

Template 1

Jordan University of Science and Technology
Faculty/College of Pharmacy
Department of Medicinal Chemistry and Pharmacognosy
2nd Semester 2018/2019

Course Specifications

Title & Instructor	
Course Title	Medicinal Chemistry I
Course Number	Pharm 321
Prerequisites	Pharmaceutical Organic Chemistry, (Phar 222)
Course Website	Lecture notes, news and updates....etc. will be posted on https://elearning.just.edu.jo/ which is the primary method by which information will be disseminated to everyone in the class. Please check it on a regular basis.
Instructors	Dr. Nizar Al-Shar'i and Dr. Jamal Al-Jilani
Office Location	PH4 Level 0
Office Phone	+962 2 720 1000 Ext. 23903 Dr. Nizar
Office Hours	Sun : 08:30 - 09:30 Mon : 10:00 - 12:00 Tue : 10:30 - 11:30 Thu : 10:30 - 11:30
E-mail	nashari@just.edu.jo
Teaching Assistant	NA

Course Description
<p>This course introduces the concept of drugs' pharmacokinetics and pharmacodynamics and discusses the effect of drugs' chemical structure on their interaction with different body macromolecule targets. In addition, the course explains the Structure-Activity Relationships (SAR) of drugs acting on the central nervous system (CNS) and the autonomic nervous system (ANS).</p>

Program competencies
<p>1.1 Learner (Learner): Develop, integrate, and apply knowledge from the foundational sciences (i.e., pharmaceutical) to evaluate the scientific literature, explain drug action and solve therapeutic problems.</p>
<p>3.1 Problem Solving (Problem Solver): Identify problems; explore and prioritize potential strategies; and design, implement, and evaluate a viable solution.</p>

Active Learning Strategies
1. STBE: Structure Based Therapeutic Evaluation cases within group discussion.
2. Problem solving formulated in exam type questions
3. Animations and simulations
4. Argumentative discussions between student groups
5. Debates

Template 1

Course Aims and Objectives
<p>The aim of this course is to impart an understanding of the followings:</p> <ul style="list-style-type: none"> • The influence of the physicochemical properties of a drug on its pharmacokinetics and pharmacodynamics and evaluate their effects on different drug classes. • The different types and Structure-Activity Relationships (SAR) of drugs acting on central and peripheral nervous systems. • To introduce the concept of rational drug design and strategies applied during the study of drugs structure-activity relationship. • To introduce the concept of structurally based therapeutic evaluation (SBTE) of drugs.

Objectives	Weights
1) To study the physicochemical properties of drug classes and how they are affected by structural modification.	15%
2) To set up the relation between drug's structure and its pharmacological action and to understand how the drug's activity depends on its composition and 3D structure.	15%
3) To learn how to predict the drug's pharmacokinetic and pharmacodynamic profiles from its functional groups.	10%
4) To Introduce key aspects of medicinal chemistry to impart an understanding of drug targets and of what medicinal chemists have to think about when attempting to design new drugs in accordance with the target and the purpose of the drug.	10%
5) Enable the student to understand the mode of action of the different drugs acting on the central and peripheral nervous system. And to understand how SAR can alter their physicochemical properties, which may affect its biological response or influence its formulation or administration.	50%

Text Book & References	
Title	Foye's principles of medicinal chemistry
Author(s)	Thomas L. Lemke, David A. Williams
Publisher	Lippincott Williams & Wilkins
Year	2013
Edition	7 th Edition
Book Website	https://www.lww.com/Product/9781609133450
References	<ol style="list-style-type: none"> 1. An Introduction to Medicinal Chemistry, Graham Patrick, 6th Edition, 2017, Oxford University press. 2. Wilson and Gisvold's textbook of organic medicinal and pharmaceutical chemistry, John H. Block, John M. Beale, 12th edition, 2013, Lippincott Williams & Wilkins

Intended Student Learning Outcomes(ISLOs)		
Upon successful completion of this course, students should be able to:		
ISLOs	Related Objective(s)	Reference(s)
1. Apply the knowledge gained from organic chemistry courses and current course regarding functional group chemistry, pharmacodynamics, and pharmacokinetics to specific drug groups.	1 - 4	Foye's Principles of Medicinal Chemistry, chapters: 1, 2, 3,4, 7, and 8.
2. Memorize the mode of action of major drug classes discussed in this course. Recognize the term Structure- Activity Relationship (SAR), and apply it to studied drug classes in terms of how structural modification may affect its biological response and affect its formulation or administration.	2, 4, 5	Foye's Principles of Medicinal Chemistry, chapters: 9, 10, 13, 14, 15, 17, and 18.
3. Predict the biological response of some groups of drugs and medical use by referring to their chemical structures (applying the SBTE approach).	5	Foye's Principles of Medicinal Chemistry, chapters: 9, 10, 13, 14, 15, 17, and 18.

