Pharmaceutical Microbiology; Code: PM 603C

A- Basic Information

Programme(s) on which the course is given:	Bachelor of Pharmacy (Pharm D clinical)
Department responsible for offering the course:	Department of Microbiology and Immunology
Department responsible for teaching the course:	Department of Microbiology and Immunology
Academic year:	Level three – spring semester (2023/2024)
Course title and code:	Pharmaceutical Microbiology; PM 603C
Prerequisite:	General microbiology and immunology
Credit hours:	Lecture: 2, Practical: 1, Total: 3
Course Coordinator:	Dr. Ann Ayman Elshamy

B- Professional Information

1 - Overall Aim of the Course

After completion of the course the student should be familiar with the different techniques that are used to control or inhibit the growth of the microorganisms including:

- Physical methods of disinfection (sterilization by dry heat, moist heat, filtration radiation etc.).
- Chemical methods of disinfection (using antiseptics, disinfectants, chemotherapeutic agents).
- Microbiological quality control of pharmaceuticals.

2 - Course Learning Outcomes

Domain 1: Fundamental knowledge

The students should be able to:

Program key elements	Course learning outcomes
1-1-1-1- Explain the basic knowledge of micro-organisms, infectious/non-infectious diseases, bioinformatics, biotechnology, and epigenetics.	**1-1-1-1-a-** Demonstrate proper understanding of different microoragnisms. **1-1-1-1-b-** Understand and implement different sterilization techniques
1-1-2-1- Utilize genetic, microbial, and epidemiological terms in pharmacy practice	**1-1-2-1-** Utilize the proper pharmaceutical and microbiological terms, abbreviations, and symbols in pharmacy practice
1-1-4-1- Explain the mechanism of action and side effects of drugs and toxins.	**1-1-4-1-** Demonstrate the knowledge of the mechanism of action of different antimicrobial agents for the treatment of microbial infections.

1-1-4-2- Illustrate the appropriateness, and effectiveness of drugs and natural products using information from fundamental sciences.	**1-1-4-2-** Illustrate the side and toxic effects of different antimicrobial agents and their contraindications in patients.

Domain 2: Professional and ethical practice

The student will be able to:

Program key elements	Course learning outcomes
2-2-2-1- Claim main needs of quality in developing, manufacturing, storing and distributing pharmaceutical products.	**2-2-2-1 -** Apply the knowledge of the microbiological quality control in manufacturing, storing and distributing different pharmaceutical products. .

Domain 3: Pharmaceutical care

The student will be able to:

Program key elements	Course learning outcomes
3-1-2-2- Use the basis of pharmaceutical microbiology to assess suitable method for infection control.	**3-1-2-2-**Apply the principles of pharmaceutical microbiology to select and assess proper methods of infection control.
3-1-3- Detect and control microbial growth & perform lab tests to identify infections	**3-1-3-** Monitor and control microbial growth and carry out laboratory tests for evaluation of pharmaceutical products.
3-1-4-1- Correlate the etiological, epidemiological, pathophysiological, clinical data and lab diagnosis of infections with pharmacotherapeutic approaches.	**3-1-4-1-** Relate etiology, epidemiology, pathophysiology, laboratory diagnosis, and clinical features of microbial infections and their pharmacotherapeutic approaches.
3-2-5- Explain and advise patients, communities, and healthcare professionals about the safe use of medicines, OTC preparations and devices.	**3-2-5-a-** Educate and counsel patients, other health care professionals, and communities about the safe use of different antimicrobial agents. **3-2-5-b-** Educate health care professionals, and communities about infection epidemiology, vaccination and vaccination program.

