

General Microbiology and Immunology; Code: PM 401C

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 two – spring semester (2023/2024)
Course title and code:	General Microbiology and Immunology, PM 401C
Prerequisite:	Registration
Contact hours (credit hours):	Lecture: 2 (2), Practical: 2 (1), Total: 3 (2+1)
Course Coordinator:	Dr. Ahmed Abu Zaid

B- Professional Information

1 - Overall Aim of the Course

The course will provide students with a combination of laboratory and theoretical experience exploring the general aspects of microbiology. It includes the general characters of microorganisms, their morphology, diversity, cell/particle structure, growth, and cultural characteristics. It also clarifies different mechanisms of transport across bacterial cell membrane, metabolic pathways, and physiology of bacteria. The course also covers the principles of genetic characters including DNA and RNA structures, replication, different forms of mutation and mutagenic agents. Moreover it introduces the advanced concepts of medical immunology, with an emphasis on host parasite relationship, non-specific and specific immunity, mechanism of immune response, molecular and cellular immunology, including antigen, antibody structure and function, their interactions, effector mechanisms, complement, cell mediated immunity, active and passive immunization, aberration of immune system including hyperactivation and hypersensitivity, immuno-deficiency disorders, autoimmunity and auto-immune diseases, organ transplantation, cancer immunotherapy and serological reactions.

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.	<p>1.1.1.1. Demonstrate proper understanding of taxonomy, physiology and genetics of bacteria, viruses and fungi:</p> <p>1.1.1.1.a. Demonstrate proper understanding of bacterial morphology, biological requirements for bacterial growth, bacterial products, bacterial physiology and genetics.</p> <p>1.1.1.1.b. Demonstrate proper understanding of general characteristics of viruses, viral replication, classification as well as methods of cultivation of different viruses.</p> <p>1.1.1.1.c. Demonstrate proper understanding of morphology and general characteristics of different fungi, their nature, chemical composition of cell wall, fungal reproduction as well as classification of fungi..</p>

1.1.1.5. Manifest understanding of physiological, pharmacological, toxicological, and clinical sciences	1.1.1.5. Comprehend different types of immune responses and different mechanisms leading to the aberration of the immune system.
1.1.4.1. Explain the mechanism of action and side effects of drugs and toxins.	1.1.4.1. Explain the mechanism of action of antimicrobial agents on different microorganisms.

Domain 2: Professional and ethical practice

The students should be able to:

Program key elements	Course learning outcomes
2.4.1. Ensure the proper handling of poisons to avoid their harms.	2.4.1. Ensure safe handling/use of microbial suspensions to avoid their harm to individuals and communities.

Domain 3: Pharmaceutical care

The students should be able to:

Program key elements	Course learning outcomes
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 different serological laboratory tests for identification bacteria.

Domain 4: Personal Practice

The student will be able to:

Program key elements	Course learning outcomes
4.3.2 Develop self-learning skills for continuous professional improvement.	4.3.2 Carry out self-learning required for continuous professional development.

3- Course Contents

Week	Lectures	Credit hrs (2)	Practical	Credit hrs (1)
	Topics		Topics	
1	Overview and history of microbiology	2	Gram staining technique (part 1)	1
2	Study of Prokaryotes; classification of bacteria	2	Gram staining technique (part 2)	1
3	Study of microbial genetics and mutation through different mutagenic agents.	2	Gram staining of bacterial mixtures (part 1)	1
4	Study of virology including general characteristics, classification.	2	Gram staining of bacterial mixtures (part 1)	1
5	Study of mycology including general characteristics, classification.	2	Acid fast staining technique	1

Week	Lectures	Credit hrs (2)	Practical	Credit hrs (1)
	Topics		Topics	
6	Midterm			
7	Basic immunology: immune system Innate and adaptive immunity	2	Spore staining technique	1
8	Basic immunology: MHC, antigen-antibody reactions	2	Capsular staining technique	1
9	off (Eid Vacation)			
10	Aberration of immune system, hypersensitivity reactions	2	Preparation of heat killed vaccine	1
11	Tumor immunology and transplantation	2	Serology	1
12	Study of different serological reactions: agglutination, precipitation, complement fixation, immunofluorescence, radioimmunoassay, ELISA.	2	Practical exam	1
13	Formative assessment	2		
14	---			
15	Written exam			
Total hours	---	20	10	

4- Teaching and Learning Methods:

- 4.1- Lectures (tools: board, projector, online classrooms).
- 4.2- Practical sessions (reagents, glassware, online tutorials)
- 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 course learning outcomes.
Oral exam	To assess	The ability of students in expressing and presenting their knowledge clearly and in systematic approach.

