenes	<b>Ch8 HW due</b>
Nov. 16	Lecture 38	Review & Test	Exam Revision	
Nov. 18	Lecture 39		<b>Exam 3 day (it covers Ch6, 7, &amp; 8)</b>	
Nov. 21	Lecture 40	Ch 10	Free radical reactions of alkenes, revision on Chapter 10	
Nov. 23	Lecture 41		<b>Thanksgiving Day: Holiday starts</b>	
Nov. 28	Lecture 42	Review & Test	Final exam revision_1	
Nov. 30	Lecture 43		Final exam revision_2	
Dec. 6	Lecture 44		<b>Final Exam Day, Tuesday, 8:00AM to 10:00AM, WSB307</b>	



