

## The University of Jordan

**Faculty: Pharmacy**

**Department:** Pharmaceutical Sciences

**Program: Pharmacy, PharmD**

**Academic Year/ Semester: Second Semester 2014-2015**

**Course Name (Course Number): 1201402**

<b>Credit hours</b>	3	<b>Level</b>	Bsc Pharmacy	<b>Pre-requisite</b>	Pharmacy degree
<b>Coordinator/ Lecturer</b>		<b>Office number</b>		<b>Office phone</b>	
<b>Course website</b>		<b>E-mail</b>		<b>Place</b>	

<b>Office hours</b>					
<b>Day/Time</b>	<b>Sunday</b>	<b>Monday</b>	<b>Tuesday</b>	<b>Wednesday</b>	<b>Thursday</b>

### **Course Description**

An introduction to the principles and methods of medicinal chemistry including lead generation, lead optimization and quantitative structure-activity relationships. An introduction to the principles of biophysical chemistry will be presented, which will include techniques focused on enzyme activity and inhibition. The different classes of biologically important molecules will be introduced, including discussion on their biosynthesis.

### **Learning Objectives**

By the end of the course the student should be able to:

- 1 - Explain the physicochemical properties of drugs including electronic, lipophilic, steric parameters in relation to synthetic and biotechnology.
- 2 - Describe the chemistry of medicinal agents, their isolation, synthesis, purification, identification and application of different analytical techniques for their estimation in dosage forms as well as structural activity relationship (SAR) and drug design.
- 3 - Understanding of the activity and toxic profile of various drugs deduced from structure, and metabolism

### **Intended Learning Outcomes (ILOs):**

**A. Knowledge and Understanding:** Student is expected

A1) Be able to discuss the structure activity relationships (SAR) that control

the pharmacokinetics (drug absorption, distribution, metabolism and excretion) and pharmacodynamics (mechanism of action of drug with respective receptor) of significant fraction of clinically applicable antibacterial (synthetic and natural antibiotics), antifungal (synthetic and natural antibiotics), antiprotozoal (in particular antimalarials, antiamebics), anthelmenthics, antivirals and antineoplastic agents.

- A2) Be able to predict qualitatively pharmacokinetic and pharmacodynamic properties of various chemotherapeutic agents from molecular structures.
- A3) Be able to locate, analyze and evaluate information from a wide variety of sources in a planned and timely manner.
- A4) Be able both independently and cooperatively to apply effective, creative and innovative solutions to solve current and future problems.
- A5) Skills in interpersonal understanding, teamwork and communication

**B. Intellectual Analytical and Cognitive Skills:** Student is expected to:

- B1 - Predict the methods of synthesis and properties of medicinal agents and their relation to molecular structure by applying the principles of bio - informatics and computer aided tools in drug design.
- B2 - Apply qualitative and quantitative analytical methods for identification, quality control and assay of raw materials as well as pharmaceutical preparations.
- B3 - Apply information and propose approaches for monitoring and design of medicinal agents of different sources.
- B4 - Select and asses appropriate methods of extraction, isolation, purification, identification, standardization medicines from synthetic origin.

**C. Subject-Specific Skills:** Student is expected

- C1) Employ theoretical organic chemistry knowledge for the synthesis of medicinal compounds.
- C1) Employ background knowledge in purification techniques (i.e., crystallization) for purifying chemical structures during synthesis.
- C3) Employ analytical techniques, i.e., infrared spectroscopy, thin layer chromatography and nuclear magnetic resonance (Demo), for characterizing chemical structures during synthetic steps.

**D. Transferable Key Skills:** Students is expected

- D1) Acquire “clinical-chemical” intuition by which the student can associate the chemotherapeutic properties of certain medicinal agent and its corresponding chemical structure.

D2) Think in a multidisciplinary way through which the student can venture smoothly within the Host-Microbe (or parasite or cancer cell) - Antimicrobial agent (or anticancer) triangle.

