

Course Plan for Bachelor Program - Study Plan Development and Updating Procedures/ Pharmacy Department	QF02/0408-4.0E
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Study Plan No.	2021/2022		University Specialization		Bachelor of Pharmacy	
Course No.	0201310		Course Name		Medicinal Chemistry (1)	
Credit Hours	2		Prerequisite *Co-requisite		Pharmaceutical Organic Chemistry (2) + *Pharmacology (1)	
Course Type	☐ Mandatory University Requirement	☐ University Elective Requirement	☐ Faculty Mandatory Requirement	☐ Support course family requirements	☒ Mandatory Requirement	☐ Elective Requirement
Teaching Style	☐ Full Online Learning		☐ Blended Learning		☒ Traditional Learning	
Teaching Model	☐ 1 Synchronous: 1 Asynchronous		☐ 1 Face to Face: 1 Asynchronous		☒ 2 Traditional	

Faculty Member and Study Divisions Information (to be filled in each semester by the subject instructor)

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Name	Academic rank	Office No.	Phone No.	E-mail	
Office Hours (Days/Time)	Sunday, Tuesday, Thursday ()		Monday, Wednesday ()		
Division number	Time	Place	Number of Students	Teaching Style	Approved Model
				Traditional Learning	2 Traditional

Brief Description

This course introduces the fundamental physicochemical and structural principles governing drug action and behavior in the body. It covers drug absorption, distribution, metabolism, excretion, and the influence of molecular properties such as ionization, solubility, and partition coefficient on bioavailability. Students will explore the structural features affecting pharmacodynamic interactions, including stereochemistry, binding forces, and functional group modifications. The course also discusses drug metabolism, prodrug strategies, and chemical approaches to optimize drug delivery, target specificity, and safety. A real-life case study of drug discovery processes is included in connecting theoretical knowledge with modern pharmaceutical applications.

Learning Resources

Course Book Information (Title, author, date of issue, publisher ... etc)	- Harrold MW, Beck K, Roche VF, Zito SW, Lemke TL, Williams DA, and editors. <i>Foye's Principles of Medicinal Chemistry</i>. 9th ed. Philadelphia: Wolters Kluwer; 2025. - Patrick GL. <i>An Introduction to Medicinal Chemistry</i>. 7th ed. Oxford: Oxford University Press; 2023.
Supportive Learning Resources (Books, databases, periodicals, software, applications, others)	- Abraham DJ, Myers M, editors. <i>Burger's Medicinal Chemistry, Drug Discovery and Development</i>. 8th ed. Hoboken (NJ): Wiley; 2021. [8-volume set]. - Lednicer D. <i>The Organic Chemistry of Drug Synthesis</i>. Vol. 7. Hoboken (NJ): Wiley-Interscience; 2007.

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	3. DrugBank. DrugBank Online [Internet]. Available from: https://go.drugbank.com .			
Supporting Websites				
The Physical Environment for Teaching	☒ Classroom	☐ Labs	☐ Virtual Educational Platform	☐ Others
Necessary Equipment and Software	- Microsoft Office. - Moodle.			
Supporting People with Special Needs				
For Technical Support	E-Learning & Open Educational Resources Center. Email: clearning@zu.edu.jo ; Phone: +962 6 429 1511 ext. 425/362.			

Course learning outcomes (K= Knowledge, S= Skills, C= Competencies)

No.	Course Learning Outcomes	The Associated Program Learning Output Code
Knowledge		
The student should be able to:		
K1	Analyze the physicochemical properties of drugs and their impact on drug's bioavailability.	MK2
K2	Evaluate the influence of stereochemistry on drug-receptor interactions and pharmacological activity.	MK2
K3	Describe drug-receptor complex formation and the bonding forces that mediate this interaction.	MK2
Skills		
The student should be able to:		
S1	Analyze drug structures and enzyme specificity to predict metabolic pathways.	MS4
S2	Design prodrug strategies or structural modifications to optimize drug stability, selectivity, and pharmacokinetics.	MS4
S3	Compare types of drug targets and mechanisms of action of different ligands.	MS4
S4	Apply chemical modification on drug's backbone.	MS4
Competencies		
The student should be able to:		
	NA	

