مركز الاعتماد وضمان الجودة
ACCREDITATION & QUALITY ASSURANCE CENTER

Course Syllabus

1	**Course title**	Organic Chemistry 2
2	**Course number**	0303232
3	**Credit hours**	3 theory
	Contact hours (theory, practical)	3 hours theory/week
4	**Prerequisites/corequisites**	0303231
5	**Program title**	B.Sc.
6	**Program code**	NA
7	**Awarding institution**	The University of Jordan
8	**School**	Science
9	**Department**	Chemistry
10	**Course level**	2rd Level
11	**Year of study and semester (s)**	2022 -2023, 2nd Semester
12	**Other department (s) involved in teaching the course**	B.Sc.
13	**Main teaching language**	English
14	**Delivery method**	✓Face to face learning ☐Blended ☐Fully online
15	**Online platforms(s)**	☐Moodle ☐Microsoft ✓Teams ☐Skype ☐Zoom ☐Others……
16	**Issuing/Revision Date**	20/06/2023

17 Course Coordinator:

Name: **Prof. Dr. Amal Alaboudi** Contact hours: 10:00-12:30

Office number: 108 Phone number:22132

Email: alaboudi@ju.edu.jo

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18 Other instructors:

Name: Prof. Dr. Jalal Zahra Office number: 300 Phone number: 22163 Email: zahra@ju.edu.jo Contact hours: 10:30 11:30 Su, Tu, Th

19 Course Description:

This course describes spectroscopic methods used to elucidate the structure of organic compounds. It discusses most of the functional groups in organic chemistry; nomenclature, structure, properties, reactions, mechanisms and synthesis.

20 Course aims and learnings outcomes (CLOs):

A- Course Learning Outcomes: 0303232 Organic Chemistry 2

Upon successful completion of this course, students will be able to:

CLO-1. elucidate the structures of organic compounds using spectroscopic methods.

CLO-2. recognize the different functional groups of organic compounds and their nomenclature, structure, properties, reactions, mechanisms and synthesis.

CLO-3. apply their knowledge, understanding and critical thinking in solving problems in organic chemistry.

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.

0333336 Identification of Organic Compounds

		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	✓	✓					

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	Mass Spectrometry of Small Molecules: Magnetic-Sector Instruments. Interpreting Mass Spectra	SO-1 & SO-2	Face to Face	Classroom	First exam, Final exam	Organic Chemistry, McMurry,8th Edition
	1.2	Mass Spectrometry of Some Common Functional Groups	SO-1 & SO-2	Face to Face	Classroom	First exam, Final exam	Organic Chemistry, McMurry,8th Edition
	1.3	Mass Spectrometry in Biological Chemistry: Time-of-Flight (TOF) Instruments	SO-1 & SO-2	Face to Face	Classroom	First exam, Final exam	Organic Chemistry, McMurry,8th Edition
2	2.1	Spectroscopy and the Electromagnetic Spectrum. Infrared Spectroscopy	SO-1 & SO-2	Face to Face	Classroom	First exam, Final exam	Organic Chemistry, McMurry,8th Edition
	2.2	Interpreting Infrared Spectra. Infrared Spectra of Some Common Functional Groups	SO-1 & SO-2	Face to Face	Classroom	First exam, Final exam	Organic Chemistry, McMurry,8th Edition
	2.3	Discussion and problem solving.	SO-1 & SO-2	Face to Face	Classroom	First exam, Final exam	Organic Chemistry, McMurry,8th Edition
3	3.1	Nuclear Magnetic Resonance Spectroscopy. The Nature of NMR Absorptions	SO-1 & SO-2	Face to Face	Classroom	First exam, Final exam	Organic Chemistry, McMurry,8th Edition
	3.2	Chemical Shifts. 13C NMR Spectroscopy: Signal Averaging and FT–NMR	SO-1 & SO-2	Face to Face	Classroom	First exam, Final exam	Organic Chemistry, McMurry,8th Edition
	3.3	Characteristics of 13C NMR Spectroscopy. DEPT 13C NMR Spectroscopy. Uses of 13C NMR Spectroscopy	SO-1 & SO-2	Face to Face	Classroom	First exam, Final exam	Organic Chemistry, McMurry,8th Edition
4	4.1	1H NMR Spectroscopy and Proton Equivalence. Chemical Shifts in 1H NMR Spectroscopy. Integration of 1H NMR Absorptions: Proton Counting	SO-1 & SO-2	Face to Face	Classroom	First exam, Final exam	Organic Chemistry, McMurry,8th Edition
	4.2	Spin–Spin Splitting in 1H NMR Spectra. More Complex Spin–Spin Splitting Patterns. Uses of 1H NMR Spectroscopy.	SO-1 & SO-2	Face to Face	Classroom	First exam, Final exam	Organic Chemistry, McMurry,8th Edition

