

المركز الوطني لضمان جودة واعتماد
المؤسسات التعليمية والتدريبية



Derna University Faculty of Medicine

Bachelor of Medicine and Surgery

Course title: Medical microbiology and immunology

Course code: MB1301

Academic year: Phase:II ;Year 3,Year: 2023 -2024

Course Specification

Microbiology

1.: General Information

Course Title	Microbiology
Course Coordinator	Dr.Aziza Buabraig.
Department	Medical Microbiology and Immunology
Language	English
➤ Teaching Hours	<ul style="list-style-type: none">• 180hr• Lecture: 120• Practical: 40• Tutorials: 20
Academic Year	3rd year 2023-2024
Date and Signature	2009-2010

1.1 : Number of hours per week.

- Lecture: 4 hours
- Practical: 2 hours
- Tutorial: 2hours
- Total: 8hrs.

2- Overall Course Aim

The aims of the course are ---

1. To provide students the basic concepts of bacterial, viral and fungal morphology, metabolism, physiology, genetics and induced diseases, especially endemic in the locality: their transmission, laboratory diagnosis, treatment, prophylaxis and control.
2. Provide a suitable background covering the immune system, its protective functions against the infection, Graft and tumor progression. Additionally, its role in the Patho-physiology of infectious and non-infectious diseases.
3. Practice the different principles of sterilization and infection control.

3.Intended learning outcomes (ILOs)

A- Knowledge and understanding

By the end of the course, students should be able to:

A1	Define general characters of bacteria (cell structure, physiology and genetics as well as differentiation between microorganisms (bacterium, virus or fungus)	Describe
A2	Describe the physiology of the immune system, its beneficial role, as well as its detrimental role in hypersensitivity, autoimmunity, tumor and transplant rejection	
A3	Discussion the most important infectious clinical conditions and outline the diagnosis, treatment, prevention and control of the most likely organisms causing such diseases.	
A4	Describe the scientific basis of mechanisms of antimicrobial drugs resistance and how to limit antimicrobial drug resistance as well as the host parasite relationship and microbial virulence and pathogenesis	
A5	Identify the morphology, culture character, antigenic structure and virulence factors of microorganisms of medical importance.	
A6	List the uses of molecular technology in microbiology and immunology.	

B- Intellectual skills

By the end of the course, students should be able to:

B1	-Distinguish microbiological, immunological and molecular reports and - Correlate according to evidence the causal relationship of microbes and diseases	
B2	Classify a microorganism as a bacterium, virus or fungus according to standard taxonomy also analyze the results of microbiological, serological and molecular tests	
B3	.Recognize principles and methods of decontamination, disinfection and sterilization and their application in laboratories and hospitals and safety measures.	
B4	Categorize a microorganism as a bacterium, virus or fungus according to standard taxonomy.	

C: Professional and practical skills:

By the end of the course, students should be able to:

C1	Demonstrate medically important bacteria based on microscopic examination of stained preparations
C2	Determine and Perform a *Gram stain and a *Ziehl-Neelsen stain of the Most 'medically important' bacteria and identify micro-organisms according to morphology and characteristics, stained preparations.
C3	Determine the principles of growing and cultivating microorganisms , Demonstrate culture media (with and without growth), the different biochemical tests used to identify bacteria and diagnose infectious diseases and antibiograms used for choice of proper antibiotics as well as Solve some common microbiologically related medical problems
C4	Demonstrate different methods of sterilization, disinfection and predict the appropriate antibiotics used in treatment of each disease and the suitable sterilization, disinfection and infection control procedures used in laboratories and hospitals.
C5	Distinguish different laboratory procedures necessary to approach diagnosis of the common infectious clinical conditions with prioritization of the most appropriate and most cost-effective tests to be used.

