

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

**Course Specifications**

Title & Instructor	
<b>Course Title</b>	Medicinal Chemistry II
<b>Course Number</b>	Pharm 322
<b>Prerequisites</b>	Medicinal Chemistry I, (Phar 321)
<b>Course Website</b>	Lecture notes, news and updates....etc. will be posted on <a href="https://elearning.just.edu.jo/">https://elearning.just.edu.jo/</a> which is the primary method by which information will be disseminated to everyone in the class. Please check it on a regular basis.
<b>Instructor</b>	Dr. Nizar Al-Shar'i
<b>Office Location</b>	PH4 Level 0
<b>Office Phone</b>	+962 2 720 1000 Ext. 23903
<b>Office Hours</b>	To be announced soon
<b>E-mail</b>	<a href="mailto:nashari@just.edu.jo">nashari@just.edu.jo</a>
<b>Teaching Assistant</b>	NA

Course Aims and Objectives	
The <b>aim</b> of this course is to impart an understanding of the structure-activity relationships of different drug classes including those affecting cardiovascular system, anti-histamines, histamine-release inhibitors, anti-ulcers, oral hypoglycemic agents, centrally and peripherally acting analgesics, local anesthetics, steroids and therapeutically related compounds. Along with an understanding of their mode of action, and the principals involved in modern drug design and discovery.	
Objectives	Weights
1. To study the scaffolds of specific drug classes and explore their structure-activity relationship maps	<b>60%</b>
2. To introduce and illustrate the concept of drug design and the strategies applied in studying the structure-activity relationship of any drug class	<b>20%</b>
3. To interpret the drug's experimental data that relates its potency and efficacy to functional groups composition, 3D structure and physicochemical properties	<b>15%</b>
4. To learn how to predict the drug's pharmacokinetic and pharmacodynamic profiles and expected side effects from its functional groups	<b>15%</b>

Course Description
The concept of structural medicinal chemistry would be applied during the course to study the drugs affecting cardiovascular system, anti-histamines, histamine-release inhibitors, anti-ulcers, oral hypoglycaemic agents, centrally and peripherally acting analgesics, local anaesthetics, steroids and therapeutically related compounds classes. The concept will be applied through the comprehensive study of the relationship between drugs chemical structures (functional groups composition and 3D shape) and their pharmacodynamics and pharmacokinetic profiles.

## Template 1

Program competencies	
<b>Domain 1: Foundational Knowledge</b>	
1.1	Learner (Learner): Develop, integrate, and apply knowledge from the foundational sciences (i.e. pharmaceutical, social/behavioral/administrative, and clinical sciences) to evaluate the scientific literature, explain drug action, solve therapeutic problems, and advance population health.
<b>Domain 3: Approach to Practice and Care</b>	
3.1	Problem solving (problem solver): identify problems; explore and prioritize potential strategies; and design, implement, and evaluate a viable solution.

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	

Text Book & References	
<b>Title</b>	Foye's principles of medicinal chemistry
<b>Author(s)</b>	Thomas L. Lemke, David A. Williams
<b>Publisher</b>	Lippincott Williams & Wilkins
<b>Year</b>	2013
<b>Edition</b>	7 <sup>th</sup> Edition
<b>Book Website</b>	<a href="http://thepoint.lww.com/Book/Show/239521">http://thepoint.lww.com/Book/Show/239521</a>
<b>References</b>	1. An Introduction to Medicinal Chemistry, Graham Patrick, 6 <sup>th</sup> Edition, 2017, Oxford University press. 2. Wilson and Gisvold's textbook of organic medicinal and pharmaceutical chemistry, John H. Block, John M. Beale, 12 <sup>th</sup> 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. Identify the drug class (of the intended classes to be studied) from its scaffold and predict its pharmacodynamic and pharmacokinetic profiles	1, 4	Chapters 21, 23, 27, 32, <b>Foye's Principles of Medicinal Chemistry</b> Chapters 24 and 25 in <b>Ref. 1</b> Chapters 22 and 25 in <b>Ref. 2</b>
2. Set up a comprehensive understanding of the drug's structure and its physicochemical properties-activity relationship	1, 4	Chapters 21, 23, 27, and 32 in <b>Foye's Principles of Medicinal Chemistry</b> Chapters 24 and 25 in <b>Ref. 1</b> Chapters 22 and 25 in <b>Ref. 2</b>
3. Solve the problems related to drug's side effects through learning essential structural modifications related that can be carried out	4	Chapters 31 and 32 in <b>Foye's Principles of Medicinal Chemistry</b>
4. Interpret the drug's <i>in vitro</i> potency and <i>in vivo</i> efficacy experimental data	3	Chapters 21 and 31 in <b>Foye's Principles of Medicinal Chemistry</b>
5. Introduce the concept of rational drug design and conventional strategies used in the design of captopril, cimetidine and morphine analogues	2	Chapter 23 in <b>Foye's Principles of Medicinal Chemistry</b> Chapters 24 and 25 in <b>Ref. 1</b>

