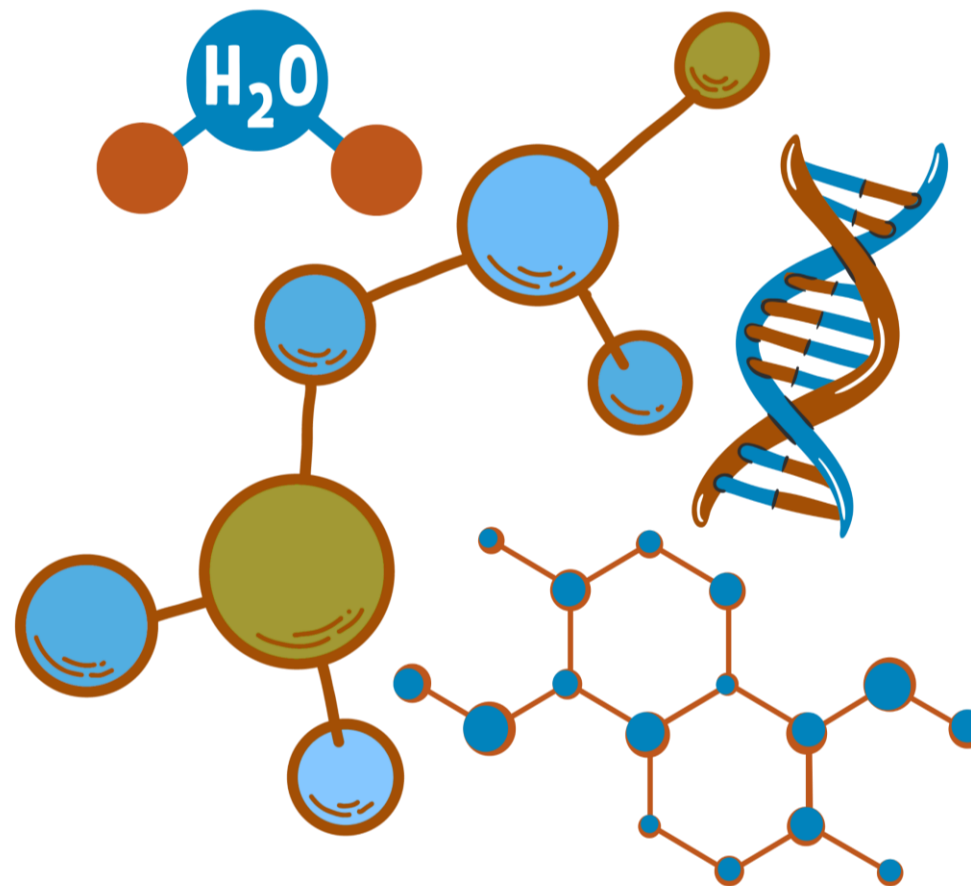


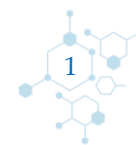
Chapter 0: Syllabus



Course Title and General Information

Course Code	Course Title	Program
CHEM 244	Principles of Organic Chemistry I	Chemical Engineering – College of Engineering

Credit Hours	Department	College
2 (2 Lectures + 0 Practical)	Chemistry Department	Science



Course Content Overview and Reference

Chapter 1	Introduction to Organic Chemistry
Carbon compounds and their chemical bonds (ionic and covalent), atomic and molecular orbitals, and hybridization.	
Chapter 2	Structure and Classification of Organic Compounds
Structure and classification of hydrocarbons, including alkanes, cycloalkanes, alkenes, alkynes, conjugated dienes, and aromatic compounds. Alkyl groups, configuration and conformational analysis of cyclohexanes, resonance and stability of conjugated systems, allylic species, aromaticity and Hückel's rule, polynuclear aromatic compounds, alkyl halides, and optical isomerism. Natural sources of hydrocarbons, petroleum refining, and octane number.	
Chapter 3	Nomenclature of Organic Compounds
IUPAC nomenclature of alkyl groups, alkanes, cycloalkanes, alkenes, alkynes, aromatic compounds, and alkyl halides.	

