Course Specifications

General Information

Course name	Medical Microbiology
Course number	AMSL3315
Faculty	
Department	
Course type	Major Needs
Course level	3
Credit hours (theoretical)	3
Credit hours (practical)	0
Course Prerequisites	

Course Objectives

1 - 1. Introduce the students to the basic concepts of medical microbiology

2 - 2. Studying medical and diagnostic knowledge of bacteria in health & disease

3 - 3. Understanding the basic structure, pathogenicity and classification of bacterial families

4 - 4. Studying bacterial physiology, genetics, epidemiology and control

5 - 5. Basic knowledge about antibacterial drugs and bacterial vaccines

6 - 6. Covering all medically important bacterial families that cause diseases in the human

7 - 7. Covering all microbiological, serological and molecular techniques that used to investigate most of the infectious diseases

Intended Learning Outcomes

Knowledge and Understanding	* 1.This course covers both the diagnostic and clinical aspects of medical microbiology * 2. Student should understand the structure, replication, classification and pathogenesis of medically important bacteria * 3. Complete knowledge about important pathogenic bacteria
Intellectual Skills	* 1. Ability to diagnose by laboratory methods the most important pathogenic bacterial diseases * 2. Ability to differentiate between different pathogenic bacterial species according to its phenotypic and genotypic characteristics
Professional Skills	* 1. Using the knowledge and skills that gained in diagnosis of diseases caused by Gram positive and Gram negative bacteria * 2. Using the knowledge and skills that gained in diagnosis of diseases caused by Mycobacteria, Spirochetes, and other neglected tropical pathogenic bacteria
General Skill	* 1. Ability to discuss this knowledge with experts and professionals * 2. Learn how to work successfully and effectively in team work and under pressure

Course Contents

1 - 1. Overview of the major pathogens, introduction to anaerobic bacteriology
2 - 2. Gram positive cocci: Staphylococci, Streptococci and Enterococci
3 - 3. Gram negative cocci: Neisseriae
4 - 4. Gram positive rods: Bacillus, Clostridium, Corynebacteria, Listeria
5 - 5. Gram negative rods related to the enteric tract: Escherichia, Salmonella
6 - 6. Gram negative rods related to the enteric tract: Shigella, Vibrio, Campylobacter, Helicobacter
7 - 7. Gram negative rods related to the enteric tract: Klebsiella, Enterobacter, Serratia, Proteus, Providincia, Morganella, Pseudomonas, Bacteroides
8 - 8. Gram negative rods related to the respiratory tract: Haemophilus, Bordetella, Legionella
9 - 9. Gram negative rods related to animal sources (Zoonotic organisms): Brucella, Francisella, Yersinia, Pasteurella
10 - 10. Mycobacteria: M. tuberculosis, Atypical mycobacteria, M. leprae
11 - 11. Actinomycetes, Mycoplasma
12 - 12. Spirochetes: Treponema, Borelia, Leptospira
13 - 13. Chlamydiae, Rickettsiae and other arthropod-borne bacterial diseases
14 - 14. Minor bacterial pathogens, revisions and case studies

Teaching and Learning Methods

1 - 1. Lectures
2 - 2. Presentations and discussion groups
3 - 3. Case studies

Teaching and Learning Methods for the Disabled Students

1 - Not applicable

Students Assessment

Assessment Method	TIME	MARKS
2. First Midterm Exam	The sixth week of the semester	20%
3. Second Midterm Exam	The twelfth week of the semester	20%
1. Attendance and Quises	Over the semester	10%
4. Final Exam	The sixteenth week of the semester	50%

Books and References

Course note	PowerPoint Presentations and printed handbook
Essential books	Warren Levinson, Review of Medical Microbiology and Immunology, Eleventh Edition 2010. By The McGraw-Hill Companies, New York
Recommended books	Medical Microbiology and Infection, Lecture Notes. Edited by Tom Elliott et al., Fifth Edition 2011. By the Wiley-Blackwell, UK
	Cases in Medical Microbiology and Infectious Diseases, Edited by Peter H. Gilligan et al., Fourth Edition 2014. ASM press, Washington, DC, USA
Other References (Periodical, web sites, ... etc.)	Jawetz, Melnick, & Adelberg's Medical Microbiology. Twenty-Seventh Edition 2016 by McGraw-Hill Education, New York, USA