Mechanisms for Direct Evaluation of Learning Outcomes

Type of Assessment / Learning Style	Fully Electronic Learning	Blended Learning	Traditional Learning (Theory Learning)	Traditional Learning (Practical Learning)
Midterm Exam	30%	30%	30%	0%
Participation / Practical Applications	0%	0%	30%	50%
Asynchronous Interactive Activities	20%	20%	0%	0%

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Final Exam	50%	50%	40%	50%
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Note 1: Asynchronous interactive activities are activities, tasks, projects, assignments, research, studies, projects, and work within student groups ... etc, which the student carries out on his own, through the virtual platform without a direct encounter with the subject teacher.

Note 2: According to the Regulations of granting Master's degree at Al-Zaytoonah University of Jordan, 40% of final evaluation goes for the final exam, and 60% for the semester work (examinations, reports, research or any scientific activity assigned to the student).

Schedule of Simultaneous / Face-to-Face Encounters and their Topics

Week	Subject	Learning Style*	Reference **
1	Introduction to medicinal chemistry	Lecture	-
2	Physicochemical Properties in Relation to Biological Action "Drug Pharmacokinetics - Absorption & Distribution- relationship"	Lecture	Course Book 1/ Chapters 1, 2, 11 Pages (1-12, 17-28, 152-156)
3	Physicochemical Properties in Relation to Biological Action "Drug Pharmacokinetics - Absorption & Distribution- relationship"	Lecture	Course Book 1/ Chapters 1, 2, 11 Pages (1-12, 17-28, 152-156)
	Optimizing Hydrophilic/Hydrophobic Properties	Assignment	Course Book 1/ Chapter 14 Pages (242-245)
4	Physicochemical Properties in Relation to Biological Action "Structure-Pharmacodynamic Relationship"	Lecture	Course Book 1/ Chapters 1, 2, 11 Pages (1-12, 17-28, 152-156)
5	Physicochemical Properties in Relation to Biological Action "Structure-Pharmacodynamic Relationship"	Lecture	Course Book 1/ Chapters 1, 2, 11 Pages (1-12, 17-28, 152-156)
6	Metabolic Changes of Drugs and Related Organic Compounds (Phase I)	Lecture	Course Book 1/ Chapter 11 Pages (155-166)
7	Metabolic Changes of Drugs and Related Organic Compounds (Phase I) Midterm Exam	Lecture	Course Book 1/ Chapter 11 Pages (155-166)
8	Metabolic Changes of Drugs and Related Organic Compounds (Phase II)	Lecture	Course Book 1/ Chapter 11 Pages (155-166)
9	Metabolic Changes of Drugs and Related Organic Compounds (Phase II)	Lecture	Course Book 1/ Chapter 11 Pages (155-166)
10	Prodrugs	Lecture	Course Book 1/

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			Chapter 14 Pages (252-257)
11	Optimizing Drug's Access to the Target	Lecture	Course Book 1/ Chapter 14 Pages (245-250)
12	Optimizing Drug's Access to the Target	Lecture	Course Book 1/ Chapter 14 Pages (245-250)
13	Receptors as Drug Targets	Lecture	Course Book 1/ Chapter 8 Pages (101-115)
14	Enzyme as Drug Targets	Lecture	Course Book 1/ Chapter 7 Pages (77-96)
15	Case Study: Design of ACE Inhibitors	Lecture	Course Book 1/ Chapter 15 Pages (285-290)
16	Final Exam		

* Learning styles: Lecture, flipped learning, learning through projects, learning through problem solving, participatory learning ... etc.

** Reference: Pages in a book, database, recorded lecture, content on the e-learning platform, video, website ... etc.

Schedule of Asynchronous Interactive Activities (in the case of e-learning and blended learning)

Week	Task / Activity	Reference	Expected Results
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