



Course Syllabus

1	Course title	Organic Chemistry for non-major chemistry	
2	Course number	0333233	
3	Credit hours	3 theory	
	Contact hours (theory, practical-major)	3 hours theory/week	
4	Prerequisites/corequisites		
5	Program title		
6	Program code	NA	
7	Awarding institution	The University of Jordan	
8	School	Science	
9	Department	Chemistry	
10	Course level	2 nd Level	
11	Year of study and semester (s)	2023 -2024, 1 st Semester	
12	Other department (s) involved in teaching the course	B.Sc.	
13	Main teaching language	English	
14	Delivery method	<input checked="" type="checkbox"/> Face to face learning <input type="checkbox"/> Blended <input type="checkbox"/> Fully online	
15	Online platforms(s)	<input type="checkbox"/> Moodle <input type="checkbox"/> Microsoft <input checked="" type="checkbox"/> Teams <input type="checkbox"/> Skype <input type="checkbox"/> Zoom <input type="checkbox"/> Others.....	
16	Issuing/Revision Date	20/06/2023	

17 Course Coordinator:

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19 Course Description:



The course covers the topics: Hydrocarbons, alkanes, cycloalkanes, alkenes, alkynes, aromatic compounds, stereochemistry, halides, alcohols, phenols, ethers, amines, carbonyl compounds and carboxylic acids.

20 Course aims and learnings outcomes (CLOs):

A- Course Learning Outcomes: 0333233 Organic Chemistry for non-major chemistry

- CLO-1.** Recognize the different functional groups of organic compounds and their nomenclature, structure, properties, reactions, mechanisms and synthesis.
- CLO-2.** Apply their knowledge, understanding and critical thinking in solving problems in organic chemistry.
- CLO-3.** Relate the structure of organic compounds with their reactivity and properties.
- CLO-4.** View organic molecules in three dimensions and understand their stereochemistry.

B- Students Learning Outcomes (SLOs):

- SO-1. Problem Solving: Graduates will be able to apply mathematical and scientific knowledge to identify, formulate, and solve technical or scientific problems relevant to the discipline of chemistry.
- SO-2. Design: Graduates will be able to use their understanding of chemistry concepts and principles to formulate and design systems, processes, procedures, or programs to meet desired goals and outcomes.
- SO-3. Experimental Skills: Graduates will be able to design, conduct, and analyze experiments or test hypotheses, utilizing appropriate chemical techniques and scientific judgment to draw meaningful conclusions.
- SO-4. Communication: Graduates will be able to communicate scientific information effectively and accurately to a range of audiences, including both technical and non-technical audiences.
- SO-5. Ethics and Global Context: Graduates will understand and apply ethical and professional responsibilities in the context of the impact of technical and scientific solutions on global, economic, environmental, and societal issues.
- SO-6. Teamwork: Graduates will be able to work effectively as part of a team, establishing goals, planning tasks, meeting deadlines, and analyzing risk and uncertainty in the context of chemistry-related projects and initiatives.
- SO-7. Handling Chemicals: An ability to apply the proper procedures for safe handling of chemicals.

0333233 Organic Chemistry for non-major chemistry		Student Outcomes (SO)						
		SO-1	SO-2	SO-3	SO-4	SO-5	SO-6	SO-7
Course Learning Outcomes (CLO)	CLO-1	✓	✓					
	CLO-2	✓	✓					
	CLO-3	✓	✓					
	CLO-4	✓	✓					

