

Course Specification

University: Al-Azhar

Faculty: Medicine

Department: **Medical Microbiology**

1- Data of the course:

Code of the course: 304-mic	Title of the course: medical microbiology	Year: 3 rd of the MBBCh program
Specialty: Medical Microbiology	Number of teaching units:	Lectures: 70 hours Practical: 70 hours Total: 140 hrs

2- Objectives o the course:	<ol style="list-style-type: none"> 1- Understanding microbial morphology, structure, physiology and metabolism relevant to common infectious diseases. 2- Understanding the basis of microbial and bacteriophage genetics. 3- Understanding the concept of immune response. 4- Understanding the natural habitat, source of infections, modes of transmission of microorganisms, treatment and prophylactic measures against common infectious diseases. 5. Understanding the basic concepts of health care associated infections (HAIs).
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3- ILOs

A- Knowledge and understanding:	<ol style="list-style-type: none"> 1. Describe the morphology and Structure of Microorganisms 2. Identify bacterial Physiology and Metabolism. 3. Describe the characteristics of the medically important RNA and DNA viruses, and bacterial genetics. 4. Describe the host defence Mechanisms and identify Major Histocompatibility Complex Classes and tumor immunology. 5. Identify the cell Migration, Inflammation and the Mucosal Immune System 6. Describe the hypersensitivity reactions types I – IV, and Tolerance & Autoimmunity and immunodeficiency dieases. 7. Recognize in each individual case of viral infection, the habitat, the source of infection, modes of transmission and the role of carrier, pathogenesis, diagnosis, the prophylactic measures and lines of management. 8. The student should understand the concepts of defence mechanisms, antigen-antibody reaction and different aspects of immunity and their
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	disorders.																
B- Intellectual Skills:	<p>1. The student should recognize the bacterial morphology, physiology, metabolism, classification, identification, genetics, pathogenesis and control (including sterilization, disinfection & antibiotics).</p> <p>2. The student should be able to recognize, the causative organism, the habitat, characteristics of pathogenic strains, modes of transmission and the role of carrier, prophylactic measures and the lines of treatment.</p>																
C- Professional Skills:	<p>1- Observe the principles of isolation and identification of bacteria (with special reference to principles of staining methods)</p> <p>2- Perform direct visualization, Cultivation, Biotyping, Serodiagnosis & Molecular typing).</p> <p>3- The student should be able to identify the different mycotic infections, and the modes of their transmission and management.</p>																
D- General Skills:	1-Communicate appropriately with staff and colleague																
4- Course Content:	<table border="0"> <thead> <tr> <th>Topic</th> <th>Hours</th> </tr> </thead> <tbody> <tr> <td>1-Introduction to Medical Microbiology: History of Microbiology 4- Microbiology & Medicine.</td> <td>1</td> </tr> <tr> <td>2- Morphology and Structure of Microorganisms: -Eukaryotic and Prokaryotic cells. -Bacterial Structure -Classification and nomenclature of bacteria -Hints on the Structures Fungi and Viruses.</td> <td>2</td> </tr> <tr> <td>3- Bacterial Physiology and Metabolism: Requirements for bacterial growth 5- Environmental conditions required for growth 6- Bacterial Growth Cycle Methods of Identification of Bacteria:</td> <td>1</td> </tr> <tr> <td>Principles of isolation and identification of bacteria (with special reference to principles of staining methods) Direct visualization, Cultivation, Biotyping, Serodiagnosis & Molecular typing).