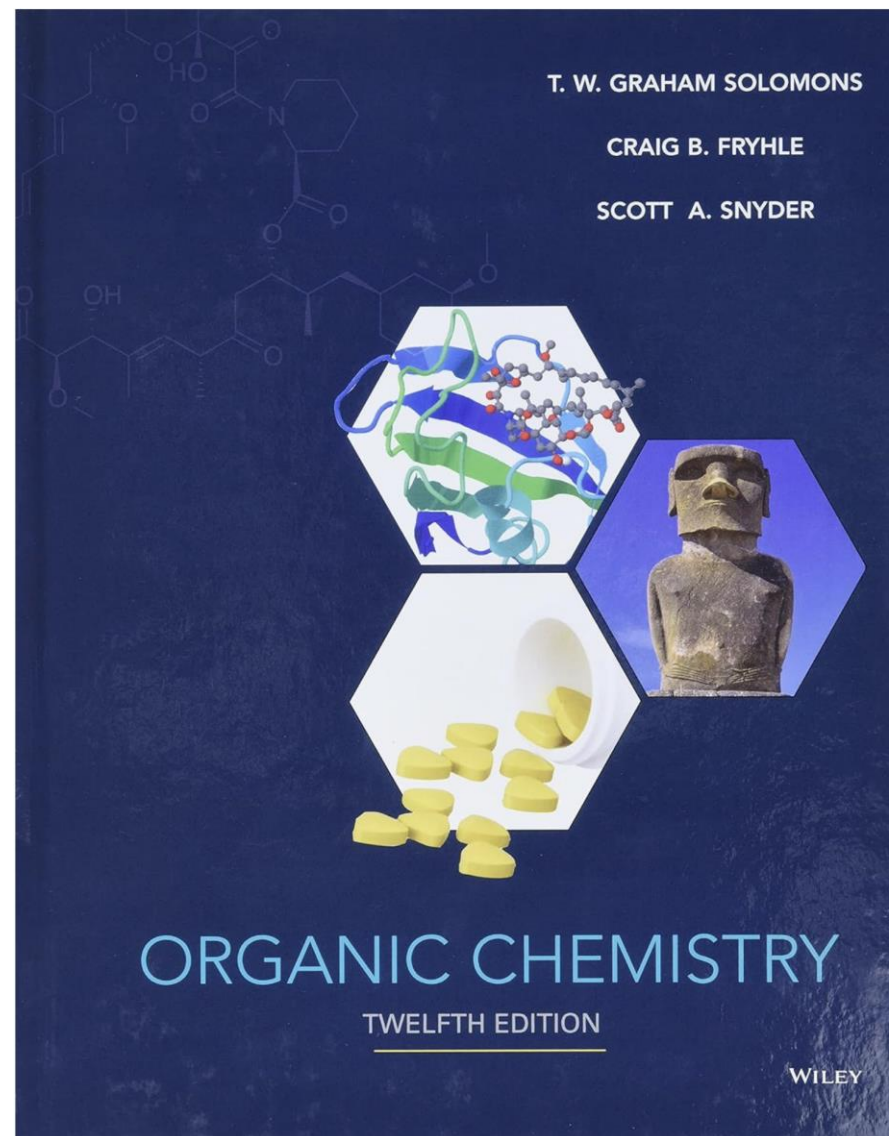
Course Content Overview and Reference

Chapter 4	Properties and Intermolecular Forces
Physical properties of organic compounds and intermolecular forces, including van der Waals forces, London dispersion forces, dipole–dipole interactions, and hydrogen bonding. Physical properties of hydrocarbons, including boiling points and solubility. Resonance and stability of conjugated dienes and benzene. Polarity and inductive effect. Acid–base concepts.	
Chapter 5	Organic Reactions
<u>Elimination Reactions:</u> Preparation of alkenes and alkynes by elimination reactions. E1 and E2 mechanisms. <u>Electrophilic Addition Reactions:</u> Addition reactions of alkenes and alkynes. Electrophilic addition to conjugated dienes, including 1,2- and 1,4-addition. Cycloaddition reactions of conjugated dienes. <u>Free Radical Reactions:</u> Free radical halogenation of alkanes and cycloalkanes. Allylic halogenation and related radical reactions. <u>Electrophilic Aromatic Substitution Reactions:</u> Electrophilic substitution reactions of aromatic compounds, including halogenation, nitration, sulphonation, alkylation, and acylation. Reactivity and orientation in substituted benzenes. <u>Nucleophilic Reactions:</u> Nucleophilic substitution reactions of alkyl halides, including SN1 and SN2 mechanisms. Preparation of alkyl halides through nucleophilic substitution reactions. <u>Oxidation and Reduction Reactions:</u> Combustion and oxidation reactions of hydrocarbons. Oxidation of alkenes, alkynes. Oxidation of alkylbenzene side chains and related oxidation and reduction reactions.	

