Course Description
(*Organic Pharmaceutical Chemistry* I) (theoretical)

نموذج وصف المقرر

Review the performance of the higher education institution ((review of the academic program)

وصف المقرر

This course description provides a summary of the most important characteristics of the course and the learning outcomes expected of the student to achieve, proving whether he has made the most of the available learning opportunities and must be linked to the program .description

1. Educational Institution	**Al-Zahrawi University - Ministry of Higher Education and Scientific Research**
2. College	**Pharmacy college**
3. Course Name / Code	***Organic Pharmaceutical Chemistry* I) (theoretical)**
4. Programs in which it is included	**Bachelor of Pharmacy**
5. Available Forms of Attendance	**Daily Attendance**
6. Semester / Year	**Second Semester, Third Stage (2025-2026)**
7. Total Number of Study Hours	**4 hours per week for each group**
8. Date of preparing this description	**2025-2026**
9. Course Objectives: **1. Acquire knowledge of fundamental theories, laws, and their applications within organic chemistry, specifically in the pharmaceutical context.** **2. Learn the structure of chemical compounds, including their chemical and physical properties, as well as chemical reactions and spectroscopic analysis.** **3. Understand the processes of drug design and development, including physicochemical and structural features that influence ADME (absorption, distribution, metabolism, and excretion) and drug-target binding, and establish structure-activity relationships**	

1. **Learning Outcomes, Teaching and Learning Methods, and Evaluation**

Students will learn core organic pharmaceutical chemistry principles, including structure-activity relationships and drug metabolism. Teaching involves lectures, problem-solving sessions, and case studies, possibly using computational tools. Evaluation is through exams, quizzes, and assignments, assessing knowledge and application skills.

A. Knowledge and Understanding

1. **Students will gain a comprehensive understanding of the core principles of organic chemistry and their relevance to pharmaceutical science.**
2. **They will learn to correlate the structure of organic molecules with their physical and chemical properties, including reactivity and stability.**
3. **A key focus will be understanding how these principles are applied in the context of drug design, drug synthesis, and the behavior of drugs within biological systems**

B. Subject-Specific Skills

1. **Students will develop skills in applying chemical principles to predict the behavior and properties of pharmaceutical compounds.**
2. **They will learn to analyze and interpret spectroscopic data to elucidate the structures of organic molecules relevant to drug design and development.**
3. **Students will gain proficiency in understanding the relationships between the chemical structure of a drug and its biological activity.**

Teaching and Learning Methods

1. **he course will employ lectures to deliver core concepts and principles of organic chemistry relevant to pharmaceutical science.**
2. **Interactive problem-solving sessions will provide students with opportunities to apply their knowledge and develop critical-thinking skills.**
3. **Case studies of drug molecules will illustrate the practical application of theoretical concepts in drug design, synthesis, and structure-activity relationships**

C. Evaluation Methods

1. **Student understanding will be evaluated through written examinations that assess their grasp of key concepts and their ability to apply them to pharmaceutical scenarios.**
2. **Problem-solving assignments will test the students' skills in areas like structure elucidation, reaction mechanisms, and predicting the properties of drug molecules.**
3. **Quizzes and tests will gauge students' knowledge of nomenclature, stereochemistry, and the relationships between chemical structure and biological activity**

D. Thinking Skills

1. **Students will develop critical thinking skills necessary for analyzing and solving complex problems related to drug synthesis, drug action, and structure-activity relationships.**
2. **They will learn to apply problem-solving strategies to organic reactions, mechanisms, and spectroscopic data interpretation, fostering a deeper understanding of chemical phenomena.**
3. **The course will encourage students to think creatively and reason through plausible solutions in the context of organic chemistry problems, similar to the diagnostic approach**

used in medicine

Teaching and Learning Methods

1. **Lectures will be used to deliver core concepts, and interactive models can help students visualize molecular phenomena.**
2. **Incorporating real-world examples from medicine, agriculture, and environmental science can enhance student engagement and help them grasp the relevance of the material.**
3. **The course may integrate a chemical structure teaching (CST) method, which focuses on the chemical structures of different drugs, to help students deduce possible properties and analytic methods based on functional groups.**