	4.3	Discussion and problem solving.	SO-1 & SO-2	Face to Face	Classroom	First exam, Final exam	Organic Chemistry, McMurry,8th Edition
5	5.1	Stability of Conjugated Dienes: Molecular Orbital Theory.	SO-1 & SO-2	Face to Face	Classroom	Mid exam, Final exam	Organic Chemistry, McMurry,8th Edition
	5.2	Electrophilic Additions to Conjugated Dienes: Allylic Carbocations. Kinetic versus Thermodynamic Control of Reaction	SO-1 & SO-2	Face to Face	Classroom	Mid exam, Final exam	Organic Chemistry, McMurry,8th Edition
	5.3	The Diels–Alder Cycloaddition Reaction. Characteristics of the Diels–Alder Reaction	SO-1 & SO-2	Face to Face	Classroom	Mid exam, Final exam	Organic Chemistry, McMurry,8th Edition
6	6.1	Structure Determination in Conjugated Systems: Ultraviolet Spectroscopy. Interpreting Ultraviolet Spectra: The Effect of Conjugation	SO-1 & SO-2	Face to Face	Classroom	Mid exam, Final exam	Organic Chemistry, McMurry,8th Edition
	6.2	Sources and Names of Aromatic Compounds. Structure and Stability of Benzene	SO-1 & SO-2	Face to Face	Classroom	Mid exam, Final exam	Organic Chemistry, McMurry,8th Edition
	6.3	Aromaticity and the Hückel 4n 1 2 Rule. Aromatic Ions. Aromatic Heterocycles: Pyridine and Pyrrole	SO-1 & SO-2	Face to Face	Classroom	Mid exam, Final exam	Organic Chemistry, McMurry,8th Edition
7	7.1	Polycyclic Aromatic Compounds. Spectroscopy of Aromatic Compound	SO-1 & SO-2	Face to Face	Classroom	Mid exam, Final exam	Organic Chemistry, McMurry,8th Edition
	7.2	Electrophilic Aromatic Substitution Reactions: Bromination Alkylation and Acylation of Aromatic Rings: The Friedel–Crafts Reaction	SO-1 & SO-2	Face to Face	Classroom	Mid exam, Final exam	Organic Chemistry, McMurry,8th Edition
	7.3	Substituent Effects in Electrophilic Substitutions. Trisubstituted Benzenes: Additivity of Effects	SO-1 & SO-2	Face to Face	Classroom	Mid exam, Final exam	Organic Chemistry, McMurry,8th Edition
8	8.1	Nucleophilic Aromatic Substitution Benzyne	SO-1 & SO-2	Face to Face	Classroom	Mid exam, Final exam	Organic Chemistry, McMurry,8th Edition
	8.2	Oxidation of Aromatic Compounds Reduction of Aromatic Compounds Synthesis of Polysubstituted Benzenes	SO-1 & SO-2	Face to Face	Classroom	Mid exam, Final exam	Organic Chemistry, McMurry,8th Edition

