COURSE PLAN

FIRST: BASIC INFORMATION

College	
College	**: Faculty of Medicine**
Department	**: Basic Medical department**
Course	
Course Title	**: Introduction to Microbiology for Medical students**
Course Code	**: 31504204**
Credit Hours	**: 3**
Prerequisite	**: General Biology**
Instructor	
Name	**: Dr. Sameer Ahmad Naji Al Haj Mahmoud**
Office No.	**: Office No. 3, 2nd floor, Faculty of Medicine Building**
Tel (Ext)	**:**
E-mail	**: sameer.alhaj@bau.edu.jo**
Office Hours	**: 10.00 - 12.00 am. Sundays, Mondays, Wednesdays**

Class Times

Building	Day	Start Time	End Time	Room No.
	Monday, Wednesday	**9.30**	**11.00**	Auditorium 1
		11.00	**12.30**	2

Text Book

Title

1. **Jawetz Medical Microbiology, 26rd Edition. Edited by Geo.F. Brooks & others. A Lange Medical Book, 2013.**
2. **Willey M. Joanne, Sherwood M. Linda, and Woolverton J. Christopher. Prescott Microbiology. 8th edition. McGraw Hill, 2011.**

References

1. Willey M. Joanne, Sherwood M. Linda, and Woolverton J. Christopher. Prescott Microbiology. 8th edition. McGraw Hill, 2011.

2. Willey M. Joanne, Sherwood M. Linda, and Woolverton J. Christopher. Prescott, Harley, and Kleins. Microbiology.7th edition. McGraw Hill, 2008.

3. Nester W. Eugene, Anderson G. Denise, Roberts C. Evans, Pearsall N. Nancy, and Nester T. Martha. Microbiology. A human Perspective. International edition. McGraw Hill, 2004.

4. Gerard J. Tortora, Berdell R. Funke, and Christine L. Case. Microbiology. An Introduction. 10th edition, Pearson Benjamin Cummings, 2010.

SECOND: PROFESSIONAL INFORMATION

COURSE DESCRIPTION

The course will cover the general aspects of microbiology including the classification of microorganisms, morphology, structure, culturing, controlling by physical and chemical factors, and microbial genetics. In addition, we will discuss the methods used for sample collection, pathogenesis, virulence factors, medical bacteriology, virology, mycology, and parasitology .

COURSE OBJECTIVES

1. Mention types of microorganisms, their classification, structure, and function.
2. Cultivation of bacteria and methods for counting.
3. List major chemical and physical factors that affect the growth of microorganisms
4. Describe the pathogenesis and manifestations of diseases caused by different microorganisms.
5. Describe methods of diagnosis of infections, including; specimen selection, handling, processing, biochemical and serological identification.
6. Study the virulence factors, routs of entrance, epidemiology, and immunology of infections associated with bacteria, fungi, viruses, and parasitic infections.

COURSE LEARNING OUTCOMES

1) Knowledge and Understanding

1. Classification of different microorganisms, their structures, and function
2. Identification of microorganisms using morphological characteristics, biochemical tests, virulence factors, and mechanisms of pathogenicity.
3. Understanding clinically important diseases attributed to bacteria, viruses, fungi, and parasite

2) Professional Skills

1. Learning methods including; manual, automated, and molecular methods used for identification of clinically important bacteria and evaluating the importance of each.
2. Correlation between the virulence factors harbored by the bacteria with the pathogenicity mechanisms

3) Competences (Transferable skill and attributes)

1. Identification of clinically significant pathogens by microscopy, morphology, cultural characteristics, and by interpreting the biochemical results to identify the phenotypic traits
2. Knowledge related to the clinical sample collection, processing, cultivation, interpreting the results.