D: General and transferable skills:

By the end of the course, students should be able to:

D1	Know the main clinical criteria of most infectious diseases.
D2	Complete a full scientific report in the field of microbiology and immunology.
D3	Communicate in groups and team in laboratory experiments
D4	Follow the computer-based tools and internet to extract information and knowledge

4: Course Contents

Wk	Topics		No. of hours	Lecture	Lab	Tut
1	General Bacteriology & Microbial Genetics	Introduction Bacterial cell structure And Bacterial Morphology	2h	1		
	General Bacteriology & Microbial Genetics	Anatomy Of The Bacterial Cell Bacterial Physiology and metabolism	2h	1		
2	General Bacteriology & Microbial Genetics	Physiology and metabolism	2h	1		
	General Bacteriology & Microbial Genetics	Microbial genetics	2h	1		
3	General Bacteriology & Microbial Genetics	Sterilization and Disinfection	1h	1		
	General Bacteriology & Microbial Genetics	Antimicrobial agents and bacterial resistance	1h	1		
	General Bacteriology & Microbial Genetics	Infection & resistance, Host parasite relationships	2h	1		
4	Systematic Bacteriology	Classification of bacteria	2h	1		
	Systematic Bacteriology	Staphylococci	2h	1		
5	Systematic Bacteriology	Streptococci & pneumococci	2h	1		
	Systematic Bacteriology	Neisseria	2h	1		
6	Systematic	Bacillus group and	2h	1		

	Bacteriology	Clostridium				
	Systematic Bacteriology	Mycobacterium group	2h	1		
7	Systematic Bacteriology	Corynebacterium, listeria	2h	1		
	Systemic bacteriology	E-coil, klebsiella and Citrobacter	2h	1		
8	Systemic bacteriology	Salmonellae	2h	1		
	.systemic bacteriology	Shigella & Proteus	2h	1		
9	Systemic bacteriology	Vibrio and Pseudomonas	2h	1		
	Systemic bacteriology	Yerssinia Pasteurella and francisella	2h	1		
10	Systemic bacteriology	Brucella	2h	1		
	Systemic bacteriology	Haemophilus, Bordetella	2h	1		
11	Systemic bacteriology	Bactericides, Actionornyces and Legionella	2h	1		
	Systemic bacteriology	Spire	2h	1		
12	Systemic bacteriology	Rickettsia	2h	2		
13 14 15	Mid Term Examination					
16	Systemic bacteriology	Chlamydia	2h	1		
	Systemic bacteriology	Mycoplasma	2h	1		
17	Basic immunology	Introduction: history and terminology Types of immunity (natural and acquired immunity)	1h	1		
	Basic immunology	Innate (natural) immunity, parameters and mechanism	1h	1		
	Basic immunology	Antigens, immunogenicity, types of antigens & mitogens	1h	1		

	Basic immunology	Organs and tissue of the immune system, primary and secondary lymphoid organs	1h	1		
18	Basic immunology	Cells involved in immune responses- types and subtypes, Sites of their developments-their functions	2h	1		
	Basic immunology	The immune response: humoral response, primary and secondary immune response ,primary and secondary Immune response, mechanism of antibody production	2h	1		
19	Basic immunology	Antibodies: structure, classes, subclasses and characters of immunoglobulins as well as their functions and uses	1h	1		
	Basic immunology	Monoclonal antibodies, hybridoma technology, and their applications. Anti-idiotypic antibodies and their uses	1h	1		
	Basic immunology	Complement system: characters, mechanism of activation, biological functions and techniques involving complement and disorder	2h	1		
20	Basic immunology	Major Histocompatibility Complex (MHC) antigens, Human leukocytes Antigens (HLA). Cellular distribution, structure and functions of MHC antigens.	1h	1		
	Basic immunology	The cellular immune response: mechanism of cytotoxicity reactions and measurement of cytotoxicity in-vitro, types	2h	1		

