مركز الاعتماد وضمان الجودة
ACCREDITATION & QUALITY ASSURANCE CENTER

Course Syllabus

1	**Course title**	Organic Chemistry 3	
2	**Course number**	0303331	
3	**Credit hours**	3 theory	
	Contact hours (theory, practical)	3 hours theory/week	
4	**Prerequisites/corequisites**	0303232	
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**	3rd Level	
11	**Year of study and semester (s)**	3rd, First semester	
12	**Other department (s) involved in teaching the course**	B.Sc.	
13	**Main teaching language**		
14	**Delivery method**	✓Face to face learning ☐Blended ☐Fully online	
15	**Online platforms(s)**	☐Moodle ☐Microsoft ✓Teams ☐Skype ☐Zoom ☐Others……	
16	**Issuing/Revision Date**		

17 Course Coordinator:

Name: Prof. Dr. Kamal Sweidan Contact hours:10:30-11:30

Office number: 204 Phone number:22155

Email: k.sweidan@ju.edu.jo

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18 Other instructors:

Name: Office number: Phone number: Email: Contact hours: Name: Office number: Phone number: Email: Contact hours:

19 Course Description:

β-dicarbonyl compounds synthesis and reactions, Amines including naming, properties, synthesis and reactions, Chemistry of biologically important organic compounds: carbohydrates; lipids; amino acids and proteins; nucleic acids

20 Course aims and learnings outcomes (CLOs):

A- Course Learning Outcomes: 0303331 Organic Chemistry 3

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

CLO-1 To provide the students with the knowledge and capacity to relate the structures of organic compounds with their reactivity and properties.

CLO-2. To develop skills to understand the synthesis and application of different carbonyl condensation reactions

CLO-3. To provide students with a basic knowledge from which they can proceed to more specialized areas in carbohydrate, lipid, protein, and nucleic acid chemistry, and biochemistry.

CLO-4. To develop skills to understand the functions and features of biomolecules in life processes.

CLO-5. To design synthetic strategies toward polysaccharides, proteins, and nucleic acids.

CLO-6. To understand the structure and function of lipids, terpenoids, and steroids

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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.

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		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	✓	✓			✓		
	CLO-5	✓	✓					
	CLO-6	✓	✓					

21. Topic Outline and Schedule:

•	Lecture	Topic	Student Learning Outcome	Learning Methods (Face to Face/Blended / Fully Online)	Platform	Synchronous / Asynchronous Lecturing	Evaluation Methods	Resources
1	1.1	Carbonyl Alpha-Substitution Reactions	CLO-2	Face to Face	Classroom		First exam, Final exam	Organic Chemistry, McMurry,8th Edition
	1.2	• Alpha Halogenation of Aldehydes and Ketones • Alpha Bromination of Carboxylic Acids	CLO-2	Face to Face	Classroom		First exam, Final exam	Organic Chemistry, McMurry,8th Edition
	1.3	• Acidity of Alpha Hydrogen Atoms:Enolate Ion Formation • Reactivity of Enolate Ions • Alkylation of Enolate Ions	CLO-1 CLO-2	Face to Face	Classroom		First exam, Final exam	Organic Chemistry, McMurry,8th Edition
2	2.1	Alkylation of Enolate Ions	CLO-1 CLO-2	Face to Face	Classroom		First exam, Final exam	Organic Chemistry, McMurry,8th Edition
	2.2	Alkylation of Enolate Ions	CLO-1 CLO-2	Face to Face	Classroom		First exam, Final exam	Organic Chemistry, McMurry,8th Edition
	2.3	Carbonyl Condensations: The Aldol Reaction	CLO-1 CLO-2	Face to Face	Classroom		First exam, Final exam	Organic Chemistry, McMurry,8th Edition
3	3.1	Carbonyl Condensations versus Alpha Substitutions	CLO-1 CLO-2	Face to Face	Classroom		First exam, Final exam	Organic Chemistry, McMurry,8th Edition
	3.2	Mixed Aldol Reactions	CLO-1 CLO-2	Face to Face	Classroom		First exam, Final exam	Organic Chemistry, McMurry,8th Edition
	3.3	Intramolecular Aldol Reactions	CLO-1 CLO-2	Face to Face	Classroom		First exam, Final exam	Organic Chemistry, McMurry,8th Edition