Reference

Reference

Solomons, T. W. Graham, Fryhle, Craig B., & Snyder, Scott A. (2016). Organic Chemistry (12th ed.). Hoboken, NJ: John Wiley & Sons, Inc. ISBN 978-1-118-87576-6.



Course Objectives

Explain fundamental concepts of organic chemistry, including carbon compounds, chemical bonding, atomic and molecular orbitals, and hybridization.	Identify and classify major organic compounds based on their structures, including alkanes, cycloalkanes, alkenes, alkynes, conjugated dienes, aromatic hydrocarbons, and alkyl halides, and describe their natural sources.	Apply IUPAC nomenclature rules systematically to name major classes of hydrocarbons and alkyl halides.
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Course Objectives

Explain physical properties of organic compounds with intermolecular forces, resonance, polarity, and inductive effects, and apply acid–base concepts.	Explain and predict fundamental organic reactions and their mechanisms, including elimination, electrophilic addition, free-radical reactions, electrophilic aromatic substitution, nucleophilic substitution, and oxidation–reduction reactions.
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Course Learning Outcomes

Knowledge	Skills	Values
▪ To recognize the basic knowledge of IUPAC nomenclature, isomerism, physical properties and chemical reactions of organic compounds. ▪ To define and reproduce scientific information about organic compounds (aliphatic and aromatic).	▪ To integrate and evaluate chemical information and data in order to gain a coherent understanding of organic chemistry. ▪ To analyze and interpret chemical data by applying chemical and physical concepts.	▪ To apply team-working skills to address chemistry problems and coordinate effectively whether in a leadership role or as a member of group.

Assessment Methods and Weighting

No.	Assessment Task	Points
1	1 st Midterm Exam	20
2	2 st Midterm Exam	20
3	5 Quizzes	10
4	Presentation	10
5	Final Exam	40
Total		100



Instructions for Computer-Based Exams (QQ)

1	Only one device is allowed (using only smartphone or tablet) with the QQ application installed. Using any additional device or a different application is forbidden per the regulations and policies governing the computerized examinations.
2	The device battery level must be above 50%, and power-saving mode must be disabled.
3	Ensure a stable internet connection before starting the exam.
4	Prior to entering the examination, students must verify their ability to access the application. In case of any technical issues prior to the exam, a support request must be submitted via: https://its.ksu.edu.sa
5	The exam access code will be provided only once and will not be repeated again.

6	After starting the exam, closing the screen or using the device for any other purpose is prohibited.
7	Bring a pen; a paper draft sheet will be provided and must be turned in after exam completion and prior to leaving the exam's room.
8	Any technical issues/malfunctions during the exam must be reported immediately to the invigilator.
9	Students are not permitted to leave before half of the allotted time has elapsed.
10	Important Note: All exams of this course (Quizzes, midterms and final) are conducted exclusively via the QQ application. NO paper-based exam will be administered under any circumstances.



Regulations for Attendance, Absence, and Alternative Examinations

Item	Limit/Rule
Semester Length	14 weeks (28 lectures)
Allowed Absence	25% = max 7 lectures
Lecture Duration	1 lecture $\times$ 50 min per day (1 academic hour)
Max Absence in Hours	7 academic hours (8 days)
Absence Excuses	Submit <i>via</i> e-mail to course instructor
Alternative Examination Regulations	1. Student must not have taken the Primary Examination. 2. Student must not be denied in the course. 3. Request must be submitted to course instructor within one week of the Primary Examination date. 4. Excuse must be official and government-approved. 5. No alternative for an alternative examination.

*Good
Luck*