		and functions of cytokines. Treg cells				
	Basic immunology	Immunoregulation and immunoprophylaxis	1hr	1		
21	Clinical Immunology	Immunity to microbial infections	1h	1		
	Clinical immunology	Immunopathology: Types of hypersensitivity (Types 1,II, III, and IV)	3h	2		
	Clinical immunology	Immunization				1
22	Clinical immunology	Transplantation and Tissue typing, mechanism of tissue Rejection, prevention and treatment	2h	1		
	Clinical immunology	Immune tolerance Autoimmune diseases and immunodeficiency diseases	2h	1		1
	Clinical immunology	Tumor immunology	1h			1
23	General virology	Introduction: history and terminology and structure of the virus	1h			
	General virology	Virus characters – physical and biochemical	1h	1		
	General virology	Basis of virus classification Viral replicative cycle	1h	1		
	General virology	Virus pathogenesis and virus immunity	1h	1		
24	General virology	Laboratory identification of viruses in clinical specimens: Direct diagnosis based on isolation, morphological and biochemical characters Laboratory diagnosis of viruses in clinical specimens: Serological identification, Molecular diagnosis based on identification of virus nucleic acid, using DNA probe, and PCR	2h	1		

	Systematic virology	herpesviruses Types, characteristics, importance, pathogenesis, clinical manifestation, treatment and laboratory diagnosis	1h			
	Systemic virology	poxviruses, parvoviruses, adenoviruses characteristics, importance, pathogenesis, clinical manifestation and laboratory diagnosis	1h	1		
25	Systemic virology	Picornaviruses, Characteristics, pathogenesis and laboratory diagnosis,	1h	1		
	Systemic virology	arthropod-borne and rodent borne viruses, reoviruses, rotaviruses,	1h	1		
	Systemic virology	orthomyxoviruses, paramyxoviruses	1h	1		
	Systemic virology	Rubella virus, Rabies virus, retroviruses,	1h	1		
26	Systemic virology	hepatitis viruses HAV, HEV, HDV (HBV & HCV Characters, epidemiology, pathogenesis and laboratory diagnosis	1h	1		
	Systemic virology	tumor viruses, slow viruses and prion diseases	1h	1		
	General MYCOLOGY	Introduction to Mycology. Structure and morphology of fungi Fungal classification and taxonomy	1h	1		
	General MYCOLOGY	Mycology, Pathogenesis of fungal diseases, and Laboratory diagnosis of fungal infection	1h	1	2h	

27	Superficial Mycosis	Superficial mycosis: Definition, symptoms, epidemiology, etiology, laboratory diagnosis and treatment	1h	1		1h
	Subcutaneous mycosis	Definition, symptoms, epidemiology, etiology, laboratory diagnosis and treatment	1h	1		1h
	Opportunistic mycosis	Definition, symptoms, epidemiology, etiology, laboratory diagnosis and treatment	1h	1		1h
	Mycotoxins & Antifungal agents	Definition, Modes of action, methods of evaluation	1h	1		1h
28	Clinical microbiology	Classification of infections of the GIT, Viral diseases of the upper digestive system, Helicobacter pylori and gastric ulcer disease	1h			1h
	Clinical microbiology	Food poisoning. 1. Define the term food poisoning. 2. common organisms causing food poisoning. 3. pathogenesis of food poisoning produced by B. cereus, Staph. aureus, C. botulinum and C. perfringens 4. laboratory diagnosis of food poisoning	1h			2h
	Clinical microbiology	Diarrhea 1. List the bacterial and viral causes of diarrhea and define their morphological characteristics 2. mechanisms by which the organisms produce diarrhea 3. characteristic clinical features of diarrhea produced by each organism. 4 laboratory diagnosis and prevention of each	1h			1h

		organism.				
	Bacteria causing upper respiratory tract infection	<p>the etiology of the common upper respiratory tract infection caused by bacteria.</p> <p>2. the major manifestations of this infection.</p> <p>3. pathogenesis, diagnosis, and the treatment of infections</p>	1h			1h
	Viral infection of respiratory tract	<p>1 .different viruses causing respiratory tract.</p> <p>2 .Identify the common viral etiology agents causing RT infections.</p> <p>3 .pathogenesis, signs and symptoms of the viral RT infections.</p> <p>4 .laboratory diagnosis of the common viral RT infections.</p> <p>5 .pathogenesis and clinical presentation of the three types of influenza and corona viral infections.</p>				2h
	Community and hospital acquired Pneumonia	<p>1 .Define community and hospital acquired pneumonia and enlist their risk factors.</p> <p>2 .Enlist etiologic agents and describe its microbiologic features.</p> <p>3 .Discuss the pathogenesis and clinical manifestations for HAP and CAP.</p> <p>4 .Discuss the laboratory diagnosis for HAP and CAP.</p> <p>5. Discuss the preventive measures for HAP and CAP</p>				2h
	Tuberculosis	<p>1 .Enlist general characters of the genus Mycobacteria.</p> <p>2 .Identify diagnosis of active tuberculosis disease.</p> <p>3 .Identify diagnosis of latent tuberculosis infection.</p>				1h