</td> <td>2</td> </tr> <tr> <td>4- Principles of Bacterial Genetics: 7- Bacterial Chromosome 8- Plasmids 9- Genetic Variations in bacteria: I- Mutation II- Gene Transfer 10- Bacteriophage (nature, replication & importance)</td> <td>2</td> </tr> <tr> <td>5- <i>Sterilization and Disinfection:</i></td> <td>2</td> </tr> <tr> <td>6- Antimicrobial Agents: antibiotics and chemotherapeutics. Mechanism of action 11- Antibiotic resistance 12- Principles of antibiotic therapy</td> <td>2</td> </tr> </tbody> </table>	Topic	Hours	1-Introduction to Medical Microbiology: History of Microbiology 4- Microbiology & Medicine.	1	2- Morphology and Structure of Microorganisms: -Eukaryotic and Prokaryotic cells. -Bacterial Structure -Classification and nomenclature of bacteria -Hints on the Structures Fungi and Viruses.	2	3- Bacterial Physiology and Metabolism: Requirements for bacterial growth 5- Environmental conditions required for growth 6- Bacterial Growth Cycle Methods of Identification of Bacteria:	1	Principles of isolation and identification of bacteria (with special reference to principles of staining methods) Direct visualization, Cultivation, Biotyping, Serodiagnosis & Molecular typing).	2	4- Principles of Bacterial Genetics: 7- Bacterial Chromosome 8- Plasmids 9- Genetic Variations in bacteria: I- Mutation II- Gene Transfer 10- Bacteriophage (nature, replication & importance)	2	5- <i>Sterilization and Disinfection:</i>	2	6- Antimicrobial Agents: antibiotics and chemotherapeutics. Mechanism of action 11- Antibiotic resistance 12- Principles of antibiotic therapy	2
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7- Bacterial Pathogenesis (including virulence factors):	1	
II- Immunology (14 hours)		
A- General Immunology:	Hours	
8-Introduction to Immunology (including history of immunology):	1	2-
Cells and organs of the immune system:	1	3- Host
defence Mechanisms	2	
-Natural (innate) immunity.		
-Acquired (Adaptive) immunity.		
9- Antigen , antibodies and Their Receptors	2	-
Antigens, Hapten, Antigenic Determinants “ epitopes”		
- Antibodies “Immunoglobulins“ (Structure, Classes & Properties)		
10-Complement		2
-Classical and Alternative Pathways		
-Mechanism and Function		
- Complement and Disease		
11-Antigen-AntibodyInteractions		2
In vivo: Protection Against Pathogenic Microorganisms.		
In vitro: Agglutination, Precipitation, Immuno-electrophoresis,		
Complement–Fixation, Enzyme-Linked Immunosorbent Assay,		
Radioimmunoassay, Immunofluorescence, etc....		
12-Major Histocompatibility Complex Classes	1	
13- Antigen presentation		
14- Disease susceptibility		
13-Cytokines	1	
14-Immune Response	2	
- Humoral Immunity		
15- Cell Cooperation in the antibody response		
16- Cell Mediated Immunity.		
17- Factors Affecting the Immune Response		
15-Cell Migration & Inflammation	1	
16-The Mucosal Immune System	1	
B-CLINICAL IMMUNOLOGY:		
17-Hypersensitivity reactions types I - IV	2	
-Type I Immediate (Anaphylactic) Hypersensitivity		
-Atopy; Treatment & Prevention (including Desensitisation),		
-Type II Cytotoxic Hypersensitivity		
-Type III Immune -Complex Hypersensitivity		
-Arthus, Serum Sickness & Immune-Complex Diseases		
-Type IV Delayed (Cell-Mediated) Hypersensitivity		
- Contact, Tuberculin Type- & Granulomatous Hypersensitivity		
18- Tolerance & Autoimmunity	1	
-Immunological Tolerance		
-Types of Autoimmune diseases		
- Mechanisms		
19-Transplantation & Transfusion Immunology	1	
- The ABO Blood Group & Transfusion Reaction		
- The Rh Blood Type & Hemolytic disease of the Newborn		

