Course Title: Medical Microbiology (as 400 Level course)

Course Instructor: Dr Adnan Arshad

Credit Hours: 3hours/ Week Monday, Wednesday and Friday 2pm-2:50pm

Prerequisite:

BIOL 315: Fundamentals of Microbiology (4 credits), BIOL 325: Human Physiology (3 credits), BIOL 411/ENVR 411: Environmental Microbiology (3 credits), BIOL 415: Food Microbiology and Safety (4 credits), BIOT 316: Fundamentals of Virology (3 credits),

Recommended Reading Material:

1) Medical Microbiology by Patrick R. Murray. 7th Edition. 2014
2) Jawetz Medical Microbiology. 28th Edition. 2018
3) Burton's Microbiology for the Health Sciences.11th Edition. 2019

Course Description:

Microbiology is the study of microorganisms, a large and assorted group of microscopic organisms that exist as either single cells or in clusters; it includes also the viruses, which are microscopic but not cellular. Microorganisms have a huge impact not only on life but the physical and chemical composition of our planet. Medical microbiology can be a mystifying field to the beginners but it is a delightful subject, with the balance between health and disease defined by the biology of microbial communities and individual organisms. Establishment of a niche in our bodies by these microbes, and their ability to cause disease, may depends on how they interact with the host's innate and immune protective responses. With new and exciting discoveries in all areas, our understanding of microbiology and immunology is rapidly expanding. In this course essential information will be instructed according to the acronym **VIRIDEPT:** The **V**irulant properties of the organism; **I**dentification of the microbial cause of disease; the specific mechanisms for microbial **R**eplication; the pros and cons of the **I**mmune response to the infection; the consequences of **D**isease; the **E**pidemiology of infections; **P**revention of the disease itself and the **T**reatment. This subject includes the study of bacteria, viruses, parasites and fungus in regard to their classification.

Expected Learning Outcomes

Our knowledge about microbiology and immunology is constantly growing, and by building a good foundation of understanding in the beginning, it will be much easier to understand with the advances of the future.

Students

- Must be able to explain the basics of the medical microbiology and immunology
- Must be able to summarize the microbial biology, virulence and the immune response
- Should know the association between an organism and disease
- Should have an understanding of the major viral, bacterial, fungal, and parasitic diseases of humans

Course Schedule:

Week 1: **Introduction to Medical Microbiology**

a) Commensal and Pathogenic Microbial Flora in Humans
b) Sterilization, Disinfection, and Antisepsis

Week 2: **General Principles of Laboratory Diagnosis**

a) Microscopy and in Vitro Culture
b) Molecular Diagnosis
c) Serologic Diagnosis

Week 3: **Basic Concepts in the Immune Response**

a) Innate Host Responses
b) Antigen-Specific Immune Responses
c) Immune Responses to Infectious Agents
d) Antimicrobial Vaccines

Week 4: **Bacteriology**

a) Bacterial Classification, Structure, and Replication
b) Mechanisms of Bacterial Pathogenesis
c) Laboratory Diagnosis of Bacterial Diseases
d) Antibacterial Agents

Week 5:
e) Gram-Positive Cocci
f) Gram-Positive Rods

Week 6:
g) Gram-Negative Rods
h) Anaerobic, Non–Spore-Forming, Gram-Positive bacteria
i) Anaerobic Gram-Negative Bacteria

Week 7: Virology

a) Viral Classification, Structure, and Replication
b) Mechanisms of Viral Pathogenesis
c) Laboratory Diagnosis of Viral Diseases
d) Antiviral Agents and Infection Contro

Week 8: e) Papillomaviruses, Adenoviruses, Human Herpesviruses, Poxviruses
f)Coronaviruses, Paramyxoviruses, Rhabdoviruses

Week 9: g) Retroviruses
h) Hepatitis Viruses
i) Unconventional Slow Viruses: Prions

Week 10: Mycology

a) Fungal Classification, Structure, and Replication
b) Pathogenesis of Fungal Disease
c) Laboratory Diagnosis of Fungal Diseases
d) Antifungal Agents

Week 11: e) Superficial and Cutaneous Mycoses
f) Systemic Mycoses Caused by Dimorphic Fungi

Week 12: g) Opportunistic Mycoses
h) Fungal and Fungal-Like Infections of Unusual or Uncertain Etiology
i) Mycotoxins and Mycotoxicoses

Week 13: Parasitology

a) Parasitic Classification, Structure, and Replication
b) Pathogenesis of Parasitic Diseases
c) Laboratory Diagnosis of Parasitic Disease
d) Antiparasitic Agents

Week 14: e) Intestinal and Urogenital Protozoa
f) Blood and Tissue Protozoa
g) Nematodes, Cestodes, Arthropods

Course Evaluation

Quizes

Assignments

Presentations

Exams (Mid and Final Term)

Attendance