		4. Identify how to prevent tuberculosis.				
	Respiratory tract immunology	<ol style="list-style-type: none"> 1 .hypersensitivity reactions of the respiratory system. 2 .bronchial asthma and differentiate between extrinsic and intrinsic asthma. 3 .types of allergens and their role in allergic sensitization and discuss the pathogenesis of bronchial asthma. 4. the role of cytokines in the pathogenesis of bronchial asthma 				2h
	Urinary tract infection	<ol style="list-style-type: none"> 1 .List the commonest causative agents (pathogens) of UTI. 2 .Recognize the risk factors of UTI. 3 .Explain the pathogenesis and microbiology of UTI. 4 .Recognize the classification of UTI. 5 .Describe the clinical manifestation of UTI. 6 .Memorize the complications of UTI. 7 .Outline the laboratory diagnostic approach of different UTI. 8. List treatment and specific preventive measures of UTI. 				1h
	Skin infections (bacterial, Fungal & viral skin infections)	<ol style="list-style-type: none"> 1 .Factors controlling the skin's microbial load. 2 .the sources, types and etiologies of skin and wound infections. 3 . major virulence factors of the etiologic agents of common bacterial skin infections (Cellulitis, impetigo, leprosy, syphilis and Pseudomonas burn infection). 4 .laboratory diagnosis of etiologic agents of 				2h

		<p>common bacterial skin infections.</p> <p>5. pathogenesis of Acne vulgaris</p> <p>6. pathogenesis of etiologic agents of common fungal infections (Tinea by Dermatophytes, Candida and Malassezia furfur) and viral skin infections (Herpes , measles, rubella, chicken pox, fifth disease, hand foot and mouth disease and viral warts.(</p> <p>7 . laboratory diagnosis of etiologic agents of common fungal and viral skin infections</p>				
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Practical Topic

1. Lab safety -Microscope
2. Sterilization, disinfection and antisepsis
3. Laboratory diagnosis of bacterial
4. infection (Simple and Gram's stain)
5. Ziehl Neelsen stain
6. Laboratory diagnosis of bacterial infection (Culture media I)
7. Laboratory diagnosis of bacterial infection (Culture media II)
8. Laboratory diagnosis of bacterial infection (Biochemical reactions Molecular diagnostic techniques (
9. Antimicrobial susceptibility testing
10. Laboratory diagnosis of viral infections
11. Laboratory diagnosis of fungal infections
12. Serology I
13. Serology II
14. Serology III
15. Basics of infection control

5: Teaching and Learning Methods

1. Lectures
2. Small group discussion
3. Practical classes
4. Quiz to solve case studies
5. Office hours (Tutorial)
6. TBL
7. Flipped class

TEACHING PLAN:

1 .Lectures:

The lecture halls are located on the third floor of the Medical Education Building. two-hour-lectures are held two times weekly (Tuesday: 09:00-11:00, Wednesday: 9:00 and: 11:00). Lectures are given all through the academic year.

2. Tutorials: Groups of 100 Students has one tutorial per week throughout the academic year. Explanation of the practical class and revision of relevant theoretical material accompanied by problem solving and discussing related case studies will be presented during this hour.

3. Practical classes Groups of 76Students will be divided into 3 smaller groups. Each group has one practical class per week throughout the academic year during which practical demonstration and discussion will occur.

