MICROBIOLOGY

Learning Objectives:

After completion of training, the MBBS student should be able to understand the infectious diseases in terms of their etiology, pathogenesis, and laboratory diagnosis in order to efficiently treat, prevent and control the disease. To achieve this, the student should be able to:

1. Describe mechanism of host-parasite relationship.
2. Enumerate normal microbial flora and its importance in health and disease.
3. Describe etiology and pathogenesis of common infectious diseases.
4. Describe etiology and pathogenesis of opportunistic infections.
5. Choose appropriate laboratory investigation to support clinical diagnosis with respect to proper sample collection, timing and transport of the specimens.
6. Describe suitable antimicrobial agents for treatment.
7. Understand the mechanism of immunity to infection.
8. Explain scope of immunotherapy and vaccines for prevention of infectious disease
9. Perform simple tests to arrive at rapid diagnosis.
10. Apply appropriate method of sterilization, disinfection and biomedical waste disposal in hospital and community practice.
11. Explain the importance of National Health Programmes for prevention of communicable diseases

COURSE CONTENTS

Course Contents	Must Know	Desirable to know
General Microbiology:		
• General concepts of infectious diseases prevalent in India (morbidity, mortality data)	☑	
• Significant milestones in history of infectious diseases	☑	
• Definitions pertaining to infectious diseases.(eg: host, parasite, endogenous, exogenous, transmission, routes, source, reservoir etc)	☑	
• Classification of microbes from clinical view point	☑	
• Normal microbial flora of humans and its importance in health and disease.	☑	
• Bacterial cell: anatomy, physiology and genetics.		
• Sterilization, disinfections and standard precautions in patient care and disease prevention.	☑ ☑	
• Antimicrobials: mode of action, testing, interpretation of results and rational use, mechanism of resistance.	☑	

Immunology:	☑	
• Immune apparatus, lymphoid organs, Immunobiology	☑	
• Antigen and antibody.	☑	
• Ag+Ab –reactions, serology	☑	
• Cell and humoral immunity in health and disease	☑	
• Hypersensitivity	☑	
• Tumor immunity/transplantation an auto- immunity		
Systematic Bacteriology:		
• Gram Positive/Negative Cocci /Bacilli associated with human infections.	☑	
Vibrio, Campylobacter, Helicobacter	☑	
Mycobacteria,	☑	
Anaerobic bacteria	☑	
Spirochaetes	☑	
Chlamydia, Rickettsia, Mycoplasma	☑	
Miscellaneous bacteria of clinical importance. Legionella,Listeria etc.		☑
Virology:		
• General properties, structure, replication, classifications.	☑	
• Antiviral agents.	☑	
• General concepts in laboratory diagnosis of viral infections.	☑	
• Herpes,Adeno,Arbo,Picorna,Orthomyxo,Paramyxo,Rabies,HIV,Hepatitis,	☑	
• Miscellaneous virus of medical importance: (Rota, Corona, etc)	☑	
• Viral vaccines.		
• Pox, slow and oncogenic.		☑
Parasitology:		
• General concepts and definition of key terms, infections of national prevalence.	☑	
• Protozoal infections prevalent in India:	☑	
Intestinal,	☑	
Blood	☑	
Genital	☑	
• Helminthes (Intestinal and tissue) prevalent in India.	☑	
Cestodes,	☑	
Nematodes:	☑	
Trematodes.	☑	
Mycology:		
• General properties and classification of fungal diseases, approach to laboratory diagnosis (sample collection, identification), antifungal agents.	☑	

APPLIED Microbiology		
• CNS Infections: Acute and chronic meningitis, encephalitis and brain abscess.	☑	
• PUO/FUO: Infective and non infective causes and approach to diagnosis	☑	
• Diarrhoeal diseases(including food poisoning)	☑	
• Respiratory Tract Infection (Upper & Lower)	☑	
• UTI	☑	
• Wound infection	☑	
• Skin and soft tissue infections	☑	
• Eye and ear infections	☑	
• Sexually transmitted Infections	☑	
• Female genital tact infections	☑	
• Infections in immuno-compromised individuals	☑	
• Bone and Joint infections	☑	
• Hospital Associated Infections and its prevention.	☑	
• Zoonotic diseases.	☑	
• National Programmes of Communicable Diseases.	☑	
• Investigation of outbreaks and notification	☑	

Skills:

A medical student, in Microbiology**, MUST** be able to perform and interpret following skills **INDEPENDENTLY.**

1. Collection of relevant clinical samples. Blood-culture /serological tests
Urine for culture
Swabs for microscopy and culture of pus & other Body fluids
2. Storage and transport of the clinical specimens
3. Preparation of smears of clinical material
4 Microscopic Examination - Gram stain.
Ziehl - Neelsen Stain
Stool for ova and cyst
Blood smear for parasites (MP, Mf).
Albert stain for diphtheria
Modified Z-N of stool for protozoa in immuno-compromised .
Modified Z-N for M. leprae.
India ink of CSF for cryptococcus
KOH for fungal elements
5. Standard (universal precautions): Hand wash, asepsis, and antisepsis.
6. Biomedical waste disposal: Needle, sharps disposal, Infectious material
7. Interpretation of Microbiology reports: Antibiotic sensitivity: Rational use of antibiotics, Serology: VDRL, HIV, Hepatitis, ASO, RF, Widal Test.
Microscopy and Culture reports.