

DATTA MEGHE INSTITUTE OF MEDICAL SCIENCES (DEEMED UNIVERSITY)

JAWAHARLAL NEHRU MEDICAL COLLEGE,

SAWANGI (MEGHE), WARDHA

Ph.D. Syllabus

DEPARTMENT OF MICROBIOLOGY

Ph.D. Syllabus - Microbiology

1. Preamble :

The aim of this course is to train the students of Medicine in the field of Medical Diagnostic Microbiology. Knowledge and practical skills shall be acquired by the Ph.D. scholar in the sub-specialities of Bacteriology including Mycobacteriology, Virology, Parasitology, Immunology, Serology & Mycology so as to be able to deal with diagnosis and prevention of infectious diseases in the community. They will be trained in basic research methodology including molecular biology so that they are able to conduct fundamental and applied research. They will also be trained in teaching methods so that they can take up teaching assignments.

- The Ph.D. course in Microbiology was started in the year 2009 under DMIMS (DU)
- The syllabus for Ph.D. in microbiology was prepared extensively in the year 2009.
- The knowledge of Microbiology has vastly changed with addition of new topics in the Ph.D. syllabus.

2. Goal

The goal of the Ph.D. medical education shall be to produce a competent specialist

- Who will recognize the health needs of the community and carry out professional obligations ethically in keeping with the objectives of the national health policy;
- Who shall have mastered most of the competencies, pertaining to Medical diagnostic Microbiology that are required to be practiced at the secondary and the tertiary levels of the health care delivery system;
- Who shall be aware of the contemporary advances and developments in the field of medical and diagnostic Microbiology
- Who shall have acquired the spirit of scientific inquiry and is oriented to the principles of research methodology and epidemiology
- Who shall have acquired the basic skills of teaching of the medical and paramedical professionals.

3. Learning objectives :

(a) KNOWLEDGE:

At the end of the course the Ph.D. Scholar shall be able to:

1. State and explain the clinical features, etiology, pathogenesis and methods of laboratory diagnosis of infectious diseases and apply that knowledge in the treatment, prevention and control of communicable diseases caused by micro-organisms.
2. State and explain the principles of immunity and immunological phenomenon which help to understand the pathogenesis, laboratory diagnosis of infectious and non-infectious diseases.
3. Establish and practice “laboratory medicine” for diagnosis of infectious diseases in hospitals and community in the field of bacteriology, parasitology, virology, mycology, serology and immunology in the light of clinical findings.
4. Organize the prevention and control of communicable diseases in the community.
5. Understand and practice the principle of prevention and control of health care associated infections and rational antibiotic policy.
6. State the recent advances in the field of Medical Microbiology and apply this knowledge in understanding aetiopathogenesis and diagnosis of diseases caused by micro-organisms.
7. Carry out fundamental or applied research in the branches of medicine involving microbiological work.
8. Develop specialization in any of the above subspecialities.
9. Undertake teaching assignments in the subject of medical Microbiology.

(B) Skills

At the end of the course the Ph.D.scholar shall be able to

1. Plan the laboratory investigations for the diagnosis of infectious diseases.
2. Perform laboratory procedures to arrive at the etiological diagnosis of infectious diseases caused by bacteria, fungi, viruses and parasites including the drug sensitivity profile.
3. Perform and interpret immunological and serological tests.
4. Operate routine and sophisticated instruments in the laboratory.
5. Successfully implement the chosen research methodology

Course content : Department of Microbiology

General Bacteriology & Immunology

Theme A (1) - General Bacteriology

1. History of Microbiology
2. Microscopy
3. Biosafety including universal containment
4. Physical and biological containment
5. Sterilization and disinfection
6. Morphology of bacteria and other microorganisms
7. Normal flora of human body
8. Bacterial metabolism
9. Bacterial toxins
10. Microbiology of hospital environment
11. Antibacterial substances and drug resistance
12. Nomenclature and classification of microorganisms
13. Normal flora of human body
14. Growth & nutrition of bacteria
15. Bacterial metabolism
16. Bacterial toxins
17. Bacteriocins
18. Microbiology of hospital environment
19. Host parasite relationship
20. Nosocomial infection

Theme B (2) Immunology

1. Components of immune system
2. Innate and acquired immunity
3. Cells & organs involved in immune response
4. Antigens
5. Immunoglobulins
6. Antigen & antibody reactions
7. Cell mediated immunity
8. Complement is health disease
9. Hypersensitivity
10. Cytokines
11. Immunodeficiency
12. Vaccines and immunotherapy
13. Immunological techniques

