



**The University of Jordan**

**Accreditation & Quality Assurance Center**

**COURSE Syllabus**

1	Course title	<b>Medicinal Chemistry I</b>
2	Course number	<b>1201401</b>
3	<b>Credit hours (theory, practical)</b>	<b>3 (theory)</b>
	<b>Contact hours (theory, practical)</b>	<b>3 (theory)</b>
4	Prerequisites/corequisites	Pharmaceutical Chemistry I (1201411)
5	Program title	<b>Pharmacy/PharmD</b>
6	Program code	
7	Awarding institution	<b>The University of Jordan</b>
8	Faculty	<b>Pharmacy</b>
9	Department	<b>Pharmaceutical Sciences</b>
10	Level of course	<b>Obligatory</b>
11	Year of study and semester (s)	<b>First semester of the 4<sup>th</sup> year</b>
12	Final Qualification	<b>Pharmacy/PharmD</b>
13	Other department (s) involved in teaching the course	<b>None</b>
14	Language of Instruction	<b>English</b>
15	Date of production/revision	<b>3<sup>th</sup> Oct 2021</b>

#### 16. Course Coordinator:

**Prof . Ghadeer Suaifan**

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<http://eacademic.ju.edu.jo/gh.suaifan/Lists/Published%20Research/AllItems.aspx>

**Course syllabus prepared by Dr Ghadeer Suaifan**

#### 17. Other instructors:

*To be announced*

**18. Course Description:**

*As stated in the approved study plan.*

This is an introductory course to provide students with idea about different mechanisms of drug action, the effect of different physicochemical factors on drug action including its pharmacokinetic and pharmacodynamic properties, as well as the different attractive forces influencing the binding of different to their respective receptors. Furthermore, this course should provide a general idea about the different metabolic routes by which the biological systems deals with foreign compounds.

The course also provides a useful introduction to the field of rational drug discovery, QSAR, as well as, the development of prodrugs and their properties.

**19. Course aims and outcomes:****A. Aims:**

1. To correlate physicochemical properties of molecules with their molecular pharmacological activity (SAR).
2. To understand the function, classes and mechanism of actions of drugs used in bacterial infections.

**B. Intended Learning Outcomes:**

Upon successful completion of this module, students should lead to the following outcomes:-

**A- knowledge and understanding (students should):**

A1) Be able to discuss and explain the effects of drug structure and physicochemical properties on pharmacokinetics (drug absorption, distribution, metabolism and excretion), pharmacodynamics (reaction of drug with respective receptor), drug latentiation (prodrugs) and drug metabolism (chemical modifications performed by the host bio-system on the drug molecules). The student should illustrate introductive understanding of recent theoretical aspects dealing with modern drug discovery, including quantitative structure-activity relationship, i.e., QSAR modeling, combinatorial chemistry and structure-based drug design.

A2) Be able to predict qualitatively pharmacokinetic properties from ligands' molecular structures, which encode all physicochemical properties of a particular compound. The physicochemical properties are the major determinants of the pharmacokinetic and pharmacodynamic behavior of various medicinal compounds. The student must illustrate ability to construct QSAR models and employ as probes for understanding ligand-macromolecule affinity and in drug design.

The student should be able to suggest and predict the outcomes of different metabolic routes for a particular medicinal compound. Finally, at the end of this course the student should be able to suggest appropriate prodrugs for known drug compounds.

**B) Intellectual Skills-With ability to:-**

B1) Employ relevant background knowledge as appropriate for understanding the pharmacodynamic and pharmacokinetic behavior of various drug classes.

B2) Apply QSAR techniques to probe the structural features responsible for the observed pharmacodynamic and pharmacokinetic behavior.

B3) Employ relevant background knowledge as appropriate for suggesting appropriate prodrugs for candidate drug classes.

C) Practical Skills-with ability to (in the laboratory Sessions): -

This course is given without practical laboratory session.

D) Transferable skills-with ability to:-

D1) Acquire “physicochemical” intuition by which the student can predict several biological properties about certain drug or bioactive compound from the chemical structure only.

D2) Think in a multidisciplinary way through which the student can mix chemistry and chemical intuition with biological activity.

This course is appropriate for undergraduate four-year curriculum at the pharmacy faculty.

**Expected Competencies:**

**1. Dispensing of Medicines:**

1.1 Recognize pharmacological classes of drugs

1.3 Characterize different dosage forms of medicines and their proper usage

1.4 Identify different routes of administration of medicines

1.6 Recognize and follow proper storage conditions of medicines

1.11 Package medicines properly to ensure their stability, safety and patient accessibility

1.12 Label dispensed medicines with all necessary information and instructions

1.17 Advise patients about the proper use of medical devices and other non-medicinal pharmaceutical products

1.18 Advise patients to seek further medical assistance whenever needed

**2. Patient Care**

2.3 Identify indications, side effects and contraindications of medicines

2.4 Identify drug-drug and drug-food interactions of medicines

2.5 Identify basic principles of drug pharmacokinetics and recognize disease conditions and other factors that interfere with safety and efficacy of medicines

2.9 Advise patients and other health professionals on proper usage of medicines including their strength, frequency, dosage form and route of administration

**3. Pharmaceutical Industry**

3.1 Identify physicochemical properties of drug substances

3.10 Identify the principles of stability testing and shelf-life determination

3.11 Identify analytical method development and validation used in pharmaceutical analysis

Course Material and Announcements

Students need to use the e-learning page at the JU website in order to get all homework uploaded there.

