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.	**0201416**		**Course Name**		**Medicinal Chemistry (3)**	
Credit Hours	**3**		**Prerequisite *Co-requisite**		**Medicinal Chemistry (2) + *Pharmacology (3)**	
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 is a continuation of Medicinal Chemistry 1 and 2 courses. The basic class format is a combination of lecture overview of the scheduled topics and active participation of students in classroom discussions, as well as out of classroom exercises from time to time. The scheduled topics will focus on reviewing the chemistry and biological activities of chemotherapeutics drugs, and discussing the structure-activity relationships, modes of action, metabolism, elimination and administration routes of some classes of chemotherapeutic agents such as antibacterial, antimycobacterial, antifungal, antiparasitic, antiviral, and anticancer drugs.

Learning Resources

Course Book Information (Title, author, date of issue, publisher ... etc)	1. Foye's Principles of Medicinal Chemistry, 7th edition, Thomas L. Lemke and David A. Williams, Lippincott Williams & Wilkins, 2013. 2. An Introduction of Medicinal Chemistry, 6th edition, Graham Patrick, Oxford University Press, 2017.
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 Software	- PC/laptop with headphones and camera. - 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 the majority of chemotherapeutic drug classes used in clinical practice and their related chemistry.	**MK2**
K2	Describe the efficacy, toxicity, advantages and disadvantages of each class of chemotherapeutic agents, as well as metabolic pathways and major metabolites.	**MK2**
K3	Identify the natural, semisynthetic and synthetic sources of chemotherapeutic agents and important synthetic reactions and precursors of them.	**MK2**
Skills **The student should be able to:**		
S1	Determine the basic physicochemical properties of drugs including electronic, lipophilic, and steric parameters that are required for optimum activity on their pharmacological targets.	**MS4**
S2	Perform correlation between the chemical structures of drugs and their pharmacological activities and/or physicochemical properties.	**MS4**
S3	Find out important chemical methods and functional groups that will allow synthetic chemists to prepare prodrugs.	**MS4**
Competencies **The student should be able to:**		
C1	Develop his/her professional and personal performance by continuously following-up lectures and submitting tasks on time.	**MC3**

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	**Synthetic Antimicrobial Agents** Sulfonamides. Quinolones. Nitrofurans.	Lecture	Textbook 1/ Chapter 33 Pages: 1080-1089
2	**Antibiotics** β-Lactams. Penicillins.	Lecture	Textbook 1/ Chapter 33 Pages: 1089-1098
3	Penicillins. Cephalosporins. Carbapenems.	Lecture	Textbook 1/ Chapter 33 Pages: 1098-1106
4	Aminoglycosides. Macrolides. Tetracyclines. Lincomycins.	Lecture	Textbook 1/ Chapter 33 Pages: 1106-1113
5	**Antifungal Drugs** Polyenes. Azoles. Allylamines and others.	Lecture	Textbook 1/ Chapter 35 Pages: 1161-1172
6	**Antimycobacterial Agents** Treatment of Tuberculosis (anti-TB). Drug therapy for Leprosy.	Lecture	Textbook 1/ Chapter 36 Pages: 1179-1196
7	**Antiparasitic Agents**	Lecture	Textbook 1/ Chapter 34

	Treatment of Amebiasis, Giardiasis, and Trichomoniasis. Treatment of Leishmaniasis.		Pages: 1131-1133
8	**Antiparasitic Agents** Treatment of Pneumocystis (PCP). Treatment of Trypanosomiasis.	Lecture	Textbook 1/ Chapter 34 Pages: 1133-1154
9	Treatment of Malaria. Drug therapy for Helminth infections. Drug therapy for Scabies and Pediculosis. **Midterm Exam**	Lecture	Textbook 1/ Chapter 34 Pages: 1133-1154
10	**Cancer and Cancer Chemotherapy** Alkylating agents (Nitrogen mustards).	Lecture	Textbook 1/ Chapter 37 Pages: 1207-1220
11	Other alkylating agents. Nitrosoureas.	Lecture	Textbook 1/ Chapter 37 Pages: 1207-1220
12	Antimetabolites and nucleoside analogues. Other antimetabolites. Antitumor antibiotics.	Lecture	Textbook 1/Chapter 37 Pages: 1233-1251
13	Antimitotic agents. Miscellaneous antineoplastics.	Lecture	Textbook 1/Chapter 37 Pages: 1224-1233
14	**Antiviral Agents and Protease Inhibitors** Agents inhibiting virus attachment, penetration and replication. Agents interfering with viral nucleic acid replication.	Lecture	Textbook 1/Chapter 38 Pages: 1278-1290
15	Antiretroviral (Anti-HIV) agents. Nucleoside and non-nucleoside reverse transcriptase inhibitors (NRTI and NNRTI).	Lecture	Textbook 1/Chapter 38 Pages: 1290-1300
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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