Theme C (3) Systemic Bacteriology

1. Isolation & identification of bacteria
2. Gram positive cocci of medical importance including Staphylococcus cocci etc.
3. Gram negative cocci of medical importance including Neisseria, Branhamella, Moraxella etc.
4. Gram positive bacilli of medical importance including Lactobacillus, Coryneform organisms, Bacillus & aerobic bacilli, other actinomycetales, Erysipelotherix, Listeria, Clostridium and other spore bearing anaerobic bacilli etc.
5. Gram negative bacilli of medical importance including Vibrios, Aeromonas, Plesiomonas, Haemophilus, Bordetella, Brucella, Gardnerella, Pseudomonas & other non- fermenters, Pasturella, Francisella, Bacteriodes, anaerobic gram negative bacilli etc.
6. Enterobacteriaceae
7. Helicobacter, Camphylobacter & Spirillum
8. Mycobacteria
9. Spirochaetes
10. Chyamydiae
11. Mycoplasmatales; Mycoplasma, Ureaplasma, Acholeplasma and other Mycoplasma
12. Rickettsiae, Coxiella, Bartonella etc.
13. Actinomycetes & Nocardia

Theme D (4) Mycology, Virology & Parasitology

Theme D (4) Mycology

1. General characteristics & classification of fungi
2. Morphology & reproduction of fungi
3. Isolation and identification of fungi
4. Tissue reactions to fungi
5. Yeasts and yeast like fungi of medical importance including Candida, Cryptococcus, Malassezia, Trichosporon, Geotrichum, Saccharomyces etc.
6. Mycelia fungi of medical importance including Aspergillus, Zygomycetes, Pseudoallescheria, Fusarium, Piedra, other dematiaceous hyphomycetes and other hyalohyphomycetes etc.
7. Dimorphic fungi including Histoplasma, Blastomyces, Coccidioides, Paracoccidioides, Sporothrix, Penicillium marneffei etc.
8. Dermatophytes
9. Common laboratory contaminant fungi

Theme D (4) Virology

1. General properties of viruses
2. Classification of viruses
3. Morphology : Virus structure
4. Virus replication
5. Isolation & identification of viruses
6. DNA viruses of medical importance including Poxviridae, Herpesviridae, Adenoviridae, Hepadna virus
7. RNA viruses of medical importance including Enteroviruses, human immunodeficiency virus, Arboviruses, Coronaviridae, Calci viruses, oncogenic viruses etc.

Theme D (4) Parasitology

1. General characters & classification of parasites
2. Methods of identification of parasites
3. Protozoan parasites of medical importance including Entamoeba, Free living amoebae, Giardia, Trichomonas, Leishmania, Trypanosoma, Plasmodium, Toxoplasma, Sarcocystis, Cryptosporidium, Microsporidium,
4. Helminthology of medical importance including those belonging to cestodes (Diphyllobothrium, Taenia, Echinococcus, Hymenolepis, Dipylidium, Multiceps etc.) Trematodes (Schistosomes, Fasciola, Fasciolopsis, Gastrodiscoides, Paragonimus, Clonorchis, Opisthorchis etc) and Nematodes (Trichuris, Trichinella, Strongyloides, Ancylostoma, Necator, Ascaris, Toxocara, Enteropneusts, Filarial worms, Dracunculus etc)

Theme E (5) Clinical Microbiology & Recent advances

1. Epidemiology & infectious diseases
2. Hospital acquired infections
3. Management of hospital waste
4. Investigation of an infectious outbreak
5. Infections of various organs and systems of human body
6. Respiratory tract infections
7. Bio safety precautions in Microbiology
8. Urinary tract infections.
9. Central nervous system infections
10. Congenital infections
11. Reproductive tract infection
12. Gastrointestinal infection
13. Hepatitis infections
14. Pyrexia of unknown origin
15. Infections of eye, ear & nose
16. Endocarditis infection
17. Haemorrhagic fever etc.
18. Opportunistic infections
19. Sexually transmitted diseases
20. Vaccines (Newer)
21. Automation in Microbiology
22. Statistical analysis of microbiological data and research methodology.
23. Monoclonal techniques in Microbiology
24. Quality control in Microbiology
25. Quality Assurance in Microbiology
26. Quantitative techniques in Microbiology
27. Immunological diagnosis of infectious diseases
28. Virological diagnosis of (Swine flu etc.) outbreaks viral infectious
29. Lab diagnosis of protozoal infections (Malaria)
30. Lab diagnosis of Helminthic infections (Filaria)
31. Lab diagnosis of superficial fungal infections
32. Lab diagnosis of Deep fungal infectious
33. Emerging & Reemerging infections disease.