21. Topic Outline and Schedule:

	Lecture	Topic	Student Learning Outcome	Learning Methods (Face to Face/Blended/ Fully Online)	Platform	Evaluation Methods	Resources
1	1.1	Bonding and Isomerism How Electrons Are Arranged in Atoms. Ionic and Covalent Bonding. Carbon and the Covalent Bond. Carbon–Carbon Single Bonds.		Face to Face	Classroom	First exam, Final exam	Organic Chemistry, A Short Course, 13th Ed Hart, Hadad Craine & Hart
	1.2	Multiple Covalent Bonds. Valence. Isomerism. Writing Structural Formulas. Abbreviated Structural Formulas. Formal Charge. Resonance.	SO-1 & SO-2	Face to Face	Classroom	First exam, Final exam	Organic Chemistry, A Short Course, 13th Ed Hart, Hadad Craine & Hart
	1.3	Polar Covalent Bonds. Arrow Formalism. The Orbital View of Bonding; the Sigma Bond Carbon sp^3 Hybrid Orbitals. Tetrahedral Carbon; the Bonding in Methane. Classification According to Functional Group.	SO-1 & SO-2	Face to Face	Classroom	First exam, Final exam	Organic Chemistry, A Short Course, 13th Ed Hart, Hadad Craine & Hart
2	2.1	Alkanes and Cycloalkanes; Conformational and Geometric Isomerism The Structures of Alkanes. Nomenclature of Organic Compounds. IUPAC Rules for Naming Alkanes.	SO-1 & SO-2	Face to Face	Classroom	First exam, Final exam	Organic Chemistry, A Short Course, 13th Ed Hart, Hadad Craine & Hart
	2.2	Alkyl and Halogen Substituents. Use of the IUPAC Rules.	SO-1 & SO-2	Face to Face	Classroom	First exam, Final exam	Organic Chemistry, A Short Course, 13th Ed Hart, Hadad Craine & Hart

	2.3	Sources of Alkanes. Physical Properties of Alkanes and Nonbonding Intermolecular Interactions.	SO-1 & SO-2	Face to Face	Classroom	First exam, Final exam	Organic Chemistry, A Short Course, 13th Ed Hart, Hadad Craine & Hart
3	3.1	Conformations of Alkanes. Cycloalkane Nomenclature and Conformation.	SO-1 & SO-2	Face to Face	Classroom	First exam, Final exam	Organic Chemistry, A Short Course, 13th Ed Hart, Hadad Craine & Hart
	3.2	<i>Cis-Trans</i> Isomerism in Cycloalkanes. Summary of Isomerism.	SO-1 & SO-2	Face to Face	Classroom	First exam, Final exam	Organic Chemistry, A Short Course, 13th Ed Hart, Hadad Craine & Hart
	3.3	Reactions of Alkanes. The Free-Radical Chain Mechanism of Halogenation.	SO-1 & SO-2	Face to Face	Classroom	First exam, Final exam	Organic Chemistry, A Short Course, 13th Ed Hart, Hadad Craine & Hart
4	4.1	Alkenes and alkynes Definition and Classification. Nomenclature. Some Facts about Double Bonds. The Orbital Model of a Double Bond. <i>Cis-Trans</i> Isomerism in Alkenes.	SO-1 & SO-2	Face to Face	Classroom	First exam, Final exam	Organic Chemistry, A Short Course, 13th Ed Hart, Hadad Craine & Hart
	4.2	Addition and Substitution Reactions Compared. Polar Addition Reactions. Addition of Unsymmetric Reagents to Unsymmetric Alkenes;	SO-1 & SO-2	Face to Face	Classroom	First exam, Final exam	Organic Chemistry, A Short Course, 13th Ed Hart, Hadad Craine & Hart
	4.3	Markovnikov's Rule. Mechanism of Electrophilic Addition to Alkenes. Markovnikov's Rule Explained. Hydroboration of Alkenes. Addition of Hydrogen. Additions to Conjugated Systems. Electrophilic Additions to Conjugated Dienes. Oxidation of Alkenes.	SO-1 & SO-2	Face to Face	Classroom	First exam, Final exam	Organic Chemistry, A Short Course, 13th Ed Hart, Hadad Craine & Hart
5	5.1	Some Facts About Triple Bonds. The Orbital Model of a Triple Bond. Addition Reactions of Alkynes. Acidity of Alkynes.	SO-1 & SO-2	Face to Face	Classroom	Mid exam, Final exam	Organic Chemistry, A Short Course, 13th Ed Hart, Hadad Craine & Hart