Knowledge and Skills Matrix

Main Course Contents	Study Week	Knowledge and Understanding	Intellectual Skills	Professional Skills	General Skill
To know the main pathogenic bacteria and to which genera they belong. Also, to learn in principle the important properties, pathogenesis and laboratory diagnosis of anaerobic bacteria.	1	To know and understand what is pathogenesis and the main phenotypic and genotypic of pathogenic bacteria	Ability to differentiate between Gram postive and Gram negative pathogens. Also different anaerobic bacteria.	Full understanding about both Gram positive and Gram negative pathogenic bacteria	Comprehensive knowledge of pathogenesis and virulence factors of pathogenic bacteria
Gram positive cocci: Staphylococci, Streptococci and Enterococci	2	Understand the shape, structure, physiology, pathogenesis and diseases that caused by Staphylococci, Streptococci and Enterococci	Get the knowledge about the main pathogenic species versus the opportunistic species of those bacterial families	Ability to diagnose and differentiate the most important pathogenic species	Comprehensive knowledge about important Gram positive cocci
Gram negative cocci: Neisseriae	3	Understanding the diseases that caused by Neisseria species	Ability to think in a clear manner to diagnose bacterial meningitis that caused by N. meningitidis	Laboratory skills and tests that used to diagnose meningitis and gonorrhea	Full understanding and training on the tests and techniques that used in the laboratory for isolation and identification of Gram negative cocci
Gram positive rods: Bacillus, Clostridium, Corynebacteria, Listeria	4	To get fine knowledge on the Bacillus, Clostridia, Corynebacteria and Listeria genera	Ability to understand its different pathogenesis process, toxins produced and mechanism of reisistance	Laboratory diagnosis tests and media used to isolate and identify it	Student should be able to diagnose and differentiate important pathogenic Gram positive rods

Gram negative rods related to the enteric tract: Escherichia, Salmonella	5	Learn the basic concepts of Enterobacteriaceae family	Get full and comprehensive information about different diseases caused by Salmonella and Escherichia	Learning why Salmonella is always pathogen while E. coli can be real or opportunistic pathogen	Ability to correctly describe the pathogenesis, clinical findings and laboratory diagnosis of those pathogens
Gram negative rods related to the enteric tract: Shigella, Vibrio, Campylobacter, Helicobacter	7	Knowledge about the Gram negative bacilli bacteria that only cause disease in the gastrointestinal system	Thinking in the complications of infections caused by these pathogens, specially the autoimmune diseases	full practice of culturing and performing serological and molecular testes to diagnose and differentiate those pathogens	Complete knowledge about Gram negative enteric pathogens that cause only diseases in the gastrointestinal system
Gram negative rods related to the enteric tract: Klebsiella, Enterobacter, Serratia, Proteus, Providincia, Morganella, Pseudomonas, Bacteroides	8	Knowledge of Enterobacteriaceae family members that causes opportunistic infections	Thanking and finding out why those pathogens are mainly cause diseases in immunocompromised peoples	Isolation and characterization of these bacteria and learning the best antibiotics for treatment	Full knowledge about Gram negative rods that causes diseases only outside the gastrointestinal system
Gram negative rods related to the respiratory tract: Haemophilus, Bordetella, Legionella	9	Understand the important properties, pathogenesis, clinical findings, laboratory findings and treatment of main respiratory bacterial pathogens	Thanking how to prevent these infections specially in infant, young children and elderly peoples	Show the ability to discuss their infections, diagnosis, treatment and vaccination	God knowledge on Gram negative bacteria that related to respiratory tract
Gram negative rods related to animal sources (Zoonotic organisms): Brucella, Francisella, Yersinia, Pasteurella	10	Understand what is zoonosis and zoonotic disaeses	How these diseases reach human, what its osurces, how transmitted and thinking in how to prevent its transmission	Studying in details the characteristics, diseases and treatment of of zoonotic bacteria	Good skills on laboratory methods including culturing, serology and molecular diagnostic test

Mycobacteria: M. tuberculosis, Atypical mycobacteria, M. leprae	11	Have good knowledge about Tuberculosis and Leprosy	Why some human begins (races) are susceptible more than others to tubercuslosis	Diagnose disease caused by Mycobacteria species in the laboratory. Ability to select proper specimen for diagnosis. Learn how to prevent spread on community and/or nosocomial infections	Ability to use staining techniques, culture, and PCR in diagnosis of typical and atypical tuberculosis infections and leprosy
Actinomycetes, Mycoplasma	13	Understand the cell wall less bacteria and the mycotic-like bacteria	Ability of our students to understand the difference between fungi and fungi-like bacteria.	Complete and excellent knowledge of the serological and molecular techniques used in the diagnosis of Mycoplasma	Full knowledge about atypical pneumonia caused by Mycoplasma and infections of Actinomycetes
Spirochetes: Treponema, Borelia, Leptospira	14	Understanding the role of animals and arthropods in transporting of those diseases. Knowledge about the most important arthropods causative agents and the most important animal reservoirs	How these bacteria can survive in both different organisms? Human and arthropod? Why it cause only disease in the Human but not in arthropod?	Learn the special microscopy and staining that aid in the diagnosis of Spirochetes. Moreover, the specific and non-specific serological tests	Have good knowledge about Syphilis, Lyme disease and leptospirosis
Chlamydiae, Rickettsiae and minor bacterial pathogens	15	Understand the important properties and diseases that caused by those obligate intracellular bacteria	Why these bacteria can not live out side the cell? How they replicate? What are the similarities and differences compared to viruses?	Ability to use serological and molecular tests for diagnosis and the experience to differentiate it from other related bacterial genera	Up to date information about Trachoma and Typhus disaeses that caused by these bacteria