Evaluation Methods

1. **Evaluations will include traditional closed-book exams that test knowledge and understanding of organic chemistry principles.**
2. **Students' abilities to solve problems and apply concepts can be assessed through open-book exams and assignments.**
3. **Oral presentations, where students discuss organic reactions, mechanisms, and drug design strategies, may also be part of the evaluation process.**

e. General and Transferable Skills

1. **Students will enhance their communication skills through presentations and group discussions, enabling them to convey complex scientific information clearly and concisely.**
2. **The course will foster analytical and problem-solving skills by engaging students in activities that require them to interpret data, evaluate scientific literature, and develop solutions to organic chemistry-related problems.**
3. **Students will develop time management and organizational skills, essential for managing workload and meeting deadlines, alongside improving their ability to work collaboratively in teams to solve problems**

11. Course Structure

Weeks	Hours	Required Learning Outcomes	Unit Name / Course or Topic	Learning Methods	Evaluation Method
1	4	Understand drug distribution principles and factors affecting it.	Drug distribution	Lectures, discussions, case studies	Quizzes, problem-solving
2	3	Explain the acid-base properties of drugs and their impact on drug behavior.	Acid-base properties	Lectures, problem-solving	Quizzes, exams
3	3	Apply statistical methods to predict pharmacological activity.	Statistical prediction of pharmacological activity	Lectures, computational exercises	Online Quiz
4	2	Develop QSAR models for predicting drug activity.	QSAR models	Lectures, model-building exercises	project, Online Quiz
5	1	Understand the use of molecular modeling in drug design.	Molecular modeling (Computer-aided drug design)	Lectures, demonstrations	Quizzes, participation
6	1	Describe the forces involved in drug-receptor interactions.	Drug receptor interaction: force involved	Lectures, discussions	Quizzes, exams
7	2	Explain the importance of steric features of drugs.	Steric features of drugs	Lectures, model viewing	Quizzes,
8	1	Explain the impact of optical isomerism on biological activity.	Optical isomerism and biological activity	Lectures, examples	Quizzes, exams
9	1	Understand the role of calculated conformation in drug activity.	Calculated conformation	Lectures, computational chemistry software	Online Quiz
10	1	Apply 3D-QSAR and use relevant databases.	Three-dimensional quantitative structure-activity relationships and databases	Lectures, software demonstrations	exams
11	1	Explain isosterism and its application in drug design.	Isosterism	Lectures, discussions	Quizzes,

12	1	Describe the events subsequent to drug-receptor interaction.	Drug-receptor interaction and subsequent events	Lectures, diagrams, flowcharts	Quizzes, exams
13-14	24	Understand the pathways of drug metabolism, the role of cytochrome P450 enzymes, and phase II reactions. Identify factors affecting drug metabolism.	General pathways of drug metabolism: Sites of drug biotransformation; Role of cytochrome P450 mono-oxygenases in oxidative biotransformation; Oxidative reactions; Reductive reactions; Hydrolytic reactions; Phase II reactions	Lectures, discussions, metabolic pathway mapping, case studies	Quizzes, exams, problem-solving, and presentations

12. Infrastructure	
Required Readings:	**References:** **Wilson and Gisvold Textbook of Organic Medicinal and Pharmaceutical Chemistry, Delgado JN, Remers WA, (Eds); Latest edition.**
Special Requirements (Workshops, Journals, Software, Websites):	**Electronic Websites: (Links to databases like CAS, ChemSpider, PubChem, and sites for nomenclature and compound information,** **Software: (Molecular modeling and QSAR software)**
Social Services (Guest Lectures, Professional Training, Field Studies, Others)	**Organizing workshops and courses for graduates:**

13.	
Prerequisites	
Minimum Number of Students	**100**
Maximum Number of Students	**200**

Name of the Instructor:

Ahmed Sabeeh Mohammed