	5.2	Aromatic Compounds Some Facts About Benzene. The Kekulé Structure of Benzene. Resonance Model for Benzene. Orbital Model for Benzene. Symbols for Benzene. Nomenclature of Aromatic Compounds.	SO-1 & SO-2	Face to Face	Classroom	Mid exam, Final exam	Organic Chemistry, A Short Course, 13th Ed Hart, Hadad Craine & Hart
	5.3	The Resonance Energy of Benzene. Electrophilic Aromatic Substitution. The Mechanism of Electrophilic Aromatic Substitution.	SO-1 & SO-2	Face to Face	Classroom	Mid exam, Final exam	Organic Chemistry, A Short Course, 13th Ed Hart, Hadad Craine & Hart
6	6.1	Ring-Activating and Ring-Deactivating Substituents. <i>Ortho</i> , <i>Para</i> -Directing and <i>Meta</i> -Directing Groups. The Importance of Directing Effects in Synthesis.	SO-1 & SO-2	Face to Face	Classroom	Mid exam, Final exam	Organic Chemistry, A Short Course, 13th Ed Hart, Hadad Craine & Hart
	6.2	Stereoisomerism Chirality and Enantiomers. Stereogenic Centers; the Stereogenic Carbon Atom.	SO-1 & SO-2	Face to Face	Classroom	Mid exam, Final exam	Organic Chemistry, A Short Course, 13th Ed Hart, Hadad Craine & Hart
	6.3	Configuration and the <i>R-S</i> Convention. The <i>E-Z</i> Convention for <i>Cis-Trans</i> Isomers. Polarized Light and Optical Activity. Properties of Enantiomers.	SO-1 & SO-2	Face to Face	Classroom	Mid exam, Final exam	Organic Chemistry, A Short Course, 13th Ed Hart, Hadad Craine & Hart
7	7.1	Fischer Projection Formulas. Compounds with More Than One Stereogenic Center;	SO-1 & SO-2	Face to Face	Classroom	Mid exam, Final exam	Organic Chemistry, A Short Course, 13th Ed Hart, Hadad Craine & Hart
	7.2	Diastereomers. <i>Meso</i> Compounds;	SO-1 & SO-2	Face to Face	Classroom	Mid exam, Final exam	Organic Chemistry, A Short Course, 13th Ed Hart, Hadad Craine & Hart
	7.3	Stereochemistry: A Recap of Definitions. Stereochemistry and Chemical Reactions. Resolution of a Racemic Mixture.	SO-1 & SO-2	Face to Face	Classroom	Mid exam, Final exam	Organic Chemistry, A Short Course, 13th Ed Hart, Hadad Craine & Hart
8	8.1	Organic Halogen Compounds; Substitution	SO-1 & SO-2	Face to Face	Classroom	Mid exam, Final exam	Organic Chemistry, A Short Course, 13th Ed

