The University of Jordan

Accreditation & Quality Assurance Center

COURSE Syllabus

1	Course title	Physical pharmacy
2	Course number	1202235
3	Credit hours (theory, practical)	2 (theory)
	Contact hours (theory, practical)	2 (theory)
4	Prerequisites/corequisites	Physicochemical principles of pharmacy (1202134)
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)	2nd 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:

19. Course aims and outcomes:

A- Aims:

1. To provide students with an understanding of the physico-chemical principles at work in pharmaceutical systems.
2. To provide students with the ability to utilize these principles in the design of active drugs and pharmaceutical dosage forms.
3. To provide the students with the ability to analyze the relationship between the physicochemical principles, pharmaceutical formulations and biological activity of drugs.
4. To act as a link between the basic courses (General Chemistry, Organic Chemistry, Biochemistry and Physiology) and the more applied courses (Industrial Pharmacy, Biopharmaceutics and Pharmacokinetics).

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

A. Knowledge and Understanding: Student is expected to

A1- Know the meaning of biocide and the difference between biocide and antibiotic
A2- Know the meaning of disinfection, antisepsis, and preservation process
A3- Know the meaning of bacteriocidal, bacteriostatic and chemical sterilants.
A4- Know the different biocides in use, their chemical nature, their spectrum of activity and their mode of actions.
A5- Know the different chemical and physical factors that affect the antimicrobial activity
A6- Know the different in vitro tests used to evaluate the efficacy, the potency and the capacity of different biocides
A7- Know the effect of microorganisms on the spoilage of pharmaceutical preparations
A8- Know the principle of preservation
A9- Know the different quality control and quality assurance measures for the control of microbial contamination
A10- Know the principle of sterilization
A11- Know the different methods used for sterilization
A12- Know the different sterile products available in the markets
A13- Know the principle of the controlled environment (aseptic and clean room facilities)

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

B1- Decide the best biocide to be used in different practical situations
B2- Calculate the temperature and dilution coefficients of different antimicrobial agents and interpret the results towards their effect on the antimicrobial efficacy
B3- Interpret the results of the different tests used to evaluate the antimicrobial efficacy
B4- Decide the appropriate test to be performed on different pharmaceutical preparation so as to measure their microbial quality
B5-Calculate the appropriate time/temp schedule for an autoclaving process to produce specific quality assurance
B6- Decide the appropriate sterilization procedure for a certain object
B7- Allocate the different measures to be taken to obtain an aseptic and clean environment and monitor those measures

C. Subject-Specific Skills: Student is expected to

C1- Decide the suitable biocide to be used for certain situation or product
C2- Design a suitable testing method to evaluate a biocidal agent
C3- Design a suitable drug formulation & or packaging material for drug products
C4- Select suitable sterilization process for specific object
C5- Design an aseptic or clean area in manufacturing plant

D. Transferable Key Skills: Students is expected to

D1- Communicate effectively with the drug manufacturing bodies concerning GMP for microbial quality monitoring & aseptic manufacturing
D2- Gain basis for the design of different disinfection policies in hospitals or pharmaceutical industry

D3- Develop the skills of self-learning

C- Program Competencies Achieved in This Course:

- Recognize and follow proper storage conditions of medicines
- Package medicines properly to ensure their stability, safety and patient accessibility
- Identify drug-drug and drug-food interactions of medicines
- Recognize the significance and identify the principles of infection control
- Recognize the principles of drug safety and efficacy evaluation
- Recognize the role of pharmaceutical excipients and their uses in drug formulations
- Characterize various pharmaceutical dosage forms
- Identify formulation principles and product development stages
- 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
- Identify the general principles of environmental control within pharmaceutical manufacturing sites
- Store pharmaceutical products in proper facilities under suitable storage conditions

20. Topic Outline and Schedule:

Topic	Week	Instructor	Achieved ILOs	Evaluation Methods	Reference
Chemical Disinfectants, Antiseptics and Preservatives	1-3		A1-A4, B1, C1, D2	Exams	Hugo and Russell's Pharmaceutical Microbiology
Non-antibiotic Antimicrobial Agents: Mode of Action and Resistance	4		A4	Exams	Same as above
Laboratory Evaluation of Antimicrobial Agents	5-7		A5-A6, B2-B3, C2	Exams	Same as above
Microbial Spoilage, Infection Risk and Contamination Control	8-10		A7-A9, B4, C3	Quiz/ Exams	Same as above
Sterilization Procedures and Sterility Assurance	11-13		A10-A11, B5	Exams	Same as above
Sterile Pharmaceutical Products	14		A12, B6, C4	Exams	Same as above
Principles of Good Manufacturing Practice	15		A13, B7, C5, D1	Exams	Same as above

21. Teaching Methods and Assignments:

Development of ILOs is promoted through the following <u>teaching and learning methods</u>:

A. Teaching Methods:
- Lectures
- Self-Reading
- Multimedia demonstrations

B. Learning Skills:
- Critical thinking
- Scientific reasoning

- Digital literacy
- Communication skills
- Problem-solving skills
- 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:

- Exams
- Quizzes

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:

- N/A

D- Honesty policy regarding cheating, plagiarism, misbehavior:

- As per the applicable university regulations

E- Grading policy:

- Midterm exam (40%)
- Quiz (10%)
- Final (50%)

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:

- Computer connected to the internet and data show projector
- Whiteboard and associated equipment

25. 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. 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