Course E-Syllabus

1	**Course title**	Pharmaceutical Microbiology II
2	**Course number**	1202441
3	**Credit hours**	2
	Contact hours (theory, practical)	2 (theory)
4	**Prerequisites/corequisites**	1202341 (Pharmaceutical Microbiology I)
5	**Program title**	BSc in Pharmacy and PharmD
6	**Program code**	N/A
7	**Awarding institution**	The University of Jordan
8	**School**	School of Pharmacy
9	**Department**	Pharmaceutics and Pharmaceutical Technology
10	**Level of course**	Undergraduate
11	**Year of study and semester (s)**	First semester of the 4th year
12	**Final Qualification**	BSc in Pharmacy or PharmD
13	**Other department (s) involved in teaching the course**	N/A
14	**Language of Instruction**	English
15	**Teaching methodology**	☐Blended ☒Online
16	**Electronic platform(s)**	☒Moodle ☒Microsoft Teams ☐Skype ☐Zoom ☐Others……
17	**Date of production/revision**	8/10/2020

18 Course Coordinator:

Name: **Dr. Mahmoud Alkawareek**
Office number: 224
Phone number: +962-6-5355000 (Ext. 23342)
Email: m.alkawareek@ju.edu.jo

19 Course Instructors:

Name: **Prof. Amal Al-Bakri** Office number: 215A Phone number: +962-6-5355000 (Ext. 23330) Email: agbakri@ju.edu.jo	Name: **Dr. Randa Haddadin** Office number: 215B Phone number: +962-6-5355000 (Ext. 23314) Email: r_haddadin@ju.edu.jo
Name: **Dr. Mahmoud Alkawareek** Office number: 224 Phone number: +962-6-5355000 (Ext. 23342) Email: m.alkawareek@ju.edu.jo	

20 Course Description:

- Introduce the students to the concept of sterilization, disinfection, antisepsis and preservation.
- Introduce the students to the different chemical and physical methods used to control microbial contamination.
- Introduce the students to the methods used for the evaluation of antimicrobial efficacy and factors affecting it.
- Introduce the students to the principles of controlled environment, quality control and quality assurance.

21 Course aims and outcomes:

A- Aims:

- Provide the students with the basic information about disinfection, antisepsis and preservation processes and the chemical agents utilized in these processes
- Provide the students with the basic information about methods used to evaluate the activity of antimicrobial agents
- Provide the students with the basic information about the negative consequences of microbial contamination of pharmaceutical products and how to control it
- Provide the students with the basic information about the different sterilization methods and their utilization in the manufacturing of pharmaceutical products
- Provide the students with the basic information about quality assurance, quality control, good manufacturing practice and controlled environment in the pharmaceutical industry with special focus on microbial quality

B- Intended Learning Outcomes (ILOs):
Upon successful completion of this course, students will be able to:

- **Develop, integrate, and apply knowledge from the foundational sciences (learner)**
  1. Distinguish between disinfection, antisepsis, preservation and sterilization processes and recognize their importance in controlling microbial contamination and infection control
  2. Recognize the different classes of chemical biocides and identify their main characteristics, applications and mode of action.
  3. Explain the different methods used to evaluate the activity of antimicrobial agents and interpret their results
  4. Recognize the negative consequences of microbial contamination of pharmaceutical products and demonstrate how to prevent them
  5. Identify the principles of quality assurance, quality control, good manufacturing practice and controlled environment and appreciate their importance in maintaining high microbial quality of pharmaceutical products
  6. Explain the different sterilization methods and their utilization in the manufacturing of pharmaceutical products
  7. Select the suitable sterilization method required for the manufacturing of each type of sterile products
- **Proactively investigates new knowledge, approaches or behavior and takes steps to evaluate and improve performance (self-learner)**
  8. Seek actively new knowledge related to microbial quality of pharmaceutical products and how to control their microbial contamination by referring to the relevant scientific resources
- **Exhibit behaviors and values that are consistent with the trust given to the profession by patients, other healthcare providers, and society (professional)**
  9. Communicate effectively and respectfully with professors and classmates
  10. Show responsibility, accountability and commitment by complying with tutor's instructions and relevant university regulations
  11. Demonstrate integrity by not cheating and not committing plagiarism