		and Elimination Reactions Nucleophilic Substitution. Examples of Nucleophilic Substitutions. Nucleophilic Substitution Mechanisms.					Hart, Hadad Craine & Hart
	8.2	The SN2 Mechanism. The SN1 Mechanism. The SN1 and SN2 Mechanisms Compared.	SO-1 & SO-2	Face to Face	Classroom	Mid exam, Final exam	Organic Chemistry, A Short Course, 13th Ed Hart, Hadad Craine & Hart
	8.3	Dehydrohalogenatio, an Elimination Reaction; the E2 and E1 Mechanisms. Substitution and Elimination in Competition	SO-1 & SO-2	Face to Face	Classroom	Mid exam, Final exam	Organic Chemistry, A Short Course, 13th Ed Hart, Hadad Craine & Hart
9	9.1	Alcohols, Phenols and Thiols Nomenclature of Alcohols Classification of Alcohols. Nomenclature of Phenols. Hydrogen Bonding in Alcohols and Phenols	SO-1 & SO-2	Face to Face	Classroom	Mid exam, Final exam	Organic Chemistry, A Short Course, 13th Ed Hart, Hadad Craine & Hart
	9.2	Acidity and Basicity Reviewed. The Acidity of Alcohols and Phenols. The Basicity of Alcohols and Phenols Dehydration of Alcohols to Alkenes. The Reaction of Alcohols with Hydrogen Halides.	SO-1 & SO-2	Face to Face	Classroom	Mid exam, Final exam	Organic Chemistry, A Short Course, 13th Ed Hart, Hadad Craine & Hart
	9.3	Other Ways to Prepare Alkyl Halides from Alcohols. A Comparison of Alcohols and Phenols. Oxidation of Alcohols to Aldehydes, Ketones, and Carboxylic Acids	SO-1 & SO-2	Face to Face	Classroom	Mid exam, Final exam	Organic Chemistry, A Short Course, 13th Ed Hart, Hadad Craine & Hart
10	10.1	Alcohols with More Than One Hydroxyl Group. Aromatic Substitution in Oxidation of Phenols. Phenols as Antioxidants. Thiols, the Sulfur Analogs of Alcohols and Phenols.	SO-1 & SO-2	Face to Face	Classroom	Mid exam, Final exam	Organic Chemistry, A Short Course, 13th Ed Hart, Hadad Craine & Hart
	10.2	Reactions of Ethers: Acidic Cleavage Reactions of Ethers: Claisen Rearrangement	SO-1 & SO-2	Face to Face	Classroom	Mid exam, Final exam	Organic Chemistry, A Short Course, 13th Ed Hart, Hadad Craine & Hart

	10.3	Cyclic Ethers: Epoxides Reactions of Epoxides: Ring-Opening	SO-1 & SO-2	Face to Face	Classroom	Mid exam, Final exam	Organic Chemistry, A Short Course, 13th Ed Hart, Hadad Craine & Hart
1 1	11.1	Thiols and Sulfides Spectroscopy of Ethers	SO-1 & SO-2	Face to Face	Classroom	Mid exam, Final exam	Organic Chemistry, A Short Course, 13th Ed Hart, Hadad Craine & Hart
	11.2	Ethers and Epoxides Nomenclature of Ethers Physical Properties of Ethers Ethers as Solvents The Grignard Reagent; an Organometallic Compound	SO-1 & SO-2	Face to Face	Classroom	Mid exam, Final exam	Organic Chemistry, A Short Course, 13th Ed Hart, Hadad Craine & Hart
	11.3	Preparation of Ethers. Cleavage of Ethers. Epoxides (Oxiranes) Reactions of Epoxides	SO-1 & SO-2	Face to Face	Classroom	Mid exam, Final exam	Organic Chemistry, A Short Course, 13th Ed Hart, Hadad Craine & Hart
1 2	12.1	Aldehydes and Ketones Nomenclature of Aldehydes and Ketones. Some Common Aldehydes and Ketones. Synthesis of Aldehydes and Ketones. Aldehydes and Ketones in Nature.	SO-1 & SO-2	Face to Face	Classroom	Final exam	Organic Chemistry, A Short Course, 13th Ed Hart, Hadad Craine & Hart
	12.2	The Carbonyl Group. Nucleophilic Addition to Carbonyl Groups: An Overview. Addition of Alcohols: Formation of Hemiacetals and Acetals.	SO-1 & SO-2	Face to Face	Classroom	Final exam	Organic Chemistry, A Short Course, 13th Ed Hart, Hadad Craine & Hart
	12.3	Addition of Water; Hydration of Aldehydes and Ketones. Addition of Grignard Reagents and Acetylides. Addition of Hydrogen Cyanide; Cyanohydrins.	SO-1 & SO-2	Face to Face	Classroom	Final exam	Organic Chemistry, A Short Course, 13th Ed Hart, Hadad Craine & Hart
1 3	13.1	Addition of Nitrogen Nucleophiles. Reduction of Carbonyl Compounds. Oxidation of Carbonyl Compounds.	SO-1 & SO-2	Face to Face	Classroom	Final exam	Organic Chemistry, A Short Course, 13th Ed Hart, Hadad Craine & Hart