6: Evaluation Methods

	Assessment Method	Date	Marks	%of Total	ILOs Assessed
1	Mid-year Exam	Second week of May	30	15%	Knowledge, understanding and intellectual skills
2	Continuous assessments (Portfolio) (Quizzes discussions, Assignments)	Through year	10	5%	Knowledge, understanding and intellectual skills

3	Final Exam (It includes a variety of questions; - True & False questions & Multiple choice questions; case studies – short note question; Matching and complete the blanks	Third week of October	100	50%	for assessment of knowledge and understanding and intellectual skills (A1-A8, B1-B6)
4	Practical exam	Third week of August	40	20%	for assessment of practical skills (C1-C4) and intellectual skills (B1-B6)
5	Oral	Third week of October	20	10%	for assessment of knowledge and understanding outcomes, intellectual skills, and general skills (A1-A8, B1-B6, D1-D4)
6	Total		200	100%	

N.B. Dates are liable to change, so check with administration

7: References:

Reference Title	Publisher	Edition	Author	Place
Course Handout			Department Staff	Library
Jawetz Melnick & Adelbergs Medical Microbiology	McGraw-Hill / Education Medical	26th	Karen C. Carroll Janet Butel Timothy Mietzner	
Cellular and molecular immunology		tenth edition	Abul k. Abbas. Andrew H Lichman. Shiv pillai	
Electronic Materials and Web Sites			Trends of Immunology Journal J. of infectious	

			diseases J. Of Clinical Microbiology J. of Medical Virology Pub med Web site	
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8: Required Facilities:

Required Facilities	Comments
Lecture hall	Data show, white board and computer ,facilities
Equipped laboratory	Microscopes, slide projector, overhead projector laboratory instruments and various lab items relevant to the goals of teaching,
Library	Textbooks, journals, internet,

- **Course Coordinator:** Dr. Aziza. Buabraig
- **Signature :**
- **Programme Coordinator:** Dr. Hitham ALhusni
- **Signature :**
- **Head of Department:** Dr. Aziza. Buabraig
- **Signature:**
- **Date of specification approval: 1.3.2024**

Quality Assurance and Performance Evaluation Office

Topic	Knowledge and Understanding A						Intellectual Skills B				Practical and Professional Skills C					General and Transferable Skills D				
	1	2	3	4	5	6	1	2	3	4	1	2	3	4	5	1	2	3	4	
General Microbiology	x	X		x				x	x		x	x							x	X
Virology	x			x				x							x					
Medical Mycology	x			x				x							x					
Systemic Bacteriology			x	x			x		X	x	x	x	x	x	x	x	x	x	x	X
Immunology		X	x		x	x	x	x			x					x	x	x	x	X
Topic on Clinical Microbiology		X	x	x		x	x		x	x	x			x		x	x	x	x	X
Weeks																				
1	x	X		x															x	X
2	x	X		x																
3	x	X		x																
4	x	X		x											x					
5	x	X	x	x				x	X						x				x	X

6	x	X	x	x				x	X										x	X
7	x	X	x	x															x	X
8	x	X	x	x															x	X
9	x	X	x	x															x	X
10	x	X	x	x																
11	x	X	x	x																
12	x	X	x	x				x	x											
13	x	X	x	x				x	x											
14	Midterm exam																			
15																				
16																				
17		x	x		X	X	x			x										
18		x	x		X	X	x			x										
19		x	x		X	X	x			x	x	x	x			x	x	x	x	X
20		x	x		X	X	x			x	x	x	x	x	x	x	x	x	x	X
21		x	x		x	X	x			x	x	x	x	x	x	x	x	x	x	X
22		x	x		x	X	x			x	x			x	x	x	x	x	x	X
23		x	x		x	X	x		x	x	X			x	X	x	x	x	x	X
24		x	x	X		X	x	x	x	x	x			x	x	x	x	x	x	X
25		x	x	x		X	x		x	x	x			x	x	x	x	x	x	X
26		x	x	x		X	x		x	x	x			x	x	x	x	x	x	X
27		x	x	x		X	x		x	x	x			x	x	x	x	x	x	X
28		x	x	x		X	x		x	x	x			x	x	x	x	x	x	x