3- Course Contents

Week	Lectures		Practical	
	Topic	Credit hrs. (2)	Topics	Credit hrs. (1)
1	Antibiotics Part 1	2	Sources of contamination	1
2	Antibiotics Part 2	2	Isolation of discrete colonies from mixed culture	1
3	Antibiotics Part 3	2	Determination of bacterial viable count	1
4	Antibiotics Part 4	2	Antibiotic sensitivity test	1
5	Evaluation of antibiotics	2	Sterility	1
6	**Midterm**			
7	Non-antibiotics Part 1	2	Determination of MIC by agar diffusion method sterility	1
8	Non-antibiotics Part 2	2	Determination of MIC by serial dilution method	1
9	Evaluation of Non-antibiotics	2	Determination of effectiveness of different antiseptics	1
10	Sterilization Part 1	2	Antibiotic Assay	1
11	Sterilization Part 2	2	Tutorial	1
12	Formative assessment	---	Practical exam	
Total hrs		20	10	
15	Final written exam			

4- Teaching and Learning Methods:

. 4.1- Lectures (tools: board, projector).
4.2- Practical sessions (reagents, glassware)
4.3- Written essays (library, internet).
4.4- Team working

5- Student Assessment Methods:

Written Midterm exam	To assess	The ability of students to follow-up the course subjects.
Practical exam and assessment of semester work (class activities)	To assess	The ability of students to apply and practice scientific knowledge
Written final exam	To assess	The overall outcomes.
Oral exam	To assess	The ability of students to follow-up the course subjects.

Assessment Schedule

Assessment 1	Periodic exams	Week 6
Assessment 2	Practical exam	Week 12
Assessment 3	Oral exam	Week 15
Assessment 4	Final written exam	Week 15

Weighting of Assessments

Periodical examination	20
Final-term Examination	75
Oral Examination	15
Practical Examination	40
Total	**150**

6- List of References

- Course notes:
  - Lecture notes of pharmaceutical microbiology prepared by instructors.
- Text books:
  - Pharmaceutical microbiology, Russel & Hugo, 8th ed., 2011
  - Pharmaceutical microbiology, Ashutosh Kar, 1st ed. 2008
- Periodicals, Web sites, etc
  - Journal of antimicrobial agents and chemotherapy
  - International journal of Antibiotics

7- Facilities Required for Teaching and Learning

Modern libraries, audiovisual tools, chemicals, cooperative assistants, glassware and instruments

Course members:

Prof. Dr. Khaled M. Anwar Aboshanab
Assoc. Prof. Dr. Sarra Ebrahim Saleh
Dr. Ann Ayman Elshamy

Course Coordinator: Dr. Ann Ayman Elshamy Ann Elshamy

Head of Department: Assoc. Prof. Dr. Sarra Ebrahim Saleh Sarra Saleh

Course name	Pharmaceutical Microbiology
Code	PM 603C

Course Plan & Matrices

Course Contents		Program Key Elements	Course learning outcomes	Teaching and Learning Methods	Student Assessment Methods
Week # 1	Antibiotics Part 1 -Sources of contamination	1-1-1-1, 1-1-2-1, 1-1-4-1, 1-1-4-3, 2-2-2-1, 2-4-1, 3-1-2, 3-1-3, 3-1-4-1, 3-2-5	1-1-1-1-a, 1-1-2-1, 1-1-4-1, 1-1-4-3, 2-2-2-1, 2-4-1, 3-1-2, 3-1-3, 3-1-4-1, 3-2-5a, 3-2-5-b	Lectures, Practical training	Written Oral Periodic Practical
Week # 2	Antibiotics Part 2 - Isolation of discrete colonies from mixed culture.	1-1-1-1, 1-1-2-1, 1-1-4-1, 1-1-4-3, 2-2-2-1, 2-4-1, 3-1-2, 3-1-3, 3-1-4-1, 3-2-5	1-1-1-1-a, 1-1-2-1, 1-1-4-1, 1-1-4-3, 2-2-2-1, 2-4-1, 3-1-2, 3-1-3, 3-1-4-1, 3-2-5a, 3-2-5-b	Lectures, Practical training	Written Oral Periodic Practical
Week # 3	Antibiotics Part 3 - Determination of bacterial viable count	1-1-1-1, 1-1-2-1, 1-1-4-1, 1-1-4-3, 2-2-2-1, 2-4-1, 3-1-2, 3-1-3, 3-1-4-1, 3-2-5	1-1-1-1-a, 1-1-2-1, 1-1-4-1, 1-1-4-3, 2-2-2-1, 2-4-1, 3-1-2, 3-1-3, 3-1-4-1, 3-2-5a, 3-2-5-b	Lectures, Practical training	Written Oral Periodic Practical
Week # 4	Antibiotics Part 4 -Antibiotic sensitivity test	1-1-1-1, 1-1-2-1, 1-1-4-1, 1-1-4-3, 2-2-2-1, 2-4-1, 3-1-2,	1-1-1-1-a, 1-1-2-1, 1-1-4-1, 1-1-4-3, 2-2-2-1, 2-4-1, 3-1-2,	Lectures, Open discussion, Practical training, Assignments	Written Oral Practical

