

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.	0201454	Course Name	Drug Discovery and Drug Design
Credit Hours	3	Prerequisite *Co-requisite	Organic chemistry 2 + Pharmacology 1+ Medicinal Chemistry 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)

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
				Blended Learning	1 Face to Face: 1 Asynchronous

Brief Description

This course is designed to impart knowledge in computational methods and drug design approaches. It aims to build students' knowledge in theoretical chemistry and its application in drug design. It is proposed to provide students with an understanding of ligand- and structure-based drug design strategies employing computer-aided drug design (CADD) software.

Learning Resources

Course Book Information (Title, author, date of issue, publisher ... etc)	1. Patrick GL. An Introduction to Medicinal Chemistry. 7th ed. Oxford: Oxford University Press; 2023. 2. The Organic Chemistry of drug design and drug action, 3 rd edition, Richard B. Silverman and Mark W. Holladay, Elsevier, 2014.
Supportive Learning Resources (Books, databases, periodicals, software, applications, others)	1. Abraham DJ, Myers M, editors. Burger's Medicinal Chemistry, Drug Discovery and Development. 8th ed. Hoboken (NJ): Wiley; 2021. 2. 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. 3. Lednicher D. <i>The Organic Chemistry of Drug Synthesis</i> . Vol. 7. Hoboken (NJ): Wiley-Interscience; 2007.
Supporting Websites	
The Physical Environment	☒ Classroom ☐ Labs ☒ Virtual ☐ Others

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

for Teaching			Educational Platform	
Necessary Equipment and Software	- Microsoft Office. - Moodle.			
Supporting People with Special Needs				
For Technical Support	E-Learning & Open Educational Resources Center. Email: ellearning@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 computational chemistry tools and their applications in drug design and discovery.	MK2
K2	Recognize modeling tactics in computer aided-drug design enterprises.	MK2
K3	Analyze binding interaction of the drug with different drug targets.	MK2
Skills		
The student should be able to:		
S1	Describe drug design approaches and their applications in drug development.	MS4
S2	Apply cheminformatic tools to calculate the physicochemical properties of drug series.	MS4
S3	Apply molecular modeling approach to explore the receptor's binding site and identify key binding residues.	MS4
S4	Relate the drug design pipelines and their applications in optimizing drug's core-structure.	MS4
Competencies		
The student should be able to:		

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%	30%	0%	0%
Final Exam	50%	40%	50%	50%

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

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 drug design	Lecture	Course Book 1/ Chapter 1 Pages (1-16)
2	Lead discovery and lead modification	Lecture	Course Book 1/ Chapter 2 Pages (20-106)
3	Lead discovery and lead modification	Lecture	Course Book 1/ Chapter 2 Pages (20-106)
4	Drug-receptor interaction	Lecture	Course Book 1/ Chapter 3 Pages (123-156)
5	Enzyme Inhibition	Lecture	Course Book 1/ Chapter 4 Pages (165-198)
6	DNA-Interactive agent	Lecture	Course Book 1/ Chapter 6 Pages (275-317)
7	Drug resistance and drug synergism Midterm Exam	Lecture	Course Book 1/ Chapter 6 Pages (333-350)
8	Computer in medicinal chemistry and pharmacophore theory	Lecture	Course Book 2/ Chapter 17 Pages (332-345)
9	Computer-aided drug design: Structure-Based Drug Design (SBDD)	Lecture	Course Book 2/ Chapter 17 Pages (346-361)
10	Computer-aided drug design: Ligand-Based Drug Design (LBDD)	Lecture	Course Book 2/ Chapter 17 Pages (332-345)
11	Computer-aided drug design: De Novo Drug Design	Lecture	Course Book 2/ Chapter 17 Pages (365-374)
12	Quantitative Structure-Activity Relationship (QSAR)	Lecture	Course Book 2/ Chapter 18 Pages (377-400)
13	Quantitative Structure-Activity Relationship (QSAR)	Lecture	Course Book 2/ Chapter 18

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

			Pages (377-400)
14	Case Studies in Drug Design and Drug Action	Lecture	Course Book 2/ Chapter 18 Pages (403-407)
15	Future Perspectives in Drug Design and Emerging Technologies	Lecture	Recently published article
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
1	Watch a recorded lecture	Video on the E-learning platform	Answer questions embedded in the video / Assignment
2	Watch a recorded lecture	Video on the E-learning platform	Answer questions embedded in the video / Assignment
3	Watch a recorded lecture	Video on the E-learning platform	Answer questions embedded in the video / Assignment
4	Watch a recorded lecture	Video on the E-learning platform	Answer questions embedded in the video / Assignment
5	Self-study	A selected topic	Assignment
6	Watch a recorded lecture	Video on the E-learning platform	Answer questions embedded in the video / Assignment
7	Watch a recorded lecture	Video on the E-learning platform	Answer questions embedded in the video / Assignment
8	Self-study	A selected topic	Assignment
9	Midterm Exam	-	-
10	Watch a recorded lecture	Video on the E-learning platform	Answer questions embedded in the video / Assignment
11	Watch a recorded lecture	Video on the E-learning platform	Answer questions embedded in the video / Assignment
12	Watch a recorded lecture	Video on the E-learning platform	Answer questions embedded in the video / Assignment
13	Self-study	A selected topic	Assignment

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

14	Watch a recorded lecture	Video on the E-learning platform	Answer questions embedded in the video / Assignment
15	Watch a recorded lecture	Video on the E-learning platform	Answer questions embedded in the video / Assignment
16	Final Exam	-	-