

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.	0201548	Course Name	Drug Delivery
Credit Hours	3	Prerequisite *Co-requisite	Pharmaceutical Technology
Course Type	☐ Mandatory University Requirement	☐ University Elective Requirement	☐ Faculty Mandatory Requirement
		☐ Support course family requirements	☒ Mandatory 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
				Blended Learning
				1 Face to Face: 1 Asynchronous

Brief Description

This course provides an in-depth exploration of drug delivery systems, focusing on the scientific principles and design strategies used to overcome biological barriers. Students will analyze conventional and novel delivery routes, including oral, pulmonary, and nasal pathways, as well as nanocarriers, stimuli-responsive platforms, and delivery systems for biologics.

Learning Resources

Course Book Information (Title, author, date of issue, publisher ... etc)	1. Aulton's Pharmaceutics: The Design and Manufacture of Medicines, M. E. Aulton and K. M. G. Taylor, 6 th Edition, 2022, Elsevier 2. Martin's Physical Pharmacy and Pharmaceutical Sciences, P.J. Sinko, 6 th Edition, 2016, Lippincott Williams & Wilkins.
Supportive Learning Resources (Books, databases, periodicals, software, applications, others)	- Selected review articles from literature.
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 Plan for Bachelor Program - Study Plan Development and Updating Procedures/ Pharmacy Department	QF02/0408-4.0E
---	----------------

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 the impact of physiological barriers on drug absorption via oral, pulmonary, nasal, and mucosal routes.	MK2
K2	Differentiate between conventional and modified-release dosage forms in terms of release kinetics and therapeutic goals.	MK2
K3	Identify the formulation requirements for advanced delivery systems.	MK2
Skills		
The student should be able to:		
S1	Design the appropriate delivery system for improving bioavailability and targeting specific tissues or organs.	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%	30%	60%
Asynchronous Interactive Activities	30%	30%	0%	0%
Final Exam	40%	40%	40%	40%

Note 1: Asynchronous interactive activities are activities, tasks, projects, assignments, research, studies, projects, 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 delivery systems	Lecture Participatory learning	Ref. 2, Chapter 23
2	Oral drug delivery (hard and soft capsules)	Lecture Participatory learning	Ref. 1, Chapters 35 & 36
3	Oral drug delivery (modified release systems)	Lecture Participatory learning	Ref. 1, Chapter 32
4	Oral drug delivery (modified release	Lecture	Ref. 1, Chapter 32

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

	systems)	Participatory learning Problem-based learning	
5	Pulmonary drug delivery	Lecture Participatory learning	Ref. 1, Chapter 39
6	Pulmonary drug delivery	Lecture Participatory learning Problem-based learning	Ref. 1, Chapter 39
7	Nasal drug delivery	Lecture Participatory learning	Ref. 1, Chapter 40
8	Midterm Exam	-	-
9	Nanotechnology and targeted drug delivery	Lecture Participatory learning	Ref. 1, Chapter 46
10	Lipid-based nanoparticles	Lecture Case studies	Selected review articles
11	Polymeric nanoparticles and micelles	Lecture Case studies	Selected review articles
12	Stimuli-responsive drug delivery systems	Lecture Participatory learning	Selected review articles
13	Protein and peptide delivery	Lecture Problem-based learning	Selected review articles
14	Gene and nucleic acid delivery	Lecture Case studies	Selected review articles
15	Regulatory considerations and clinical translation of drug delivery systems	Lecture Participatory learning	Selected review articles, FDA website
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
2	Watch a recorded lecture	Video on the E-learning platform	Answer questions embedded in the video
3	Watch a recorded lecture	Video on the E-learning platform	Answer questions embedded in the video
4	Assignment (1) - Case study on modified release	Assignment on the E- Learning platform	Assignment marked out of 5
5	Watch a recorded lecture	Video on the E-learning platform	Answer questions embedded in the video

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

6	Watch a recorded lecture	Video on the E-learning platform	Answer questions embedded in the video
7	Watch a recorded lecture	Video on the E-learning platform	Answer questions embedded in the video
8	Watch a recorded lecture	Video on the E-learning platform	Answer questions embedded in the video
9	Midterm Exam	-	-
10	Assignment (2) - Case study on targeted drug delivery using nanocarriers	Assignment on the E-Learning platform	Assignment marked out of 5
11	Watch a recorded lecture	Video on the E-learning platform	Answer questions embedded in the video
12	Watch a recorded lecture	Video on the E-learning platform	Answer questions embedded in the video
13	Watch a recorded lecture	Video on the E-learning platform	Answer questions embedded in the video
14	Watch a recorded lecture	Video on the E-learning platform	Answer questions embedded in the video
15	Watch a recorded lecture	Video on the E-learning platform	Answer questions embedded in the video
16	Final Exam		