

COURSE DESCRIPTIONS

Faculty	Pharmacy				
Department	Pharmacy Doctor	NQF level	7		
Course Title	Pharmaceutical Organic Chemistry	Code	903225	Prerequisite	903225
Credit Hours	2	Theory	2	Practical	0
Course Leader	Abdullah Ghawanmeh	Email	<a href="mailto:a.ghawanmeh@jadara.edu.jo">a.ghawanmeh@jadara.edu.jo</a>		
Lecturers	Abdullah Ghawanmeh Dr. Mamon Okour	Emails	<a href="mailto:a.ghawanmeh@jadara.edu.jo">a.ghawanmeh@jadara.edu.jo</a>		
Lecture time		Classroom			
Semester	Second _2025/2026	Production	2025	Updated	2025
Type of Teaching	<input type="checkbox"/> Face to Face <input type="checkbox"/> Online	<input checked="" type="checkbox"/> Blended	<input type="checkbox"/>	Attendance	Fulltime

Short Description

This course is a study of the nomenclature and synthesis of organic pharmaceutical compounds. Classification of these compounds, their physical and chemical properties, their method of preparation, reactivity and mechanisms of reactions of poly-functional aromatic compounds and hetero-aromatic compounds, esters, amides, carboxylic acids and amino compounds. Isomerism and stereoisomerism of organic compounds, carbohydrate, amino acids, peptides and proteins also will be studied.

Course Objectives

1. Provide students with the significance of different functional groups in organic compounds, and the importance of these functional groups in the structural formula of drugs.
2. Understand the chemical and physical behavior, and synthetic reactions of different functional groups and their significance in pharmacy.
3. Illustrate different chemical reactions, methods of preparation and mechanisms for the different classes of organic compounds.
4. Introduce more advanced topics in pharmaceutical organic chemistry such as Medicinal Chemistry, Analytical Chemistry and SARS.
5. Provide students with the importance of the different organic nuclei from which most of the drugs consist, (Heterocyclic compounds and poly-cyclic compounds).
6. Understand the chemical and physical behavior of hetero-aromatics and their importance.
7. Understand the importance of stereo-chemical aspects and their relationships with drugs activities

Learning Outcomes

A. Knowledge - Theoretical Understanding

- a1. Classify organic compounds according to functional groups.

<p><b>a2.</b> define the physical and chemical properties of functional groups, heterocycles and polycyclic compounds and their stereochemical aspects.</p> <p><b>a3.</b> tell the biological importance of these systems in organic and pharmaceutical compounds.</p>
<b>B. Knowledge - Practical Application</b>
<b>a4.</b> list the appropriate chemical equations for the preparation of certain organic compounds.
<b>C. Skills – Generic Problem Solving and Analytical Skills</b>
<b>b1.</b> choose appropriate way to synthesize simple pharmaceutical substances, as well as orally and in writing account for the theoretical and practical results.
<b>D. Skills – Communication, ICT, and Numeracy</b>
<b>b2.</b> Develop the ability to communicate information and arguments effectively using written and oral skills to Apply of organic chemistry knowledge in pharmaceutical preparation.
<b>E. Competence: Autonomy, Responsibility, and Context</b>
<b>Teaching and Learning Methods</b>
<input checked="" type="checkbox"/> Face to Face Lectures <input type="checkbox"/> Brain Storming <input checked="" type="checkbox"/> Synchronous remote <input checked="" type="checkbox"/> Asynchronous remote <input checked="" type="checkbox"/> Using Video <input type="checkbox"/> Discussions <input type="checkbox"/> Research Project <input type="checkbox"/> Case Study <input type="checkbox"/> Field visit <input type="checkbox"/> Problem solving.
<b>Assessment Methods</b>
<input checked="" type="checkbox"/> Formative Assessment <input checked="" type="checkbox"/> Quiz <input type="checkbox"/> Lab Exam <input checked="" type="checkbox"/> Homework <input type="checkbox"/> Project Assessment <input type="checkbox"/> Oral Presentation <input checked="" type="checkbox"/> Midterm <input checked="" type="checkbox"/> Final Exam

Course Contents					
Week	Hours	CLOs	Topics	Teaching & Learning Methods	Assessment Methods
1, 2	4	a1, b1	<b>Aromaticity and Benzene Chemistry</b> Benzene and its characteristics Aromaticity rules. Electrophilic Aromatic Substitution Reactions Nucleophilic Aromatic Substitution Reactions	Discussion Brainstorming Advanced Lecture (Presentations)	Short quizzes, Exams
3	2	a1, a2	<b>Introduction to heterocyclic rings.</b> Classification and nomenclature Chemical properties Some common reaction	Discussion Brainstorming	Short quizzes, homework
4	2	a3, b1, b2	<b>Chemistry of carbonyl compounds</b> Kinds of carbonyl compounds Nature of carbonyl group .General reactions of carbonyl compounds	Advanced Lecture (Presentations) Discussion Brainstorming	quizzes - homework – exams