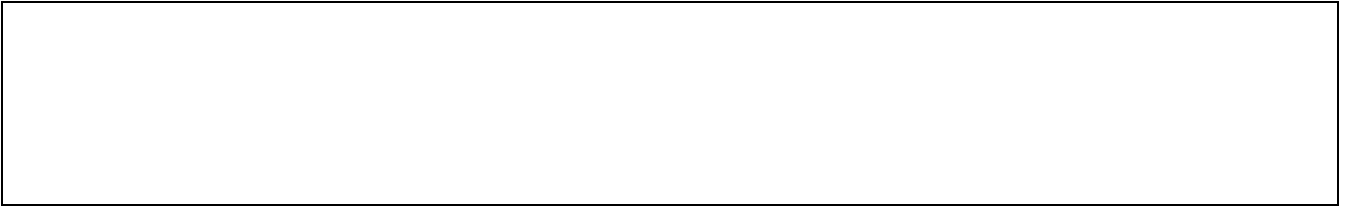
In addition, course related announcements and exam results will be posted on the e-learning page and is the responsibility of each student to check the site regularly.

Username and password to access the course on the e-learning page will be provided to students in the beginning of the semester.

**20. Topic Outline and Schedule:**

Week	Topic	Schedule		Assignments (Done by every Sunday BEFORE class)
		Day	Recourses	
1 (3/10)	Registration (Addition and withdrawing period)	Sun/Mon	Orientation Registering and creating moodle account. Reading the Blended Learning 'How to' Guide	
		Tue/Wed		
2(10/10)	Introduction to blended Learning and Medicinal Chemistry I course material	Sun/Mon	Instructor Prepared PPT	
		Tue/Wed	Instructor Prepared PPT	
3 (16/10)	Physicochemical Properties in relation to biological activity Pharmacokinetic (Absorption, Distribution, Metabolism and Elimination)	Sun/Mon	Instructor Prepared PPT	
		Tue/Wed	Watch Online ressource provided	
4 (24/10)	Physicochemical Properties in relation to biological activity Pharmacokinetic (Absorption, Distribution, Metabolism and Elimination)	Sun/Mon	Class discussion & Instructor Prepared PPT Watch Online ressource provided	As posted on Moodle by every Tuesday E-learning.ju.edu.jo
		Tue/Wed		
5 (31/10)	Physicochemical Properties in relation to biological activity Pharmacokinetic (Absorption, Distribution, Metabolism and Elimination)	Sun/Mon	Class discussion & Instructor Prepared PPT Watch Online ressource provided	As posted on Moodle by every Tuesday E-learning.ju.edu.jo
		Tue/Wed		
6 (7/11)	Structural Features and Pharmacological Activity (Optical, Geometric, Conformational, Isosterism)	Sun/Mon	Class Discussion & Instructor Prepared PPT Watch Online ressource provided	As posted on Moodle by every Tuesday E-learning.ju.edu.jo
		Tue/Wed		

7 (14/11)	Structural Features and Pharmacological Activity (Optical, Geometric, Conformational, Isosterism)	Sun/Mon	Class Discussion & Instructor Prepared PPT Watch Online resource provided	As posted on Moodle by every Tuesday E-learning.ju.edu.jo
		Tue/Wed		
8 (21/11)	Drug Receptor Interaction. The Involved Forces	Sun/Mon	Class Discussion & Instructor Prepared PPT Watch Online resource provided	As posted on Moodle by every Tuesday E-learning.ju.edu.jo
		Tue/Wed		
9 (28/11)	Selected aspects regarding Drug Design and QSAR	Sun/Mon	Class Discussion & Instructor Prepared PPT Watch Online resource provided	As posted on Moodle by every Tuesday E-learning.ju.edu.jo
		Tue/Wed		
10 (5/12)	Selected aspects regarding Drug Design and QSAR	Sun/Mon	Class Discussion & Instructor Prepared PPT Watch Online resource provided	As posted on Moodle by every Tuesday E-learning.ju.edu.jo
		Tue/Wed		
11 (12/12)	Drug Receptor Theories  Prodrugs and Drug Latentiation	Sun/Mon	Class Discussion & Instructor Prepared PPT Watch Online resource provided	As posted on Moodle by every Tuesday E-learning.ju.edu.jo
		Tue/Wed		
12 (19/12)	Prodrugs and Drug Latentiation	Sun/Mon	Class Discussion ,Instructor Prepared PPT Watch Online resource provided	As posted on Moodle by every Tuesday E-learning.ju.edu.jo
		Tue/Wed		
13 (26/12)	Metabolism	Sun/Mon	Class Discussion ,Instructor Prepared PPT Watch Online resource provided	As posted on Moodle by every Tuesday E-learning.ju.edu.jo
		Tue/Wed		
14 (2/1)	Metabolism	Sun/Mon	Instructor Prepared PPT	
		Tue/Wed	Instructor Prepared PPT	
15 (9/1)	Metabolism	Sun/Mon	Instructor Prepared PPT	
		Tue/Wed	Instructor Prepared PPT	
16 (16/1)	Final Exam	Sun/Mon	Class Discussion	
		Tue/Wed		