Template 1

Teaching & Learning Methods
Teaching and learning methods are designed to achieve the course objectives. Those methods include: <ol style="list-style-type: none"> 1. Lecture notes and handouts 2. Data show and computer in lectures 3. Problem solving 4. Group discussion 5. Workshops

Assessment		
Assessment Type	Expected Due Date	Weight
First Exam	4 th – 6 th week	30 %
Second Exam	9 th – 11 th week	30 %
Final Exam	15 th – 17 th week	40 %
Useful Resources		
Textbook, References, Class notes, Internet, Drugbank website, Protein Data Bank, and Freely Available Visualizers such as DS and PyMol.		

Course Content		
Week	Topics	Chapter in Text/handouts
1	Introduction to medicinal chemistry <ul style="list-style-type: none"> - Medicinal chemistry: understanding of drug chemistry - What is drug? - Drug's biological activity 	Chapter 1 in ref. 1
2-3	Pharmacokinetics <ul style="list-style-type: none"> - Drug absorption: mainly oral absorption - Mechanisms of drug absorption - Physicochemical properties affecting drug absorption - Drug distribution 	Chapters 2 and 3 Chapter 11 in ref. 1
4	Bioisosterism and Pharmacophore	Chapter 2 (Wilson and Gisvold's textbook of Organic Medicinal and Pharmaceutical Chemistry)
5-6	Pharmacodynamics <ul style="list-style-type: none"> - Drug targets at molecular level - How do drugs interact with their targets? - Types of drug-target intermolecular interactions - Stereochemistry and drug action - Drug targets: Receptors and enzymes - Enzyme kinetics 	Chapter 7,8
7-10	Cholinergic and adrenergic system	Chapter 9, 10
11	Sedative hypnotics	Chapter 15
12	Antipsychotics	Chapter 14
13	antidepressants	Chapter 18
14	Antiparkinson	Chapter 13
15	antiseizures	Chapter 17

Template 1

Additional Notes	
Exams	<ul style="list-style-type: none"> • The format for the exams is generally (but NOT always) as follows: Multiple-choice and short essay questions. • Grades will not be given out via e-mail • All exams are closed book and notes. The final exam is comprehensive (covers all the material). • Instructor should return exam papers graded to students not after the week following the exam date. • Incomplete exams should not be given unless there is a valid excuse and they need approval from the dean. • Arrangements to take an exam at a time different than the one scheduled MUST be made prior to the scheduled exam time.
Cheating	<p>The commitment of the acts of cheating and deceit such as copying during examinations, altering examinations for re-grade, plagiarism of homework assignments, and in any way representing the work of others as your own is dishonest and will not be tolerated. Standard JUST policy will be applied</p> <p style="text-align: center;">المادة 7: إذا ضُبط الطالب أثناء الامتحان أو الاختبار متلبساً بالغش فتوقع عليه العقوبات التالية مجتمعة: أ- اعتباره راسباً في ذلك الامتحان أو الاختبار. ب- الغاء تسجيله في بقية المساقات المسجل لها في ذلك الفصل. ج- فصله من الجامعة لمدة فصل دراسي واحد يلي الفصل الذي ضبط فيه.</p>
Attendance	<ul style="list-style-type: none"> • Excellent attendance is expected. • JUST policy requires the faculty member to assign ZERO grade (35) if a student misses 10% of the classes that are not excused, and a total of 20% with approved valid excuses. • If you miss class, it is your responsibility to find out about any announcements or assignments you may have missed.
Participation	<ul style="list-style-type: none"> • Students are expected be proactive and to be fully engaged in interactive class discussions.
Drop Date (withdraw)	<ul style="list-style-type: none"> • Last day to drop the course is last day before the final exams