Course Plan for Bachelor Program - Study Plan Development and Updating Procedures/ Pharmacy Department	QF02/0408-4.0E

Study Plan No.	**2021/2022**		**University Specialization**		**Bachelor of Pharmacy**	
Course No.	**0201310**		**Course Name**		**Medicinal Chemistry (1)**	
Credit Hours	**3**		**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)*

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 explores the role of organic chemistry in the design and action of drugs. It addresses principles of drug discovery, drug development, and drug/receptor interactions, types of chemical bonds involved in drug-receptor interactions, drug mechanism of action, and drug metabolism. Aspects of biochemistry and physical organic chemistry are covered as necessary to understand the chemistry of drug action and metabolism in the body. This course is designed to impart the knowledge in computational methods and drug design approaches.

Learning Resources

Course Book Information (Title, author, date of issue, publisher ... etc)	1- An Introduction of Medicinal Chemistry, 6th edition, Graham Patrick, Oxford University Press, 2017. 2- Foye's Principles of Medicinal Chemistry, 7th edition, Thomas L. Lemke and David A. Williams, Lippincott Williams & Wilkins, 2013.			
Supportive Learning Resources (Books, databases, periodicals, software, applications, others)	1. Burger's Medicinal Chemistry and Drug Discovery, 6th edition, M. E. Wolff, 2003. 2. The Organic Chemistry of Drug Synthesis, Vol. 1-6, D. Lednicer and L. A. Mitscher, John Wiley and Sons.			
Supporting Websites				
The Physical Environment for Teaching	☑ **Classroom**	☐ Labs	☐ **Virtual Educational Platform**	☐ Others
Necessary Equipment and	- PC/laptop with headphones and camera.			

Software	- Data-show. - Microsoft Office. - Microsoft Teams. - ZOOM Platform. - Moodle.
Supporting People with Special Needs	
For Technical Support	E-Learning & Open Educational Resources Center. Email: elearning@zuj.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	Recognize drugs' physicochemical properties and their influence on drug bioavailability.	**MK2**
K2	Define drug/receptor complex formation and recognize bonding forces mediating complex formation.	**MK2**
K3	Describe drug's fingerprint and their corresponding targets.	**MK2**
Skills **The student should be able to:**		
S1	Determine drugs' metabolic pathways and clarify between the metabolic phases and their corresponding enzymes.	**MS4**
S2	Apply chemical modification on drug's backbone.	**MS4**
S3	Apply bioorganic chemistry and its implementation in drug design and discovery.	**MS4**
Competencies **The student should be able to:**		
C1	Recognize the mechanism of action of ligand (activator, inhibitor, agonist, and antagonist) and recall new trends in drug discovery and development.	**MK2, MS4**

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%	**20%**	50%
Asynchronous Interactive Activities	20%	20%	**0%**	0%
Final Exam	50%	50%	**50%**	50%

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	Physicochemical Properties in Relation to Biological Action	Lecture	Course Book 1/ Chapters 1, 2, 11 Pages (1-12, 17-28, 152-156)
2	Physicochemical Properties in Relation to Biological Action	Lecture	Course Book 1/ Chapters 1, 2, 11 Pages (1-12, 17-28, 152-156)
3	Physicochemical Properties in Relation to Biological Action	Lecture	Course Book 1/ Chapters 1, 2, 11 Pages (1-12, 17-28, 152-156)
4	Prodrugs	Lecture	Course Book 1/ Chapter 14 Pages (252-257)
5	Metabolic Changes of Drugs and Related Organic Compounds	Lecture	Course Book 1/ Chapter 11 Pages (155-166)
6	Metabolic Changes of Drugs and Related Organic Compounds	Lecture	Course Book 1/ Chapter 11 Pages (155-166)
7	Metabolic Changes of Drugs and Related Organic Compounds	Lecture	Course Book 1/ Chapter 11 Pages (155-166)
8	Making Drugs More or Less Resistant to Enzymatic and Chemical Hydrolysis	Lecture	Course Book 1/ Chapter 14 Pages (245-250)
9	Optimizing Hydrophilic/Hydrophobic Properties **Midterm Exam**	Lecture	Course Book 1/ Chapter 14 Pages (242-245)
10	Optimizing Hydrophilic/Hydrophobic Properties	Lecture	Course Book 1/ Chapter 14 Pages (242-245)
11	Receptors as Drug Targets	Lecture	Course Book 1/ Chapter 8 Pages (101-115)
12	Enzyme as Drug Targets	Lecture	Course Book 1/ Chapter 7

			Pages (77-96)
13	Combinatorial Chemistry	Lecture	Course Book 1/ Chapter 16 Pages (307-316)
14	Case Study: Design of ACE Inhibitors	Lecture	Course Book 1/ Chapter 15 Pages (285-290)
15	Case Study: Current Research into Antidepressant Agents	Lecture	Course Book 1/ Chapter 25 Pages (683-687)
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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