22. Topic Outline and Schedule:

Week	Lecture	Topic	Teaching Method (Platform)	Evaluation Methods	Reference
1	1.1	Chemical Disinfectants, Antiseptics and Preservatives	Asynchronous (Moodle)	Mid Exam / Presentation/ Final Exam	Denyer, S. P., N. A. Hodges, S. P. Gorman, and B. F. Gilmore. Hugo and Russell's Pharmaceutical Microbiology. Wiley-Blackwell, UK; 8th Edition. (2011)
	1.2		Synchronous (MS Teams)		
2	2.1	Chemical Disinfectants, Antiseptics and Preservatives	Asynchronous (Moodle)		
	2.2		Synchronous (MS Teams)		
3	3.1	Chemical Disinfectants, Antiseptics and Preservatives	Asynchronous (Moodle)		
	3.2		Synchronous (MS Teams)		
4	4.1	Biocides Mode of Action & Laboratory Evaluation of Antimicrobial Agents	Asynchronous (Moodle)	Mid Exam / Final Exam	
	4.2		Synchronous (MS Teams)		
5	5.1	Laboratory Evaluation of Antimicrobial Agents	Asynchronous (Moodle)		
	5.2		Synchronous (MS Teams)		
6	6.1	Laboratory Evaluation of Antimicrobial Agents	Asynchronous (Moodle)		
	6.2		Synchronous (MS Teams)		
7	7.1	Microbial Spoilage, Infection Risk and Contamination Control	Asynchronous (Moodle)	Quiz/ Final Exam	
	7.2		Synchronous (MS Teams)		
8	8.1	Microbial Spoilage, Infection Risk and Contamination Control	Asynchronous (Moodle)		
	8.2		Synchronous (MS Teams)		
9	9.1	Microbial Spoilage, Infection Risk and Contamination Control	Asynchronous (Moodle)		
	9.2		Synchronous (MS Teams)		
10	10.1	Sterilization Procedures and Sterility Assurance	Asynchronous (Moodle)	Final Exam	
	10.2		Synchronous (MS Teams)		
11	11.1	Sterilization Procedures and Sterility Assurance	Asynchronous (Moodle)		
	11.2		Synchronous (MS Teams)		
12	12.1	Sterilization Procedures and Sterility Assurance	Asynchronous (Moodle)		
	12.2		Synchronous (MS Teams)		
13	13.1	Sterile Pharmaceutical Products	Asynchronous (Moodle)	Final Exam	
	13.2		Synchronous (MS Teams)		
14	14.1	Principles of Good Manufacturing Practice	Asynchronous (Moodle)		
	14.2		Synchronous (MS Teams)		

23 Course Requirements:

Students should have:

- Computer
- Internet connection
- Webcam
- Active university account on Moodle (e-learning) website
- Active university account on Microsoft Teams

24 Evaluation Methods:

Opportunities to demonstrate achievement of the ILOs are provided through the following assessment methods and requirements:

Evaluation Activity	Mark	Topic(s)	Period (Week)	Platform
Assignment (Video Presentation)	10	• Chemical Disinfectants, Antiseptics and Preservatives	Week 3-4	Moodle
Mid Exam	30	• Chemical Disinfectants, Antiseptics and Preservatives • Biocides Mode of Action • Laboratory Evaluation of Antimicrobial Agents	Week 7	On Campus
Online Quiz	10	• Microbial Spoilage, Infection Risk and Contamination Control	Week 9-10	Moodle
Final Exam	50	All topics	Week 15	On Campus

25 Course Policies:

A- Attendance policies:
As per the applicable university regulations
B- Absences from exams and submitting assignments on time:
As per the applicable university regulations
C- Health and safety procedures:
N/A
D- Honesty policy regarding cheating, plagiarism, misbehavior:
As per the applicable university regulations
E- Grading policy:
As per the applicable school bylaw
F- Available university services that support achievement in the course:
Moodle (e-learning) website
Microsoft Teams institutional subscription

26 References:

A- Required book(s), assigned reading and audio-visuals:

- Denyer, S. P., N. A. Hodges, S. P. Gorman, and B. F. Gilmore. Hugo and Russell's Pharmaceutical Microbiology. Wiley-Blackwell, UK; 8th Edition. (2011).

B- Recommended books, materials and media:

- Adam Fraise, Jean-Yves Maillard & Syed Sattar. Principles and Practice of Disinfection, Preservation & Sterilization. Wiley-Blackwell, UK; 5th Edition (2013)
- Michael J. Akers. Sterile Drug Products: Formulation, Packaging, Manufacturing and Quality. CRC Press; 1st Edition (2010)
- Richard Schwalbe, Lynn Steele-Moore & Avery C. Goodwin. Antimicrobial Susceptibility Testing Protocols. CRC Press; 1st edition (2007)

27 Additional information:

Name of Course Coordinator: **Mahmoud Alkawareek** Signature: ---------- Date: **8/10/2020**

Head of Curriculum Committee/Department: ---------- Signature: ----------

Head of Department: ---------- Signature: ----------

Head of Curriculum Committee/Faculty: ---------- Signature: ----------

Dean: ---------- Signature: ----------