

MICROBIOLOGY - Medical

**POST GRADUATE DEGREE
STANDARD**

PAPER -I

(General Microbiology, Immunology, Systematic bacteriology, Microbiological techniques)

UNIT I

GENERAL MICROBIOLOGY

- 1 History of Microbiology - Important contributions and Contributors.
- 2 General Properties of Bacteria.
 - a. Morphology and Cell Structure.
 - b. Metabolism, pathways and enzymes.
 - c. Growth and cultivation - Growth curve, Nutrients and Media
- 3 Control of Microorganisms
 - a. Sterilisation
 - b. Disinfectants
 - c. Anti Microbial agents
- 4 Genetics
- 5 Host parasite relationship - Normal flora, pathogens, Routes of infection, virulence factors.
- 6 Use and Care of laboratory animals
- 7 Principles of epidemiology of infections

UNIT II

IMMUNOLOGY

- 1 Structure and development of Immune system
- 2 Cells involved in Immune systems
- 3 Non specific resistance mechanisms
- 4 Antigens
- 5 Immunoglobulins - structure and function
- 6 Complement system
- 7 Antigen, Antibody reactions and applications
- 8 Specific immune response, humoral and cellular against micro organisms
- 9 Hypersensitivity reactions (Different types)
- 10 Major histocompatibility complex - HLA systems
- 11 Transplantation immUNITY
- 12 AutoimmUNITY (Mechanism and diagnosis)
- 13 Immuno deficiency mechanisms and diagnosis
- 14 Principles of Tumour immunology
- 15 Immunisation and Immunotherapy

UNIT III

SYSTEMATIC BACTERIOLOGY

Morphology, cultural characteristics, pathogenicity, laboratory diagnosis, and principles of management and control and epidemiology of the following medically important bacteria.

- 1 Gram positive cocci - Staphylococci, streptococci, Entrococci
- 2 Gram Negative Cocci - Gonococci, Meningococci, Brahamella
- 3 Gram positive non sporing bacilli - Corynebacteria, Actinomycetes (aerobic and anaerobic)
- 4 Gram positive spore forming bacilli - Bacillus, Clostridia
- 5 Acid fast bacteria - M. tuberculosis, M.leprae, other mycobacteria
- 6 Small gram negative bacteria - Haemophilus, Bordetella, Yersinia, Brucella
- 7 Enteric Gram Negative bacilli
 - a. Entrobacteriaceae
 - b. Vibrios
 - c. Campy labacter
 - d. Helicobacter
- 8 Pseudomonas and other related non fermenting organisms.
- 9 Legionella
- 10 Anaerobic gram negative bacilli
 - (a) Bacteriodes
 - (b) Prevotella
 - (c) Porphyromonas
 - (d) Fusobacterium
- 11 Spirochaetes : treponema, leptospira, borellia
- 12 Mycoplasma
- 13 Chlamydia
- 14 Rickettsiae

UNIT IV

MICROBIOLOGICAL TECHNIQUES

- 1 Microscopy:
 - a. Different types and usefulness
 - b. Technical specifications
 - c. General maintenance
- 2 Staining:- Preparation and use of stains for bacteriology, parasitology,mycology and virology
- 3 Specimen collection, preservation, transport, processing
- 4 Principles and techniques employed in indentification of micro organisms.
- 5 Immunisation
 - a. Hyperimmune sera preparation
 - b. Use of adjuvants
- 6 Maintenance of stock cultures
- 7 Blood grouping, Rh typing, cross matching.
- 8 HLA typing
- 9 Principle and techniques of sera diaganosis of infections
- 10 Maintenance of equipments - Deep freezers, centrifuges etc.
- 11 Methods of assessing status of immune system.
 - a. Complement system
 - b. Estimation of T & B Cells
 - c. Estimation of antibodies
 - d. Tests for hypersensitivity reactions
 - e. Tests for auto immune diseases
- 12 Preparation and uses of monoclonal antibodies.

PAPER -II

Virology, Parasitology, Mycology, Laboratory, Management, Applied Microbiology and Recent advances

UNIT I

VIROLOGY:

- 1 General Properties of all RNA and DNA virus families of medical importance and prions
- 2 Pathogenesis and pathology of individual viral diseases
- 3 Laboratory diagnosis (including molecular techniques) of viral diseases
- 4 Antiviral therapy
- 5 Viral vaccines and antisera
- 6 Epidemiology and control of viral diseases
- 7 Oncogenic viruses
- 8 Bacteriophages
- 9 Tissue culture techniques

UNIT II

PARASITOLOGY:

Morphology, life cycle, pathogenesis, laboratory diagnostic methods, drug used for therapy, and epidemiology of following parasites:-

A. PROTOZOA:-

- 1 Intestinal amoebae
- 2 Free living pathogenic amoebae
- 3 Intestinal and genital flagellates
- 4 Haemoflagellates
- 5 Ciliates of medical importance
- 6 Malarial parasites
- 7 Opportunistic protozoa - P - carinii, Toxoplasma, Cryptosporidium, microsporidia

B. HELMINTHS: 1 Nematodes -

- a) Intestinal
- b) Tissue

- 2 Cestodes
- 3 Trematodes
- 4 Larva migrans

C. ENTOMOLOGY: related to transmission of parasitic infections

UNIT III

MYCOLOGY:

- 1 General properties of Yeast like fungi, filamentous fungi, dimorphic fungi
- 2 Isolation and Identification of medically important fungi
- 3 Morphology, cultural characteristics, pathogenesis, laboratory diagnosis, treatment and epidemiology of the following:-

- a) Candida and Cryptococci
- b) Dermatophytes
- c) Dimorphic fungi
- d) Agents of mycetoma
- e) Agents of subcutaneous mycosis

f)Opportunistic fungi.

4 Mycotoxins

UNIT IV

LABORATORY MANAGEMENT

1 Quality control in Microbiology

a)External

b)Internal

2 Safety in Microbiology laboratory

3 Staff - Requirements, pattern, training, Continuing education.

4 Materials purchase, storage, accounting maintenance equipment - glassware, reagents and chemicals.

5 Laboratory design and maintenance

6 Records - Requisitions, reporting, recording, including computerisation, statistics.

7 Budget and costing

8 Research design and methodology

UNIT V

APPLIED MICROBIOLOGY

(Clinical, Industrial, food)

1 Nosocomial infections

a)Types

b)Surveillance

c)Investigation of an outbreak

d)control

2 Etiology and laboratory diagnosis of infections of each system

a)Urinary tract

b)respiratory tract

c)Gastro intestinal Tract

d)Central nervous system

e)Cardio vascular system and blood

f)Sexually transmitted diseases

g)Genital tract

3 Infections in immunocompromised host

4 Microbiology of air, water, milk and food

5 National programmes in prevention of infectious diseases.

UNIT VI

RECENT ADVANCES

1 Emerging and Reemerging infections

- 2 Laboratory techniques
- 3 Bacteriology
- 4 Virology
- 5 Immunology
- 6 Parasitology
- 7 Mycology