	13.2	<p>Carboxylic Acids and Their Derivatives</p> <p>Nomenclature of Acids. Physical Properties of Acids. Acidity and Acidity Constants. What Makes Carboxylic Acids Acidic?</p>	SO-1 & SO-2	Face to Face	Classroom	Final exam	Organic Chemistry, A Short Course, 13th Ed Hart, Hadad Craine & Hart
	13.3	<p>Effect of Structure on Acidity. Conversion of Acids to Salts. Preparation of Acids. Carboxylic Acid Derivatives. Esters. Preparation of Esters; Fischer Esterification. The Mechanism of Acid-Catalyzed Esterification; Nucleophilic Acyl Substitution. Lactones.</p>	SO-1 & SO-2	Face to Face	Classroom	Final exam	Organic Chemistry, A Short Course, 13th Ed Hart, Hadad Craine & Hart
1 4	14.1	<p>Saponification of Esters. Ammonolysis of Esters. Reaction of Esters with Grignard Reagents. Reduction of Esters</p>	SO-1 & SO-2	Face to Face	Classroom	Final exam	Organic Chemistry, A Short Course, 13th Ed Hart, Hadad Craine & Hart
	14.2	<p>The Need for Activated Acyl Compounds Acyl Halides. Acid Anhydrides. Amides. A Summary of Carboxylic Acid Derivatives</p>	SO-1 & SO-2	Face to Face	Classroom	Final exam	Organic Chemistry, A Short Course, 13th Ed Hart, Hadad Craine & Hart
	14.3	<p>Amines and Related Nitrogen Compounds Classification and Structure of Amines. Nomenclature of Amines. Physical Properties and Intermolecular Interactions of Amines.</p>	SO-1 & SO-2	Face to Face	Classroom	Final exam	Organic Chemistry, A Short Course, 13th Ed Hart, Hadad Craine & Hart
1 5	15.1	<p>Preparation of Amines. Preparation of Amines. The Basicity of Amines. Comparison of the Basicity and Acidity of Amines and Amides. Chiral Amines as Resolving Agents</p>	SO-1 & SO-2	Face to Face	Classroom	Final exam	Organic Chemistry, A Short Course, 13th Ed Hart, Hadad Craine & Hart



15.2	Acylation of Amines. with Acid Derivatives. Quaternary Ammonium Compounds. Aromatic Diazonium Compounds. Diazo Coupling; Azo Dyes.	SO-1 & SO-2	Face to Face	Classroom	Final exam	Organic Chemistry, A Short Course, 13th Ed Hart, Hadad Craine & Hart
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22 Evaluation Methods:

Opportunities to demonstrate achievement of the SLOs are provided through the following assessment methods and requirements:

Evaluation Activity	Mark	Topic(s)	SLOs	Period (Week)	Platform
First exam	20%	Chapters 1-4	SO-1 & SO-2	5 weeks	In the department
Mid exam	30%	Chapters 5-8	SO-1 & SO-2	10 weeks	In the department
Final exam	50%	Chapters 1-11	SO-1 & SO-2	16 weeks	In the department

23 Course Requirements

White or smart board

24 Course Policies:

A- Attendance policies: A- Attendance policies:

Maximum 15% absence is allowed.

B- Absences from exams and submitting assignments on time:

Incomplete Exams are conducted later after arrangement a new date.

C- Health and safety procedures:

This is a theoretical course.



D- Honesty policy regarding cheating, plagiarism, misbehavior:
The general Jordan University's laws are applied in any case of cheating.

E- Grading policy:

Letters scale is applied.

F- Available university services that support achievement in the course:

Free Internet-access and E-learning,

25 References:

Hart, Hadad, Craine, and Hart Organic Chemistry, A Brief Course, 13th Edition (Brooks\Cole, 2012).

26 Additional information:

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Name of Course Coordinator: -----Signature: ----- Date: ----- -----
Head of Curriculum Committee/Department: ----- Signature: ----- ---
Head of Department: ----- Signature: ----- -
Head of Curriculum Committee/Faculty: ----- Signature: ----- -
Dean: ----- Signature: -----