		3-1-3, 3-1-4-1, 3-2-5	3-1-3, 3-1-4-1, 3-2-5a, 3-2-5-b		
Week # 5	Evaluation of antibiotics - Sterility testing	1-1-4-1, 1-1-4-3, 2-2-2-1, 2-4-1, 3-1-4-1	1-1-1-1-b, 1-1-2-1, 2-4-1, 3-1-2, 3-1-3, 3-1-4-1	Lectures, Practical training	Written Oral Practical
Week # 6	**Midterm**				
Week # 7	Non-antibiotics Part 1 - Determination of MIC by agar diffusion method.	1-1-1-1, 1-1-2-1, 1-1-4-1, 1-1-4-3, 2-2-2-1, 2-4-1, 3-1-2, 3-1-3, 3-1-4-1, 3-2-5	1-1-1-1-b, 2-4-1, 3-1-2, 3-1-3, 3-1-4-1	Lectures Assignments, Practical training	Written Oral Practical
Week # 8	Non-antibiotics Part 2 -Determination of MIC by serial dilution method	1-1-1-1, 1-1-2-1, 1-1-4-1, 1-1-4-3, 2-2-2-1, 2-4-1, 3-1-2, 3-1-3, 3-1-4-1, 3-2-5	1-1-4-1, 1-1-4-3, 2-2-2-1, 2-4-1	Lectures, Practical training	Written Oral Practical
Week # 9	Evaluation of Non-antibiotics -Determination of effectiveness of different antiseptics.	1-1-4-1, 1-1-4-3, 2-2-2-1, 2-4-1	1-1-1-1-a, 1-1-2-1, 2-2-2-1, 3-1-2, 3-1-3	Lectures, Open discussion	Written Oral Practical
Week # 10	Sterilization Part 1 -AB. assay	1-1-1-1, 1-1-2-1, 2-4-1, 3-1-2, 3-1-3, 3-1-4-1	1-1-4-1, 1-1-4-3, 2-2-2-1, 2-4-1	Lecture, Assignments, Practical training	Written Oral Practical
Week # 11	Sterilization Part 2	1-1-1-1,	1-1-4-1,	Lecture,	Written

	-Tutorial	2-4-1, 3-1-2, 3-1-3, 3-1-4-1	1-1-4-3, 2-2-2-1, 2-4-1, 3-1-4-1	Practical training	Oral Practical
Week # 12	Formative assessment Practical exam	1-1-1-1, 2-4-1, 3-1-2, 3-1-3, 3-1-4-1	1-1-1-1, 2-4-1, 3-1-2, 3-1-3, 3-1-4-1	Open discussion	Written Oral
Week # 15	Final written exam				

In case of pandemic spreading, the study will be suspended, and the lectures will be converted to recorded and interactive lectures.

تم الاعتماد فى (محضر مجلس قسم الميكربيولوجيا والمناعة)
جلسة رقم (6) بتاريخ 14 / 2 / 2024