## Template 1

Teaching & Learning Methods
<p>Teaching and learning methods are designed to achieve the course objectives. Those methods include:</p> <ol style="list-style-type: none"> <li>1. Lecture notes and handouts</li> <li>2. Data show and computer in lectures</li> <li>3. Demonstration videos</li> <li>4. Problem solving</li> <li>5. Group discussion</li> <li>6. Workshops</li> <li>7. Viewing 3D structures of drugs, co-crystallized with their proteins, in order to teach and explore drug-target interactions</li> </ol>


Assessment		
Assessment Type	Expected Due Date	Weight
First Exam	4 <sup>th</sup> – 6 <sup>th</sup> week	30 %
Second Exam	9 <sup>th</sup> – 11 <sup>th</sup> week	30 %
Final Exam	15 <sup>th</sup> – 17 <sup>th</sup> week	40 %

Useful Resources
<p>Textbook, References, Class notes, Internet, <a href="#">Drugbank website</a>, <a href="#">Protein Data Bank</a>, and Freely Available Visualizers such as <a href="#">DS</a>, <a href="#">PyMol</a>, <a href="#">Chimera</a>, ...etc</p>

Course Content		
Week	Topics	Chapter in Text/handouts
1	Antihypertensive drugs: Diuretics	Chapter 21
2-3	Antihypertensive drugs: Angiotensin converting enzyme inhibitors	Chapter 23
4	Antihypertensive drugs: Angiotensin II receptor antagonists	Chapter 23
4	Antihypertensive drugs: Calcium channel blockers	Chapter 23
5	Antihyperlipidemic drugs	Chapter 25
6	Insulin and oral hypoglycemic agents	Chapter 27
7-8	H1-Antihistamines	Chapter 32
8	Histamine-release inhibitors	Chapter 32
9	H2-Antihistamines	Chapter 25 (Ref 1).
9	Proton pump inhibitors	Chapter 25 (Ref 1).
10	Local anesthetics	Chapter 22 (Ref 2).
10-11	Opioid analgesics	Chapter 24 (Ref 1).
12-13	Non-steroidal anti-inflammatory drugs	Chapter 31
13-14	Steroidal hormones and therapeutically related compounds	Chapter 25 (Ref 2).

Additional Notes	
<b>Exams</b>	<ul style="list-style-type: none"> <li>• The format for the exams is generally (but NOT always) as follows: Multiple-choice and short essay questions.</li> <li>• Grades will not be given out via e-mail</li> <li>• All exams are closed book and notes. The final exam is comprehensive (covers all the material).</li> <li>• Instructor should return exam papers graded to students not after the week following the exam date.</li> <li>• Incomplete exams should not be given unless there is a valid excuse and they need approval from the dean.</li> </ul>

## Template 1

	<ul style="list-style-type: none"> <li>• Arrangements to take an exam at a time different than the one scheduled MUST be made prior to the scheduled exam time.</li> </ul>
<b>Cheating</b>	<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: right;">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>
<b>Attendance</b>	<ul style="list-style-type: none"> <li>• Excellent attendance is expected.</li> <li>• 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.</li> <li>• If you miss class, it is your responsibility to find out about any announcements or assignments you may have missed.</li> </ul>
<b>participation</b>	<ul style="list-style-type: none"> <li>• Students are expected be proactive and to be fully engaged in interactive class discussions.</li> </ul>
<b>Drop Date (withdraw)</b>	<ul style="list-style-type: none"> <li>• Last day to drop the course is before the twelve (12<sup>th</sup>) week of the current semester.</li> </ul>
<b>Workload</b>	<ul style="list-style-type: none"> <li>• Average work-load student should expect to spend is 3 hours/week</li> </ul>
<b>Classroom Cell Phone Policy</b>	<ul style="list-style-type: none"> <li>• The use of cell phones, smart phones, or other mobile communication devices is disruptive, and is therefore prohibited during class without permission.</li> <li>• Except in emergencies, those using such devices must leave the classroom for the remainder of the class period.</li> </ul> <div style="text-align: right;">  <p style="text-align: right;"><b>Thank You</b> for Not Using Cell Phone!</p> </div>