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.	**0201238**		**Course Name**		**Pharmaceutical Microbiology Lab**	
Credit Hours	**1**		**Prerequisite *Co-requisite**		**Anatomy and Physiology (1) + *Pharmaceutical Microbiology**	
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		☑ 1 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	**1 Traditional**

Brief Description

In this course the students will apply some of the knowledge they gained in pharmaceutical microbiology. The students will perform tests used to monitor the environment (air, personnel, water, etc). Moreover, the student will apply aseptic techniques while conducting experiments in the laboratory. Also the students will perform microbial identification through simple and gram staining. The students will perform various in vitro tests for evaluating antimicrobial agents.

Learning Resources

Course Book Information (Title, author, date of issue, publisher ... etc)	1. Cappuccino, J.G. and Sherman, N. (2005) "Microbiology- A Laboratory Manual" 7th ed. Pearson Education, Inc., Publishing as Benjamin Cumming, San Francisco, CA 94111, USA.			
Supportive Learning Resources (Books, databases, periodicals, software, applications, others)	1. Primrose S.B. and Wardlaw A.C. (2004) Sourcebook of Experiments for the Teaching of Microbiology 5th ed., Academic Press, London.			
Supporting Websites				
The Physical Environment for Teaching	☐ Classroom	☑ Labs	☐ Virtual Educational Platform	☐ Others
Necessary Equipment and Software	☑ Moodle. ☑ Whiteboard and associated equipment.			

Supporting People with Special Needs	Lab technician
For Technical Support	

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 general laboratory safety awareness practical skills.	**MK3**
K2	Identify the different techniques that are used to monitor microbial quality of the environment.	**MK3**
K3	Describe the different methods used to culture and identify microorganisms and the different media used.	**MK3**
K4	Describe the different qualitative and quantitative tests that are used to evaluate microbial susceptibility towards different antimicrobial agents.	**MK3**
Skills		
The student should be able to:		
S1	Apply practical skills of aseptic techniques.	**MS3**
S2	Judge the microbial quality of different pharmaceutical preparation and environmental conditions.	**MS3**
S3	Identify microorganisms macroscopically and microscopically.	**MS3**
S4	Calculate and interpret the MIC of different antimicrobial agents.	**MS3**
Competencies		
The student should be able to:		
C1	Develop the skills needed for practical microbiology and collaborate effectively with team members to achieve shared goals	**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	Check in		
2	Laboratory safety and laboratory protocol. Aseptic techniques and sub-culturing of bacterial cultures	lecture	*Textbook* (1-3)
3	Sources of microbial contamination.	lecture	*Textbook* (4-5)
4	Techniques for isolation of pure cultures. Cultural characteristics of microorganisms.	lecture	*Textbook* (6-10)
5	Microscopy. Preparation of bacterial smears. Simple staining.	lecture	*Textbook* (11-16)
6	Differential staining of bacterial cell structure (Gram stain and Acid-fast stain)	lecture	*Textbook* (17-23)
7	Media for routine cultivation of bacteria. Differential, selective and enrichment media (MacConkey agar, Mannitol-salt agar, EMB agar and Blood agar).	lecture	*Textbook* (43-46)
8	Chemotherapeutic agents. The Kirby-Bauer antibiotic susceptibility test procedure.	lecture	*Textbook* (24-26)
9	Determination of minimal inhibitory concentration (MIC) by broth dilution method.	lecture	*Textbook* (27-29)
10	Disinfectants and antiseptics. Agar plate-sensitivity method.	lecture	*Textbook* (30-31)
11	The fungi. Cultural characteristics of yeasts and molds. *Penicillium*, *Aspergillus*, and *Candida*.	lecture	*Textbook* (34-38)
12	Parasitic protozoa. Intestinal, luminal, blood and tissue protozoa.	lecture	*Textbook* (39-42)
13	Check out		
14			
15			
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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