COURSE SYLLABUS

Week	Course Topic	Notes
Week 1	**Scope of Microbiology and Microscopy.**	- Naming and Classifying Microorganisms - Nomenclature - Types of Microorganisms - Classification of Microorganisms - The Three Domains

	Cell structure and function	- A Phylogenetic Hierarchy - The Size, Shape, and Arrangement of Bacterial Cells - Structures External to the Cell Wall - Glycocalyx - Flagella - Axial Filaments - Fimbriae and Pili - The Cell Wall - Composition and Characteristics - Cell Walls and The Gram Stain Mechanism - Atypical Cell Walls - Damage to the Cell Wall - Structures Internal to the Cell Wall - The Plasma (Cytoplasmic) Membrane - The Nucleoid - Ribosomes - Inclusions - Endospores
Week 2	**Growth and death of bacteria**	- The Requirements for Growth - Physical Requirements - Chemical Requirements - Biofilms
	Culture media: types and composition	- Chemically Defined Media - Complex Media - Selective and Differential Media - Enrichment Culture - Obtaining Pure Cultures
	The growth of bacterial cultures	- Bacterial Division - Generation Time - Phases of Growth - Direct Measurement of Microbial Growth - Estimating Bacterial Numbers by Indirect Methods

Week 3	**Control of microorganisms by physical and chemical methods**	- The Terminology of Microbial Control - Actions of Microbial Control Agents - Alteration of Membrane Permeability - Damage to Proteins and Nucleic Acids
	Physical methods of microbial control	- Heat - Filtration - Low Temperatures - High Pressure - Desiccation - Osmotic Pressure - Radiation
	Chemical methods of microbial control	- Principles of Effective Disinfection - Types of Disinfectants
Week 4	**Structure and function of the genetic material**	- Genotype and Phenotype - DNA and Chromosomes - The Flow of Genetic Information - DNA Replication - RNA and Protein Synthesis
	Mutation: change in the genetic material	- Types of mutations
	Genetic transfer and recombination	- Transformation in Bacteria - Conjugation in Bacteria - Transduction in Bacteria - Plasmids and Transposons
Week 5	**Specimen Handling and collection**	- Basic principles of specimen collection - Collection procedures - Labeling and requisitions - Safety, Preservation, storage, and transport of specimens - Shipping infectious substances - Specimen receipt and processing - Specimen priority - Unacceptable specimens and specimen rejection - Macroscopic observation - Microscopic observation - Isolation techniques
	Pathogenesis of bacterial infections	- Transmission of Infection - The Infectious Process - Bacterial Virulence Factors - Normal Human Microbiota

	Normal human microbiota	- Role of the Resident Microbiota
Week 6	**Paathogenic bacteria: Gram Positive Coccus**	- The Staphylococci - The Streptococcus - The Enterococci, and Related Genera - Classification of Streptococci - Streptococcus pyogenes group A - Streptococcus agalactiae group B - Streptococcus pneumoniae
Week 7	**Gram negative coccus** **Enteric Gram-Negative Rods (Enterobacteriaceae)**	- The Neisseriae - Neisseria gonorrhoeae - Neisseria meningitidis - Classification - *Citrobacter freundii* - *Enterobacter aerogenes* - *Escherichia coli* - *Klebsiella pneumoniae* - *Proteus mirabilis, Proteus vulgaris* - *Salmonella spp.* - *Serratia marcescens* - *Shigella spp.* - *Yersinia pestis, Yersinia enterocolitica, Yersinia pseudotuberculosis*
Week 8	**Block Week**	**Midterm Exam 50 % of Total Grades**
Week 9	**Spore-Forming Gram-Positive Bacilli: Bacillus and Clostridium** **Aerobic Non spore forming Gram-positive Bacilli:**	- Bacillus Species: Bacillus anthracis, and Bacillus cereus - Clostridium Species: Clostridium botulinum, Clostridium tetani, Clostridium difficile and Diarrheal Disease - Corynebacterium diphtheriae - Listeria monocytogenes - Actinomycetes