	8.3	Naming Alcohols and Phenols. Properties of Alcohols and Phenols.	SO-1 & SO-2	Face to Face	Classroom	Mid exam, Final exam	Organic Chemistry, McMurry,8th Edition
9	9.1	Preparation of Alcohols: A Review Alcohols from Carbonyl Compounds: Reduction Alcohols from Carbonyl Compounds: Grignard Reaction	SO-1 & SO-2	Face to Face	Classroom	Mid exam, Final exam	Organic Chemistry, McMurry,8th Edition
	9.2	Reactions of Alcohols Oxidation of Alcohols Protection of Alcohols	SO-1 & SO-2	Face to Face	Classroom	Mid exam, Final exam	Organic Chemistry, McMurry,8th Edition
	9.3	Phenols and Their Uses Reactions of Phenols Spectroscopy of Alcohols and Phenols	SO-1 & SO-2	Face to Face	Classroom	Mid exam, Final exam	Organic Chemistry, McMurry,8th Edition
10	10.1	Names and Properties of Ethers Preparing Ethers	SO-1 & SO-2	Face to Face	Classroom	Final exam	Organic Chemistry, McMurry,8th Edition
	10.2	Reactions of Ethers: Acidic Cleavage Reactions of Ethers: Claisen Rearrangement	SO-1 & SO-2	Face to Face	Classroom	Final exam	Organic Chemistry, McMurry,8th Edition
	10.3	Cyclic Ethers: Epoxides Reactions of Epoxides: Ring-Opening	SO-1 & SO-2	Face to Face	Classroom	Final exam	Organic Chemistry, McMurry,8th Edition
11	11.1	Thiols and Sulfides Spectroscopy of Ethers	SO-1 & SO-2	Face to Face	Classroom	Final exam	Organic Chemistry, McMurry,8th Edition
	11.2	Naming Aldehydes and Ketones. Preparing Aldehydes and Ketones Oxidation of Aldehydes and Ketones Nucleophilic Addition Reactions of Aldehydes and Ketones	SO-1 & SO-2	Face to Face	Classroom	Final exam	Organic Chemistry, McMurry,8th Edition
	11.3	Nucleophilic Addition of H2O: Hydration Nucleophilic Addition of Alcohols: Acetal Formation Nucleophilic Addition of HCN: Cyanohydrin Formation Nucleophilic Addition of Hydride and Grignard Reagents: Alcohol Formation	SO-1 & SO-2	Face to Face	Classroom	Final exam	Organic Chemistry, McMurry,8th Edition
12	12.1	Nucleophilic Addition of Amines: Imine and Enamine Formation Nucleophilic Addition of Hydrazine: The Wolff–	SO-1 & SO-2	Face to Face	Classroom	Final exam	Organic Chemistry, McMurry,8th Edition

		Kishner Reaction					
	12.2	Conjugate Nucleophilic Addition to a,b-Unsaturated Aldehydes and Ketones Spectroscopy of Aldehydes and Ketones	SO-1 & SO-2	Face to Face	Classroom	Final exam	Organic Chemistry, McMurry,8th Edition
	12.3	Naming Carboxylic Acids and Nitriles Structure and Properties of Carboxylic Acids	SO-1 & SO-2	Face to Face	Classroom	Final exam	Organic Chemistry, McMurry,8th Edition
13	13.1	Substituent Effects on Acidity Preparing Carboxylic Acids Reactions of Carboxylic Acids: An Overview	SO-1 & SO-2	Face to Face	Classroom	Final exam	Organic Chemistry, McMurry,8th Edition
	13.2	Chemistry of Nitriles Spectroscopy of Carboxylic Acids and Nitriles	SO-1 & SO-2	Face to Face	Classroom	Final exam	Organic Chemistry, McMurry,8th Edition
	13.3	Naming Carboxylic Acid Derivatives Nucleophilic Acyl Substitution Reactions	SO-1 & SO-2	Face to Face	Classroom	Final exam	Organic Chemistry, McMurry,8th Edition
14	14.1	Reactions of Carboxylic Acids	SO-1 & SO-2	Face to Face	Classroom	Final exam	Organic Chemistry, McMurry,8th Edition
	14.2	Chemistry of Acid Halides Chemistry of Acid Anhydrides	SO-1 & SO-2	Face to Face	Classroom	Final exam	Organic Chemistry, McMurry,8th Edition
	14.3	Chemistry of Esters Chemistry of Amides	SO-1 & SO-2	Face to Face	Classroom	Final exam	Organic Chemistry, McMurry,8th Edition
15	15.1	Spectroscopy of Carboxylic Acid Derivatives	SO-1 & SO-2	Face to Face	Classroom	Final exam	Organic Chemistry, McMurry,8th Edition
	15.2	Discussion and problem Solving	SO-1 & SO-2	Face to Face	Classroom	Final exam	Organic Chemistry, McMurry,8th Edition

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 12-13	SO-1 & SO-2	5 weeks	In the department
Mid exam	30%	Chapters 14-17	SO-1 & SO-2	10 weeks	In the department
Final exam	50%	Chapters 12-17	SO-1 & SO-2	16 weeks	In the department

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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:

Organic Chemistry, McMurry,8th Edition

26 Additional information:

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