## 21. Teaching Methods and Assignments:

Development of ILOs is promoted through the following teaching and learning methods:

- Blended Learning

## 22. Evaluation Methods and Course Requirements:

Opportunities to demonstrate achievement of the ILOs are provided through the following assessment methods and requirements:

- \* Submission of weekly online assignments when requested
- \* Participation in online discussion forum
- \* Quizzes
  
- \*Midterm Exam
  
- \*Final Exam

## 23. Course Policies:

**A-** This course is designed to be at least two-thirds class meetings and one-third online learning. This means that you are expected to attend class at the university every Sunday for section 1 and Monday for section 4. You are also expected to participate in online discussions, collaborate and work with your fellow students, and prepare and complete any assigned homework.

- You are expected to be in class on time. Students coming late are allowed to enter but will be marked absent on attendance sheet. **No exceptions.**
- Participation and students' involvement are crucial to the success of the course. All students are expected to have read the assigned materials before coming to class in order to fully engage in the discussions. In addition to in-class discussions, students are encouraged to post their comments and questions **on E-Learning (Moodle) which can be accessed at <http://elearning.ju.edu.jo/>.**
- In BL course, the University allows a maximum of **THREE** excused absences. If you exceed this limit, you will not be allowed to sit for the final exam. Also, a minimum of 25 % of the online homework must be completed. Otherwise, student you will not be allowed to sit for the final exam. **No make-up exams for Midterm and quizzes.** In case of sickness, only reports issued directly from a public clinic or hospital will be accepted. Medical reports from private practiced doctors or private hospitals will not be accepted even if they are stamped by the university's clinic. Reports should be produced within a week of the date of the exam. **No exceptions.**

**B-** Absences from exams and handing in assignments on time:

Will result in zero achievement unless health report or other significant excuse is documented.

**C- Health and safety procedures:**

NA

**D- Honesty policy regarding cheating, plagiarism, misbehavior:**

The participation, the commitment of cheating will lead to applying all following penalties together

- 1) Failing the subject he/she cheated at
- 2) Failing the other subjects taken in the same course
- 3) Not allowed to register for the next semester. The summer semester is not considered as a semester

**24. Required equipment:**

Data show and internet connection

**25. References:****A- Required book (s), assigned reading and audio-visuals:**

- Wilson and Gisvold's Textbook of Organic, Medicinal and Pharmaceutical Chemistry, 11<sup>th</sup> Edition. Delgado, J.N.; Remers, W.A.
- Principles of Medicinal Chemistry, 4<sup>th</sup> Edition. Foye, W.O.; Lemke, T.L.; Williams, D.A. 12<sup>th</sup> Edition
- An Introduction to Medicinal Chemistry. Graham L. Patrick; 5<sup>th</sup> Edition

**B- Recommended books, materials, and media:**

- Burger's Medicinal Chemistry, 6<sup>th</sup> Edition; D.J. Abraham, Ed.
- Burger's Medicinal Chemistry, 5<sup>th</sup> edition, Vol. 1-5; M.E. Wolff, Ed.
- Burger's Medicinal Chemistry, 4<sup>th</sup> edition, Vol. 1-3; M.E. Wolff, Ed.
- Organic Chemistry of Drug Synthesis, Vol. I-6, Daniel Lednicer and Lester A. Mitscher
- Goodman & Gilman's the Pharmacological Basis of Therapeutics, 10<sup>th</sup> ed., Joel G.
- Hardman & Lee L. Limbird, Eds.; Alfred Gilman, Contrib. Ed The Pharmacological Basis of Therapeutics, 4<sup>th</sup> ed., Louis S. Goodman and Alfred Gilman

**C- Online and Multimedia**

**26. Additional information:****Assessment:****● Online Assessment (30)****● In-Class Assessment (70)**

○ Mid-term Exam (30)

○ Final Exam (40)

- Part of the Final exam material will be from the course material.
- Some exam questions may be taken from within the discussion forums throughout the semester.

**Prepared By Dr Ghadeer Suaifan**

Name of Course Coordinator: Prof. Ghadeer Suaifan

Signature: Prof Ghadeer Suaifan,

Date Sept, 19, 2021

Head of curriculum committee/Department: -----

Signature: -----

Head of Department:

Signature: -----

Head of curriculum committee/Faculty: ----- Signature: -----

Dean: ----- -Signature: -----

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Course File