	-Types of Transplantation and Types of Grafts		
	- Allograft Rejection, Mechanisms		
	- Graft-Versus Host (GVR) Reaction		
	12- Tumour immunology	1	
	-Tumour-Associated Antigens, Onco-Fetal Antigens		
	-Mechanism of Tumour immunology		
	- Escape Mechanism of Tumours & Immunotherapy		
	14-Immunodeficiency	1	
	-Primary and Secondary Defects		
	15-Vaccines & Immunotherapy	1	16-
	Infection and Immunity (bacterial, fungal & viral)	1	
	III-Systematic Bacteriology (& Related Diseases): (17 hours)		
	1-Pyogenic Cocci:	4	
	-Staphylococcus+ Methicillin-Resistant Staph aureus (MRSA) & Micrococcus.		
	-Streptococci (including S.pneumoniae).		
	-Neisseria and Moraxella.		
	2-Gram Positive Non-Sporulating Bacilli	2	
	-Corynebacterium: diphtheriae, and other Corynebacteria.		
	-Erysipelothrix and Listeria.		
	-Actinomyces, Nocardia, and: actinomycosis,.		
	3-Gram Positive Sporulating Bacilli	3	
	-Aerobic group :Bacillus anthracis and anthracoid.		
	-Anaerobic Group: Clostridium tetani, perfergens and botulinum & difficile.		
	3-Acid-Fast Bacilli	2	
	-Mycobacterium: tuberculosis, leprosy, and atypical mycobacterium.		
	5-GRAM NEGATIVE BACTERIA:	10	-
	Enterobacteriaceae:		
	-Coliform bacteria, Klebsiella, Proteus, and Providencia.		
	-Shigella.		
	-Salmonella.		
	-Pasteurella, Francisella, and Yersinia.		
	-Pseudomonas, Acinetobacter, Vibrio, Spirillum, Campylobacter, and Helicobacter.		
	-Haemophilus, and Bordetella..		
	-Brucella.		
	-Bacteroides and Fusobacterium.		
	-Gardenella.		
	- Legionella		
	6-SPIROCHAETES:	3	
	-Treponema, Borrelia, and Leptospira.		
	7-Rickettsia	1	
	8-Chlamydia & Mycoplasma	1	
	IV- Virology (8 hours)		
	A-General Virology	2	
	-Properties of viruses	1	(Nature,
	Structure, morphology & Classification).		
	- Viral Replication & genetics.	1	
	-Diagnosis of Viral diseases.	1	

	(Isolation & Serological diagnosis of viruses). -Viral Pathogenesis & Control (chemotherapy and vaccines). 1
	B-Systemic Virology (& Related Diseases): 6
	-Herpesviruses, 2
	-Poxviruses, 1
	-Parvoviruses, Polyomavirus & Adenoviruses 1
	-Hepatitis viruses (HA, HB, HC, HDV & HEV) 2
	-Orthomyxoviridae, 1
	-Paramyxoviruses and Rubella virus 1
	-Coronaviruses & Rotaviruses 1
	- Picornaviruses (Enteroviruses & Rhinovirus) 1
	- Retroviruses (HIV & HTLV) 2
	- Rabies virus 1
	-Arboviruses (Arthropod & Rodent bite viruses) 1
	- Oncogenic Viruses, 1
	-Prion Diseases & Slow virus infections 1
	V- Medical Mycology (4 Hours)
	1- General Mycology. 2
	-Morphology, taxonomy and classification of the fungi.
	-Detection and recovery of fungus from clinical samples.
	-Mycotoxins & Hypersensitivity
	-Pathogenesis & chemotherapy of fungal diseases.
	2- Systemic Mycology (& Related Diseases): 2
	- Superficial mycosis.
	-Cutaneous mycosis.
	- Subcutaneous mycosis.
	- Systemic mycosis.
	-Opportunistic mycosis.

5- Methods of teaching:	- Lectures - Practical sessions
6- Methods of teaching of handicaps	Not present

7- Students evaluation and assessment:

A- Method of assessment:	1. Ongoing assessment 20 % of total marks allocated 2. Final Examination 80 % of total marks allocated including written, oral and practical examinations).
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