Week 10	**Acid fast bacteria: Mycobacteria**	- Mycobacterium tuberculosis - Mycobacterium leprae
	Spirochetes and Other Spiral Microorganisms	- Treponema pallidum and Syphilis - Borrelia Species and Relapsing Fever - Rickettsia and Related Genera
	Cell wall less bacteria: Mycoplasma	- Mycoplasma pneumoniae - Mycoplasma hominis - Ureaplasma urealyticum
	Chlamydia Spp.	- Chlamydia Trachomatis - Chlamydia pneumoniae - Chlamydia psittaci
	Legionella	- Legionella pneumonia
Week 11	**Medical Mycology**	- General characteristics and classification - Superficial fungal infection - Subcutaneous fungal infections - Systemic fungal infections - Opportunistic fungi
Week 12	**Medical Virology**	- General characteristics and classification - Viral Replication - Viral genetics - Cultivation of viruses and their laboratory diagnosis - Pathogenesis of viral infections - Immunity to viral infections
	DNA Viruses:	- Parvoviruses - Papovaviruses - Adenoviruses - Herpesviruses - Poxviruses - Hepadnaviruses
Week 13	**RNA Viruses**:	- Picornaviruses - Orthomyxoviruses - Paramyxoviruses - Coronaviruses - Rubella virus - Rhabdoviruses - Reoviruses - Retroviruses - Hepatitis C virus - Hepatitis E virus

Week 14	**Medical Parasitology** **Protozoa: Ameba**	- Introduction and Classification - ***Entamoeba histolytica*** - ***Acanthamoeba*** - ***Naegleria***
	Flagellates	- ***Trichomonas vaginalis*** - ***Trepanosoma (hemoflagellates)*** - ***Giardia lamblia (intestinal* flagellate)** - ***Balantidium coli***
	Sporozoa	- Apicomplexans - Plasmodium (malaria)
	Nematodes- Roundworms **Intestinal roundworms**	- Ascaris (Giant intestinal roundworm) - Enterobius (Pinworm) - Necator / Ancylostoma (Hookworm) - Trichuris trichiura (intestinal nematode) - Trichinella spiralis - trichinosis
	Tissue roundworms **Trematodes – Flukes**	- Schistosoma - blood fluke - Schistosoma mansoni - S. japonicum - S. haematobium
	Cestodes: tapeworms	- Taenia - Taenia saginata (beef tapeworm) - Taenia solium (pork tapeworm)
	Arthropods	
Week 16	**Final exam**	

COURSE LEARNING RESOURCES

Lectures, Labs, Data show, Vedio, discussion

ONLINE RESOURCES

https://sites.google.com/site/allmicrobiologysite/audio-lecturs

https://www.slideshare.net/sayanmanta/lecture-notes-medical-microbiology-and-infection-fifth-edition-elliott-tom

ASSESSMANT TOOLS

(Assessment tools that will be used to test students ability to understand the course material and gain the skills and competencies stated in learning outcomes

ASSESSMENT TOOLS	%
Mid Exam	50
Final Exam	50
TOTAL MARKS	100

THIRD: COURSE RULES

ATTENDANCE RULES

Attendance and participation are extremely important, and the usual University rules will apply. Attendance will be recorded for each class. Absence of 10% will result in a first written warning. Absence of 15% of the course will result in a second warning. Absence of 20% or more will result in forfeiting the course and the student will not be permitted to attend the final examination. Should a student encounter any special circumstances (i.e. medical or personal), he/she is encouraged to discuss this with the instructor and written proof will be required to delete any absences from his/her attendance records.

GRADING SYSTEM :Example:

90 – 100	**A**
85 – 89	**B+**
75 – 84	**B**
65 – 74	**C+**
60 – 64	**C**
55 – 59	**D+**
50 – 54	**D**
45-49	**D-**
Less than 45	**F**

REMARKS

COORDINATOR COURSE

Course Coordinator: **Department Head: Dr. Nabil Amer**

Signature: **Dr. Sameer Ai Haj Mahmoud** **Signature:**

Date: **Date: 22/9/2019**