Course Description Template for Pharmaceutical Chemistry, fourth Year First Semester

Performance Review of Higher Education Institution ((Academic Program Review))

(Theoretical)

Course Description

This course description provides a summary of the main characteristics of the course and the learning outcomes expected from the student to achieve, demonstrating whether they have made the maximum use of the available learning opportunities. It must be linked to the .program description

1. Educational Institution	**Ministry of Higher Education and Scientific Research / Al-Zahrawi University**
2. University Department / Center	**College of Pharmacy**
3. Course Name / Code	**Pharmaceutical Organic Chemistry II: Theoretical** **PPCS 47**
4. Programs in which it is included	**Bachelor of Pharmaceutical Sciences**
5. Available Forms of Attendance	**Daily Attendance**
6. Semester / Year	**First semester / Fourth year**
7. Total Number of Study Hours	**6 hours weekly**
8. Date of preparing this description	**2025-2026**
1) Course Objectives: This course offers an in-depth exploration of the pharmaceutical chemistry and pharmacology of major drug classes that target key physiological systems. The curriculum focuses on the relationship between chemical structure and biological activity (SAR), the mechanism of action at specific receptors, and the therapeutic applications of these agents in treating various diseases.	
9. Learning Outcomes, Teaching and Learning Methods, and Evaluation	

A. Knowledge and Understanding

Demonstrate deep knowledge of the chemistry, synthesis, and SAR of specific therapeutic classes, such as: Autonomic Nervous System Drugs: Adrenergic and Cholinergic agents. Cardiovascular Drugs: ACE inhibitors, Beta-blockers, and Calcium channel blockers' Drugs: Antipsychotics, Anticonvulsants, and Sedative-hypnotics. Analgesics: Opioid and Non-steroidal anti-inflammatory drugs (NSAIDs).

1. Subject-Specific Skills

These skills involve critical thinking and problem-solving within the context of drug chemistry:

- **SAR Analysis:** Analyze the **Structure-Activity Relationship (SAR)** of a drug to predict how chemical modifications (e.g., adding a fluorine atom or a methyl group) will alter its potency or toxicity.
- **Metabolic Prediction:** Predict the most likely **metabolic pathways** and metabolites of a drug molecule based on its functional groups to identify potential "toxic metabolites."
- **Rational Drug Design:** Design a **Prodrug** strategy for a specific molecule to overcome physical barriers, such as poor water solubility or low gastric stability.

Teaching and Learning Methods

1. Theoretical lectures.
2. Scientific posters and interactive classroom activities.
3. Homework assignments (coursework).

2. Evaluation Methods

1. Midterm and final examinations.
2. Oral examinations.
3. Classroom activities and homework assignments.

3. Thinking Skills

1. Using modern methods to prepare and deliver lectures through PowerPoint presentations.
2. Applying group discussion techniques to enhance understanding of the subject matter.
3. Assigning homework and research tasks to develop analytical and critical thinking skills.

4. General and Transferable Skills

1. Enabling students to apply the knowledge they have acquired in practical settings.
2. Enhancing students' self-confidence through participation in discussions and seminars.
3. Empowering students to apply what they have learned to their professional development.

11. Course Structure					
Weeks	Hours	Required Learning Outcomes	Unit Name / Course or Topic	Learning Methods	Evaluation Method
1	٢	Knowledge	Cholinergic agents , cholinergic receptors and their subtype	Whiteboard and PowerPoint Presentations	Group discussion, oral exams, and assignments
2-3	5	Knowledge	Cholinergic agonists; stereochemistry and SAR; products; cholinesterase inhibitors	and PowerPoint Presentations	Group discussion, oral exams, and assignments
4	5	Knowledge	Cholinergic blocking agents; SAR; solanaceous alkaloid and analogues; synthetic cholinergic blocking agents and products; ganglionic blocking agents)neuromuscular blocking agents.(	whiteboard and PowerPoint Presentations	Group discussion, oral exams, and assignments
5-7	9	Knowledge	Adrenergic agents (adrenergic neurotransmitters), adrenergic receptor; drugs affecting adrenergic neurotransmission; sympathomimetic agents, adrenergic receptor antagonists	whiteboard and PowerPoint Presentations	Group discussion, oral exams, and assignments
8-9	5	Knowledge	CNS depressant; benzodiazepines and related compounds; barbiturate; CNS depressant with skeletal muscle relaxant properties; antipsychotics; anticonvulsants CNS stimulants	whiteboard and PowerPoint Presentations	Group discussion, oral exams, and assignments
10-11	5	Knowledge	Drugs affecting the Renin Angiotensin pathway and calcium blockers, vasodilators.	Whiteboard and PowerPoint Presentations	Group discussion, oral exams, and assignments
12-13	7	Knowledge	Structure–activity relationships at H-١ receptors ;first-generation antihistamine classes ; second-generation antihistamines; recent antihistamine developments: the“ dual-acting” antihistamines;	Whiteboard and PowerPoint Presentations	Group discussion, oral exams, and assignments

			histamine H-۲antagonists: structural derivation of the "H-۲antagonists"		
14-15	5	Knowledge	Cyclooxygenases; Therapeutic Classifications; SAR.	Whiteboard and PowerPoint Presentations	Group discussion, oral exams, and assignments

12. Infrastructure	
Required Readings:	**References:** **1)** Foye's Principles of Medicinal Chemistry Roche PhD (Author), S. William PhD Zito 7 th Edition PhD by Victoria PhD F. , College of Pharmacy, Houston Uni, Texas, USA. **2)** Wilson and Gisvolds textbook of organic medicinal and pharmaceutical chemistry, John M. B.; John H.B. (twelfth edition). **3)** An Introduction to Medicinal Chemistry 7th Edition by Graham L. Patrick, University of the West of Scotland, UK
Special Requirements (Workshops, Journals, Software, Websites):	**Electronic Websites:** **Web sites for pharmaceutical molecules**

13. Admission:	
Prerequisites	Admission according to the central plan
Minimum Number of Students	/
Maximum Number of Students	Admission exceeds the capacity plan.

Name of the Instructor:

Lecturer assistant Ahmed M. Motlk

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