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
Other types of assessment	---

Total **150**

6- List of References

Course notes

- Lecture notes of General Microbiology & Immunology prepared by instructors.

Essential books (textbooks)

- Brock Biology of Microorganisms, 14th Edition, 2014
- Kuby Immunology, 6th Edition, 2006.

Periodicals, Web sites, etc

- Journal of bacteriology
- Journal of basic microbiology
- European Journal of immunology

7- Facilities Required for Teaching and Learning

Modern libraries, audiovisual tools, chemicals, cooperative assistants, glassware and instruments, lecture halls, data show, and internet.

Course members:

Prof. Dr. Nadia Hassouna
Prof. Dr. Mahmoud Yassien
Dr. Ahmed Abu Zaid
Dr. Ann El-shamy

Course Coordinator: Dr. Ahmed Abu Zaid *Ahmed Abouzeid*

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

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Course Plan & Matrix

Week	Course Content	Program Key Elements	Course learning outcomes	Teaching and Learning Methods	Student Assessment Methods
1	Overview and history of microbiology P: Gram staining technique (part 1)	1.1.1.1	1.1.1.1.a 1.1.1.1.b 1.1.1.1.c	Lecture Practical session	Periodic exam Written exam Oral exam Practical exam
2	Study of Prokaryotes; classification of bacteria P: Gram staining technique (part 2)	1.1.1.1 2.4.1 3.1.3	1.1.1.1.a 2.4.1 3.1.3	Lecture Open discussion Practical session	Periodic exam Written exam Oral exam Practical exam
3	Study of microbial genetics and mutation through different mutagenic agents. P: Gram staining of bacterial mixtures (part 1)	1.1.1.1 2.4.1 3.1.3 4.3.2	1.1.1.1.a 2.4.1 3.1.3 4.3.2	Lecture Practical session	Periodic exam Written exam Oral exam Practical exam
4	Study of virology including general characteristics, classification. P: Gram staining of bacterial mixtures (part 2)	1.1.1.1 1.1.4.1 2.4.1 3.1.3 4.3.2	1.1.1.1.a 1.1.4.1 2.4.1 3.1.3 4.3.2	Lecture Open discussion Practical session	Periodic exam Written exam Oral exam Practical exam
5	Study of mycology including general characteristics, classification. P: Acid fast staining technique	1.1.1.1 2.4.1 3.1.3 4.3.2	1.1.1.1.a 2.4.1 3.1.3 4.3.2	Lecture Practical session	Written exam Oral exam Practical exam
6	Midterm				
7	Basic immunology: immune system Innate and adaptive immunity P: Spore staining technique	1.1.1.1 1.1.4.1 2.4.1 3.1.3	1.1.1.1.b 1.1.4.1 2.4.1 3.1.3	Lecture Practical session	Written exam Oral exam Practical exam
8	Basic immunology: MHC, antigen-antibody reactions P: Capsular staining technique	1.1.1.1 1.1.4.1 2.4.1 3.1.3	1.1.1.1.c 1.1.4.1 2.4.1 3.1.3	Lecture Open discussion Brain storming Practical session	Written exam Oral exam Practical exam
9	Aberration of immune system, hypersensitivity reactions P: Preparation of heat killed vaccine	1.1.1.5 3.1.3	1.1.1.5 3.1.3	Lecture Assignment Practical session	Written exam Oral exam Practical exam
10	Tumor immunology and transplantation	1.1.1.5	1.1.1.5	Online lecture	Written exam Oral exam

	P: Tutorial			Online tutorial	Practical exam
11	off (Eid Vacation)				
12	Study of different serological reactions: agglutination, precipitation, complement fixation, immunoflourescence, radioimmunoassay, ELISA. P: Serology	1.1.1.5 3.1.3	1.1.1.5 3.1.3	Lecture Open discussion Practical exam	Written exam Oral exam
13	Formative assessment				
14	---				
15	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 في (محضر مجلس قسم الميكروبيولوجيا والمناعة)
جلسة رقم (6) بتاريخ 2024/٢/14