4	4.1	• The Claisen Condensation Reaction • Mixed Claisen Condensations	CLO-1 CLO-2	Face to Face	Classroom		First exam, Final exam	Organic Chemistry, McMurry,8th Edition
	4.2	• Intramolecular Claisen Condensations:The Michael Reaction	CLO-1 CLO-2	Face to Face	Classroom		First exam, Final exam	Organic Chemistry, McMurry,8th Edition
	4.3	• Carbonyl Condensations with Enamines • The Robinson Annulation Reaction	CLO-1 CLO-2	Face to Face	Classroom		First exam, Final exam	Organic Chemistry, McMurry,8th Edition
5	5.1	• **24.1** Naming of Amines. • **24.2** Structure and Properties of Amines	CLO-1 CLO-2	Face to Face	Classroom		First exam, Final exam	Organic Chemistry, McMurry,8th Edition
	5.2	• **24.3-24.4** Basicity of Amines	CLO-1 CLO-2	Face to Face	Classroom		First exam, Final exam	Organic Chemistry, McMurry,8th Edition
	5.3	• **24.6** Synthesis of amines • **24.7** Reactions of Amines	CLO-1 CLO-2	Face to Face	Classroom		First exam, Final exam	Organic Chemistry, McMurry,8th Edition
6	6.1	• **25.1** Classification of Carbohydrates • **25.2** Depicting Carbohydrate Stereochemistry: Fischer Projections	CLO-3	Face to Face	Classroom		Mid exam, Final exam	Organic Chemistry, McMurry,8th Edition
	6.2	• **25.3** D, L Sugars • **25.4** Configurations of Aldoses • **25.5** Cyclic Structures of Monosaccharides : Anomers	CLO-3	Face to Face	Classroom		Mid exam, Final exam	Organic Chemistry, McMurry,8th Edition
	6.3	**25.6** Reactions of Monosaccharides	CLO-5	Face to Face	Classroom		Mid exam, Final exam	Organic Chemistry, McMurry,8th Edition
7	7.1	• **25.7** The Eight Essential Monosaccharides • **25.8** Disaccharides	CLO-4	Face to Face	Classroom		Mid exam, Final exam	Organic Chemistry, McMurry,8th Edition

	7.2	**25.9** Polysaccharides and Their Synthesis **25.10** Other Important Carbohydrates	CLO-4	Face to Face	Classroom		Mid exam, Final exam	Organic Chemistry, McMurry,8th Edition
	7.3	• **26.1** Structures of Amino Acids • **26.2** Amino Acids and the Henderson–Hasselbalch Equation: Isoelectric Points	CLO-3	Face to Face	Classroom		Mid exam, Final exam	Organic Chemistry, McMurry,8th Edition
8	8.1	**26.3** Synthesis of Amino Acids	CLO-5	Face to Face	Classroom		Mid exam, Final exam	Organic Chemistry, McMurry,8th Edition
	8.2	• **26.4** Peptides and Proteins • **26.5** Amino Acid Analysis of Peptides	CLO-3	Face to Face	Classroom		Mid exam, Final exam	Organic Chemistry, McMurry,8th Edition
	8.3	• **26.6** Peptide Sequencing:The Edman Degradation • **26.7** Peptide Synthesis	CLO-3	Face to Face	Classroom		Mid exam, Final exam	Organic Chemistry, McMurry,8th Edition
9	9.1	**26.8** Automated Peptide Synthesis:The Merrifield Solid-Phase Method	CLO-5	Face to Face	Classroom		Mid exam, Final exam	Organic Chemistry, McMurry,8th Edition
	9.2	**26.9** Protein Structure	CLO-3 CLO-4	Face to Face	Classroom		Mid exam, Final exam	• Organic Chemistry, McMurry, 8th Edition • https://www.youtube.com/watch?v=qBRFIMcxZNM
	9.3	**26.10** Enzymes and Coenzymes	CLO-4	Face to Face	Classroom		Mid exam, Final exam	Organic Chemistry, McMurry,8th Edition
10	10.1	**26.11** How Do Enzymes Work? Citrate Synthase	CLO-4	Face to Face	Classroom		Mid exam, Final exam	Organic Chemistry, McMurry,8th Edition
	10.2	**27.1** Waxes, Fats, and Oils **27.2** Soap	CLO-1 CLO-5	Face to Face	Classroom		Mid exam, Final exam	Organic Chemistry, McMurry,8th Edition
	10.3	**27.3** Phospholipids	CLO-1 CLO-5	Face to Face	Classroom		Mid exam, Final exam	Organic Chemistry, McMurry,8th Edition

