



**Faculty of Arts and Science**  
**Course Syllabus**  
**Semester: Second semester**  
**Academic Year: 2021/ 2022**

<b>Course Title :</b>	Chemistry of Biomolecules
<b>Course No. :</b>	1722422
<b>Prerequisite :</b>	1722301
<b>Concurrent :</b>	.....
<b>Department :</b>	Chemistry
<b>Coordinator :</b>	Dr. Ahmed Abu-Rayyan
<b>Mode of Instruction</b>	<b><u>Blended Learning</u></b> - 2 hours in-class (Synonym) learning - 1 hour online asynchronous learning using Edu-Gate

**\* Instructor:**

Name	Office Number	Office Phone	Office Hours	E-mail
Dr. Ahmed Abu-Rayyan	220	1410	Su. Tu. Thu 12-13 Mon. Wed. 9:30-11:00	a_aburayyan@asu.edu.jo

• **Course Description:**

Chemistry of Biomolecules is the third in the three-term undergraduate organic chemistry lecture sequence that includes. It emphasizes on the chemistry of  $\alpha$ - substitutions of carbonyl compounds and condensation reactions (carbon-carbon bond formation). It demonstrates an understanding of basic principles of carbohydrates, amino acids, lipids and selected biologically important compounds. It provides the basic knowledge of aromatic heterocycles, free radicals and pericyclic reactions. It also makes connection from chemical principles to the structures and functions of biological molecules. Demonstrate an understanding of the



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chemical environment and the role that organic molecules play in the natural and the synthetic medicinal drugs.

### **\* Learning Outcomes :**

**Successful completion of this course should lead to the following learning outcomes:**

#### ***A-Knowledge and Understanding :***

A1 -Name and categorize major biochemicals found in biological systems

A2--Understand the fundamentals of pericyclic reactions.

A3- Understand industrial applications of oils and fats, especially for food, &detergents.

#### ***B-Intellectual Skills :***

B1) Identify biochemical processes and the role of DNA and RNA in proteins synthesis

B2) Identify the stereochemistry& Reactions of Monosaccharides; Disaccharides and Polysaccharude.

#### ***C-Subject Specific Skills :***

C1) Follow courses in biochemistry and cellular biology.

C2) Follow many new developments in the field of molecular biology and medicine





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7 & 8	Sun. 17/4/2022 Tue. 19/4/2022 Thur. 28/4/2022	<b>Chapter 26: Aminoacides Peptides &amp; Proteins:</b> 26.1 Structure of Amino Acids 26.2 Isoelectric points 26.3 Synthesis of Amino Acids 25.4 Peptides & Proteins 26.5 Amino Acids Analysis of Peptides 26.6 Peptides Sequencing 26.7 Peptides Synthesis 26.8 Automated Peptides synthesis 26.9 Protein structure 26.10 Enzymes & Coenzymes	In-class lecture Quiz1	A2, B3 C1,	3,6,7
			In-class lecture		
9 & 10	Sun. 15/5/2022 Tue. 17/5/2022 Thur. 26/5/2022 2	<b>Chapter 27: Lipids:</b> 27.1 Waxes fats & Oils 27.2 Soap 27.3 Phospholipids 27.5 Terpenoids 27.6 Steriods 27.7 Biosynthesis of Steriods	In-class lecture	A1, B2 C1,	6,7
			Online sessions (asynchronous)		
11 & 12	Mon. 16/5/2022 Wed. 18/5/2022	<b>Chapter 28 : Nucleic Acids:</b> 28.1 Nucleotides & Nucleic Acids 28.2 Base Pairing in DNA 28.3 Replication of DNA 28.4 Transcription of DNA 28.5 Translation of DNA 28.6 DNA Sequencing 28.7 DNA Synthesis 28.8 The Polymerase Chain Reaction	In-class lecture	A3, C2,	1,9,10
			Quiz 2 Online sessions (asynchronous)		
13&14	Sun. 29/5/2022 Tue. 31/5/2022 Thur. 9/6/2022	<b>Chapter 30: Pericyclic Reactions:</b> 30.1 Molecular Orbital of Conjugated Pi Systems 30.2 Electrocyclic Reactions 30.3 Stereochemistry of Thermal Electrocyclic Reactions 30.4 Photochemical Electrocyclic Reactions 30.5 Cycloaddition Reactions 30.6 Stereochemistry of Cycloaddition 30.7 Sigmatropic Rearrangements 30.8 some Examples of Sigmatropic Rearrangements	In-class lecture	A1, B2	2,3
			Online sessions (asynchronous)		
15	Sun. 12/6/2022 Tue. 14/6/2022 Thur. 16/6/2022	<b>Chapter 31: Synthetic Polymers:</b> 31.1 Chain Growth Polymers 31.2 Stereochemistry of Polymerization 31.3 Copolymers 24.3-24.4 Basicity of Amines & Arylamins	In-class lecture	A1, B3 C1,	4,8
			Assignment 2		
			Online sessions (asynchronous)		
Sixteen		<b>Final Exam</b>			



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## Teaching Methods

1. Inter active lectures
2. Group discussions
3. Assignments
4. Reports
5. Quizzes

## \* Evaluation:

Grading Plan and Assessments		
Methods	Weights	Due date
Mid-term	30%	TBA
Written assignments & Quizzes	30%	TBA
Final Exam	40%	TBA

- **Textbook:**

- Organic Chemistry, by John E. McMurry. 8thEd, 2012.

- **References:**

- Organic Chemistry, 7th Edition, L. G. Wade, Jr., Person Education Inc., 2010
- Organic Chemistry I For Dummies, by Arthur Winter. July (2008).
- Organic Chemistry I, by David R. Klein. 2nd edition June, (2007.)



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**Subject Coordinator**

**Dr. Ahmed Abu-Rayyan**

**Signature:**

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**Head of Curriculum Committee**

**Dr. Hussam Miqdad**

**Signature:**

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**Department Head**

**Dr. Hussam Miqdad**

**Signature:**

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**Faculty Dean**

**Dr. Hadeel Ali Saed**

**Signature:**

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**Copy to:**

- Department Head.
- Head of Curriculum Committee.
- Course File.