The University of Jordan

Accreditation & Quality Assurance Center

COURSE Syllabus

1	Course title	Pharmaceutical Microbiology Practical
2	Course number	1202442
3	Credit hours (theory, practical)	1 (practical)
	Contact hours (theory, practical)	3 (practical)
4	Prerequisites/corequisites	Prerequisite: 1202341 (Pharmaceutical Microbiology I)
5	Program title	BSc in Pharmacy and PharmD
6	Program code	
7	Awarding institution	The University of Jordan
8	Faculty	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	Date of production/revision	31 January 2016

16. Course Coordinator:

To be determined for each semester

17. Course instructors:

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18. Course Description:

In this course the students will apply some of the knowledge they gained in pharmaceutical microbiology I & pharmaceutical microbiology II. The students will perform tests used to monitor the environment (air, personnel, water, etc) & test sterile products. Also the students will perform microbial identification through gram staining. The students will perform various in vitro tests for evaluating antimicrobial agents & will perform some microbial quality tests for sterile and non-sterile products.

19. Course aims and outcomes:

A- Aims:

By the end of this practical the student will develop the skills for identifying microorganisms, measuring the efficacy and potency of different antimicrobial agents, using different sterilization methods and designing optimum sterilization cycles and monitoring microbiological quality for both sterile and non-sterile dosage forms.

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

A. Knowledge and Understanding: Student is expected to

A.1 Know the general laboratory safety awareness practical skills

A.2 Know the different qualitative and quantitative tests that are used to evaluate microbial susceptibility towards different antimicrobial agents

A.3 Know the different techniques that are used to monitor microbial quality of the environment and pharmaceutical preparations

A.4 Know the different methods that are used to control microbial contamination

A.5 Know the different methods used to identify microorganisms

A.6 Know the different methods used to culture microorganisms and the different media used

B. Intellectual, Analytical and Cognitive Skills: Student is expected to

B.1 Calculate and interpret the MIC of different antimicrobial agents

B.2 Judge the microbial quality of different pharmaceutical preparation and environmental conditions

B.3 Calculate D value, Z- value and the lethality of different sterilization cycles

B.4 Identify microorganisms macroscopically and microscopically

B.5 Quantifying microbial contamination

C. Subject-Specific Skills: Student is expected to

C.1 Practical skills of aseptic techniques

C.2 Practical skills of handling microbial culture

C.3 Practical skills of identifying and quantifying bacterial culture

C.4 Practical skills of designing sterilization cycle

C.5 Practical skills of performing different susceptibility tests

D. Transferable Key Skills: Students is expected to

D.1. Team work

D.2. Time management

D.3. Data collection, presentation and interpretation

D.4. Written and oral communication

D.5. Analysis

D.6. Information data collection

C- Program Competencies Achieved in This Course:

- Identify the general principles of environmental control within pharmaceutical manufacturing sites

- Recognize the principles of drug safety and efficacy evaluation
- Identify drug-drug and drug-food interactions of medicines
- Recognize various pharmaceutical manufacturing processes
- Comply with principles of good manufacturing practice (GMP) and good laboratory practice (GLP)
- Recognize quality assurance principles
- Recognize quality control principles
- Demonstrate the ability to perform proper documentation

20. Topic Outline and Schedule:

Topic	Week	Achieved ILOs	Evaluation Methods	Reference
Aseptic techniques and subculturing of bacterial cultures	1	A1, A6, C1-C2, D1-D6	Experimental work/Reports/ Exams	Pharmaceutical Microbiology Laboratory Manual, Faculty of Pharmacy, University of Jordan
Sources of microbial contamination Gram staining and morphology identification of bacteria and yeast	2	A3-A6, B4-B5, C3, D1-D6	Same as above	Same as above
Qualitative methods used for the evaluation of bacteriostatic activity of different antimicrobial agents	3	A2, C5, D1-D6	Same as above	Same as above
Determination of the minimal inhibitory concentration (MIC) of a bacteriostatic agent by agar diffusion method	4	A2, B1, C5, D1-D6	Same as above	Same as above
Determination of the minimal inhibitory concentration (MIC) using broth dilution method and two-fold serial dilution technique	5	A2, B1, C5, D1-D6	Same as above	Same as above
Determination of the potency of an antibiotic solution by the cup plate method **(Midterm exam)**	6	A2, B1, C5, D1-D6	Same as above	Same as above
Kelsey-Sykes test	7	A2, C5, D1-D6	Same as above	Same as above
Sterilization techniques - sterilization by moist heat, dry heat, UV light and filtration Laminar Air Flow Cabinets	8	A4, D1-D6	Same as above	Same as above
Aseptic laboratory and aseptic operations / Sterility test Determination of the microbial count for water soluble non sterile solid product and water soluble non sterile semi solid product	9	A3, B2, B5, C3, D1-D6	Same as above	Same as above
Tutorial: Data handling and interpretation associated with heat sterilization processes	10	B3, C4, D1-D6	Same as above	Same as above
(Final Exam)	11-12	D1-D6	Same as above	Same as above

21. Teaching Methods and Assignments:

Development of ILOs is promoted through the following teaching and learning methods:

A. Teaching Methods:
- Demonstrations
- Experiments
- Discussion
- Tutorials

B. Learning Skills:
- Critical thinking
- Scientific reasoning
- Digital literacy
- Communication skills
- Problem-solving skills
- Team and group working
- Self-directed learning

22. Evaluation Methods and Course Requirements:

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

- Experimental work
- Reports
- Quizzes
- Exams

23. Course Policies:

A- Attendance policies:
- As per the applicable university regulations

B- Absences from exams and handing in assignments on time:
- As per the applicable university regulations

C- Health and safety procedures:
- Health and safety procedures are detailed in the laboratory manual and will be discussed in the first practical session

D- Honesty policy regarding cheating, plagiarism, misbehavior:
- As per the applicable university regulations

E- Grading policy:
- Evaluation (10%)
- Reports (10%)
- Quizzes (10%)
- Midterm exam (30%)
- Final Exam (40%)

F- Available university services that support achievement in the course:
- University libraries
- Student computer labs
- University website (including E-Learning and faculty member websites)

24. Required equipment:

- Microbiology laboratory with all equipment and materials required by the practical experiments
- Whiteboard and associated stationary

25. References:

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

- Pharmaceutical Microbiology Laboratory Manual, Faculty of Pharmacy, University of Jordan (last update)

B- Recommended books, materials, and media:

- 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).
- Adam Fraise, Jean-Yves Maillard & Syed Sattar. Princ*iples 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)

26. Additional information:

Name of Course Coordinator: ----------Signature: ---------- Date: ----------

Head of curriculum committee/Department: ---------- Signature: ----------

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

Head of curriculum committee/Faculty: ---------- Signature: ----------

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

Copy to:
Head of Department
Assistant Dean for Quality Assurance
Course File