This course is appropriate for undergraduate curriculum at a four-year pharmacy faculty. The level of the course is to be supplemented with relevant practical laboratory sessions.

**ILOs: Learning and Evaluation Methods**

<b>ILO/s</b>	<b>Learning Methods</b>	<b>Evaluation Methods</b>
<b>Knowledge and Understanding</b> <b>Intellectual Analytical and Cognitive Skills</b>	<b>Lectures</b>	<b>Exams, oral discussions</b>
<b>Subject-Specific Skills</b>	<b>Lectures and Discussions, Homework and Assignments, Projects, Presentation, ...</b>	<b>Quiz, presentation, project, assignments.</b>
<b>Transferable Key Skills</b>	<b>Lectures and Discussions, Homework and Assignments, Projects, Presentation, ...</b>	<b>presentation, project, assignments.</b>

## Course Contents

		Topic	No. of lectures	Reference textbook
<b>Week 1</b>	<b>Dr. Suaifan</b>	$\beta$ -Lactam Antibiotics	3 lectures	<i>Patrick</i>
<b>Week2</b>	<b>Dr. Suaifan</b>	Cephalosporins	3Lectures	<i>Patrick</i>
<b>Week 3</b>	<b>Dr. Taha</b>	Quinolones Sufonamides	2 Lectures	<i>Wilson and Gisvold's</i>
<b>Week 4</b>	<b>Dr. Abuhammad</b>	Aminoglycosides Macrolides	1 lecture 1 lecture	<i>Wilson and Gisvold's</i>
<b>Week 5</b>	<b>Dr. Abuhammad</b>	Antituberculars	2 lectures	<i>Wilson and Gisvold's</i>
<b>Week 6</b>	<b>Dr. Abuhammad</b>	Antifungals	2 lectures	<i>Wilson and Gisvold's</i>
<b>Week 7</b>		<b>Midterm Exam</b>		
<b>Week 8</b>	<b>Dr. Abuhammad</b>	Antimalaria Anthelminthics	1 lecture 1 lecture	<i>Wilson and Gisvold's</i>
<b>Week 9</b>	<b>Dr. Abuhammad</b>	Antivirals	1lectures	<i>Wilson and Gisvold's</i>
<b>Week 10</b>	<b>Dr. Abuhammad</b>	Antivirals	1 lectures	<i>Wilson and Gisvold's</i>
<b>Week 11</b>	<b>Dr. Abuhammad</b> <b>Dr. Taha</b>	Antiprotozoal Tetracyclines	1 lecture 1 lecture	<i>Wilson and Gisvold's</i>
<b>Week 12</b>	<b>Dr. Taha</b>	Lincomycin Misc.antibiotics	1 lecture 1 lecture	<i>Wilson and Gisvold's</i>
<b>Week 13</b>	<b>Dr. Taha</b>	Anticancer agents	2 Lectures	<i>Wilson and Gisvold's</i>
<b>Week 14</b>	<b>Dr. Taha</b>	Anticancer agents	2 Lectures	<i>Wilson and Gisvold's</i>
<b>Week 15</b>		Final Exam		

## Learning Methodology

## Projects and Assignments

## **Evaluation**

<b>Evaluation</b>	<b>Point %</b>	<b>Date</b>
<b>Midterm Exam</b>	<b>40</b>	
<b>Project</b>	<b>10</b>	
<b>Assignments</b>		
<b>Homework</b>		
<b>Final Exam</b>	<b>50</b>	

### **Main Reference/s:**

Wilson and Gisvold's Textbook of Organic, Medicinal and Pharmaceutical Chemistry, 10th Edition. Delgado, J.N.; Remers, W.A.

Principles of Medicinal Chemistry, 4th Edition. Foye, W.O.; Lemke, T.L.; Williams, D.A.

An Introduction to Medicinal Chemistry, 3rd edition; Graham L. Patrick; Oxford University Press Inc., New York, 2005