5	2	a1, a2, b1,a3, a4	<b>Carboxylic Acids and its Derivatives</b> Properties, Nomenclature. Preparation and Reactions $\alpha$ -Substitution and Condensation Reactions	Advanced Lecture (Presentations) Brainstorming	quizzes - homework - exams
6	2	a1, a2, b2,a3, a4	<b>Carboxylic Acids Derivatives</b> Nomenclature and relative reactivity Chemistry of carboxylic acid derivatives Carbonyl alpha substitution reactions	Advanced Lecture (Presentations) Brainstorming	quizzes - homework - exams
7	2	a1, a2, ,a3,a4 , b2	<b>Carbonyl condensation reactions</b> General mechanism of reaction The aldol reaction, The claisen condensation reaction	Advanced Lecture (Presentations) Using instructional technologies	quizzes - homework - exams
8	2	a2, a3,a4, b1	<b>Aliphatic amines</b> Properties Nomenclature Preparation and Reactions	Advanced Lecture (Presentations) Using instructional technologies	quizzes - homework - exams
9	2	a2, a3, a4, b1, b2	<b>Dienes : conjugation and resonance</b> Stability and reactivity, Electrophilic addition reactions ( 1,2- vs 1,4- addition) Isoprene reactions	Advanced Lecture (Presentations) Using instructional technologies	quizzes - homework - exams
10, 1 1	3	a1, a2, a3,a4 b1,b2	<b>Aldehydes and ketones.</b> Nomenclature. Preparation. General consideration of the Reactions, Unsaturated aldehydes and ketones	Advanced Lecture (Presentations) Using instructional technologies	quizzes - homework - exams
11, 1 2	3	a2, a3, a4, b1, b2	<b>Phenols</b> . Structure and nomenclature of other derivatives, physical properties . Synthesis of phenols Reactions of phenols as Acids	Advanced Lecture (Presentations) Using instructional technologies	quizzes - homework - exams
13, 1 4	4	a1, a2, a3,a4 b1,b2	<b>Amino acids, peptides and proteins</b>	Advanced Lecture (Presentations) Using instructional technologies	quizzes - homework - exams

15				
-				
16			<b>Final exam</b>	

<b>Infrastructure</b>	
<b>Textbook</b>	Organic Chemistry, by Solomons & Fryhle. Publisher: Wiley Organic Chemistry, by McMurry. Publisher: Brooks/Cole Organic Chemistry, by Bruice. Publisher: Pearson. Organic Chemistry, by Carey & Giuliano. Publisher: McGraw Hill. Organic chemistry: A short course by I Harold Hart, David J. Hart and
<b>References</b>	<ul style="list-style-type: none"> <li>• <a href="http://www.emedicine.com">www.emedicine.com</a></li> <li>• <a href="http://www.sciencedirect.com">www.sciencedirect.com</a></li> <li>• <a href="http://www.pubmed.com">www.pubmed.com</a></li> <li>• Lecture handouts</li> <li>• Internet: there are many websites that provide valuable data related to organic chemistry including research paper, books, animation, etc. you can find more of these websites by searching in the internet using a suitable searching key. Many websites will be posted on E-learning during the semester.</li> </ul>
<b>Required reading</b>	Textbook is obligatory and required by the students
<b>Electronic materials</b>	Provided to the students through JU e-learning website.
<b>Other</b>	In addition to the above, the students will be provided with handouts by the lecturer.

<b>Course Assessment Plan</b>								
<b>Assessment Method</b>		<b>Grade</b>	<b>CLOs</b>					
			<b>a1</b>	<b>a2</b>	<b>a3</b>	<b>a4</b>	<b>b1</b>	<b>b2</b>
<b>First(Midterm)</b>		<b>30%</b>	<b>7</b>	<b>8</b>	<b>0</b>	<b>0</b>	<b>7</b>	<b>8</b>
<b>Second (if applicable)</b>								
<b>Final Exam</b>		<b>40%</b>	<b>5</b>	<b>7</b>	<b>5</b>	<b>7</b>	<b>6</b>	<b>10</b>
<b>Coursework</b>								
<b>Coursework assessment methods</b>	Assignments	<b>15%</b>	<b>2</b>	<b>2</b>	<b>2</b>	<b>2</b>	<b>2</b>	<b>2</b>
	Case study							
	Discussion and interaction							
	Group work activities							
	Labtests and assignments							
	Presentations							
	Quizzes	<b>15%</b>	<b>3</b>	<b>3</b>	<b>3</b>	<b>3</b>	<b>3</b>	<b>3</b>
<b>Total</b>		<b>100%</b>	<b>17</b>	<b>20</b>	<b>10</b>	<b>12</b>	<b>18</b>	<b>23</b>

## **Plagiarism**

Plagiarism is claiming that someone else's work is your own. The department has a strict policy regarding plagiarism and, if plagiarism is indeed discovered, this policy will be applied. Note that punishments apply also to anyone assisting another to commit plagiarism (for example by knowingly allowing someone to copy your code).

Plagiarism is different from group work in which a number of individuals share ideas on how to carry out the coursework. You are strongly encouraged to work in small groups, and you will certainly not be penalized for doing so. This means that you may work together on the program. What is important is that you have a full understanding of all aspects of the completed program. In order to allow proper assessment that this is indeed the case, you must adhere strictly to the course work requirements as outlined above and detailed in the coursework problem description. These requirements are in place to encourage individual understanding, facilitate individual assessment, and deter plagiarism.