11	11.1	**27.4** Prostaglandins and Other Eicosanoids	CLO-1 CLO-5	Face to Face	Classroom		Mid exam, Final exam	Organic Chemistry, McMurry,8th Edition
	11.2	**27.4** Prostaglandins and Other Eicosanoids	CLO-1 CLO-5	Face to Face	Classroom		Mid exam, Final exam	Organic Chemistry, McMurry,8th Edition
	11.3	**27.5** Terpenoids	CLO-1 CLO-5	Face to Face	Classroom		Mid exam, Final exam	Organic Chemistry, McMurry,8th Edition
12	12.1	**27.5** Terpenoids	CLO-1 CLO-5	Face to Face	Classroom		Mid exam, Final exam	Organic Chemistry, McMurry,8th Edition
	12.2	**27.6** Steroids	CLO-4 CLO-5	Face to Face	Classroom		Mid exam, Final exam	Organic Chemistry, McMurry,8th Edition
	12.3	**27.6** Steroids	CLO-4 CLO-5	Face to Face	Classroom		Mid exam, Final exam	Organic Chemistry, McMurry,8th Edition
13	13.1	27.7 Biosynthesis of Steroids	CLO-4	Face to Face	Classroom		Mid exam, Final exam	Organic Chemistry, McMurry,8th Edition
	13.2	27.7 Biosynthesis of Steroids	CLO-4	Face to Face	Classroom		Mid exam, Final exam	Organic Chemistry, McMurry,8th Edition
	13.3	27.7 Biosynthesis of Steroids	CLO-4	Face to Face	Classroom		Mid exam, Final exam	Organic Chemistry, McMurry,8th Edition
14	14.1	28.1 Nucleotides and Nucleic Acids	CLO-3 CLO-4	Face to Face	Classroom		Mid exam, Final exam	Organic Chemistry, McMurry,8th Edition
	14.2	28.2 Base Pairing in DNA: The Watson–Crick Model	CLO-3 CLO-4	Face to Face	Classroom		Mid exam, Final exam	Organic Chemistry, McMurry,8th Edition
	14.3	28.3 Replication of DNA	CLO-3 CLO-4	Face to Face	Classroom		Mid exam, Final exam	• Organic Chemistry, McMurry, 8th Edition • https://www.youtube.com/watch?v=TNKWgcFPHqw
15	15.1	28.4 Transcription of DNA	CLO-4 CLO-5	Face to Face	Classroom		Mid exam, Final exam	Organic Chemistry, McMurry,8th Edition

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	15.2	28.5 Translation of RNA: Protein Biosynthesis	CLO-4 CLO-5	Face to Face	Classroom		Mid exam, Final exam	• Organic Chemistry, McMurry, 8th Edition • https://www.youtube.com/watch?v=gG7uCskUOrA&t=8s
	15.3	28.5 Translation of RNA: Protein Biosynthesis	CLO-4 CLO-5	Face to Face	Classroom		Mid exam, Final exam	• Organic Chemistry, McMurry, 8th Edition • https://www.youtube.com/watch?v=gG7uCskUOrA&t=8s
16	16.1	28.5 Translation of RNA: Protein Biosynthesis	CLO-4 CLO-5	Face to Face	Classroom		Mid exam, Final exam	• Organic Chemistry, McMurry, 8th Edition • https://www.youtube.com/watch?v=gG7uCskUOrA&t=8s
	16.2	28.7 DNA Synthesis	CLO-4 CLO-5	Face to Face	Classroom		Mid exam, Final exam	Organic Chemistry, McMurry,8th Edition
	16.3	28.8 The Polymerase Chain Reaction	CLO-4 CLO-5	Face to Face	Classroom		Mid exam, 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: 22, 23 and 24	CLO-1 CLO-2	6 weeks	In the department
Mid exam	30%	Chapters 25, 26 and 27	CLO-3 CLO-4 CLO-5 CLO-6	13 weeks	In the department

Final exam	50%		CLO-1 CLO-2 CLO-3 CLO-4 CLO-5 CLO-6	16 weeks	In the department

23 Course Requirements

(e.g: students should have a computer, internet connection, webcam, account on a specific software/platform…etc): : students should have a computer, , internet connection.

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:

A- Required book(s), assigned reading and audio-visuals: Organic Chemistry, John McMurry

B- Recommended books, materials, and media:

26 Additional information:

Name of Course Coordinator: Kamal Sweidan Signature: K.Sweidan Date: 11-11-2023
Head of Curriculum Committee/Department: ---------- Signature: ----------
Head of Department: ---------- Signature: ----------
Head of Curriculum Committee/Faculty: ---------- Signature: ----------
Dean: ---------- Signature: ----------