

Course Description Template for Pharmaceutical Chemistry, Fourth Year second 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 III: Theoretical PPCS 48
4. Programs in which it is included	Bachelor of Pharmaceutical Sciences
5. Available Forms of Attendance	Daily Attendance
6. Semester / Year	Second semester / Fourth year
7. Total Number of Study Hours	4 hours weekly
8. Date of preparing this description	2025-2026
1) Course Objectives: 1) This course covers the medicinal chemistry and pharmacology of chemotherapeutic drugs. It details the mechanisms of anticancer agents, from traditional antineoplastics to modern biotherapeutics. 2) The curriculum also provides an in-depth analysis of major antibacterial classes (including β -lactams and sulfonamides) and concludes with an overview of antiviral and antifungal agents	
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: anti-cancer chemotherapy, anti-bacterial agents, antiviral, and antifungal agents

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

- ☐ Midterm and final examinations.
- ☒ Oral examinations.
- ☒ Classroom activities and homework assignments.

3. Thinking Skills

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

4. General and Transferable Skills

- ☐ Enabling students to apply the knowledge they have acquired in practical settings.
- ☒ Enhancing students' self-confidence through participation in discussions and seminars.
- ☒ 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
1-4	15	Knowledge	Antineoplastic agents : alkylating agents; antimetabolites; antibiotics; plants products ;miscellaneous compounds	Whiteboard and PowerPoint Presentations	Group discussion, oral exams, and assignments
5-7	5	Knowledge	Hormones and related compounds; Future anti- neoplastic agents; Monoclonal antibodies; Gene therapy of cancer.	and PowerPoint Presentations	Group discussion, oral exams, and assignments
8-10	5	Knowledge	β - lactam antibiotics(penicillins); β - lactamase inhibitors; cephalosporins and monobactams	whiteboard and PowerPoint Presentations	Group discussion, oral exams, and assignments
11-12	9	Knowledge	Aminoglycosides and chloramphenicol; tetracyclines; macrolides; Lincomycins and polypeptides	whiteboard and PowerPoint Presentations	Group discussion, oral exams, and assignments
13	3	Knowledge	Sulfonamide:chemistry, nomenclature, mechanism of action, resistance, toxicity, side effect, metabolism protein binding, distribution and SAR) products, sulfones	whiteboard and PowerPoint Presentations	Group discussion, oral exams, and assignments
14-15	6	Knowledge	Agents Inhibiting Virus Attachment, Penetration, and Early; Agents Interfering with Viral Nucleic Acid Replication; HIV Protease Inhibitors; HIV Reverse Transcriptase Inhibitors; HIV Integrase Inhibitors; Investigational Antiviral Agents	Whiteboard and PowerPoint Presentations	Group discussion, oral exams, and assignments
16-18	6	Knowledge	Biochemical targets for antifungal chemotherapy; Polyene Membrane Disruptors; Ergosterol Biosynthesis Inhibitors; Inhibitors of Cell Wall Biosynthesis— Echinocandins;	Whiteboard and PowerPoint Presentations	Group discussion, oral exams, and assignments

			miscellaneous drugs		
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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
Social Services (Guest Lectures, Professional Training, Field Studies, Others)	Organizing workshops and courses for graduates: none

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

Name of the Instructor:

Lecturer assistant Ahmed M. Motlk