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SANJAY GANDHI POST GRADUATE INSTITUTE OF MEDICAL SCIENCES
RAEBARELI ROAD, LUCKNOW
Department of Microbiology

Curriculum for Post- Doctoral Certificate Course (PDCC) in Infectious Disease

Name of the Course: Post Doctoral Certificate Course (PDCC) in Infectious Disease

Introduction:

Sanjay Gandhi Postgraduate Institute of Medical Sciences is a tertiary care approx. 1200 bedded hospital. Patients from all over Uttar Pradesh, India and also from neighboring countries come for treatment in this hospital. In the recent years, the concept of specialization/sub-specialization has emerged in almost all disciplines of medicine throughout the world. We all know that the infectious disease is a major component of modern medicine. Most of the developed world has infectious diseases division run by clinical microbiologists. Infectious diseases are on rise both in developed and developing countries, especially after recent development in medicine. (e.g solid organ and bone marrow transplants, aggressive cancer therapy etc.) and acquired immunodeficiency syndrome (AIDS) pandemic. Emergence of susceptible population, advent of many new microbial species as pathogens and re-emergence of old infectious agents had made the situation more problematic and complicated. The developing countries are trailing behind because of lack of development in the field of infectious diseases, though the major brunt of these illnesses is borne by them. There is a need for early, appropriate diagnosis of infectious diseases including the emerging and re-emerging ones and their management.


So far, no separate training program on infectious disease exists in India. The problem of infectious disease being taken a new dimension, there is a need to develop a well-planned structured course in the form of PDCC (Infectious Disease). Accordingly the details of curriculum are being formulated to place before the Board of Studies.

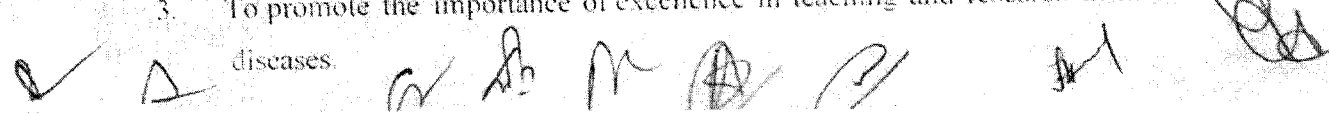
Aim:

The aim of the course is to train consultants so as to provide a well-supervised expertise in the field of infectious diseases.

Objectives:

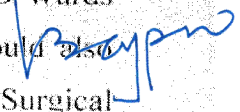
1. To create experts who can diagnose and treat patients with infectious diseases. This includes specific management of infectious diseases.
2. To develop laboratory skills to carry out and report on investigations in patients with infectious disorders including the unusual one.
3. To promote the importance of excellence in teaching and research in infectious diseases.

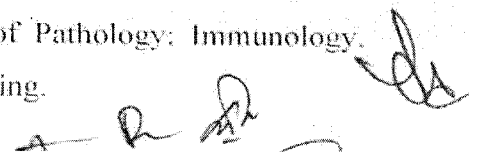

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Proposed Course:

1. **Name** : Post Doctoral Certificate Course (PDCC) in Infectious Disease
2. **Duration:** One year
3. **Number** : Two students per year
4. **Eligibility:** The course is open for candidates holding the following degrees MD (Microbiology), MD (General/Internal Medicine), MD (Pediatric) from a MCI recognized Institution. Age limit as per Institute's rule.
5. **Mode of Selection:** Through all India open entrance test. Sponsored candidates can also join the course as per rule but they have also to qualify in the entrance test.
6. **Selection process:** Selection process will start through an all India advertisement. The entrance examination will be held in November/December for course starting in January of the next year. The examination will have written test and viva voce. The written examination will be based on multiple choice questions drawn from Microbiology and Medicine in relation to infectious diseases. Candidates three times the number of seats securing more than 50% marks in written test will be asked to appear for departmental practical and viva voce examination which will judge the practical skill, clinical aptitude, decision making ability and problem-solving potential. This will follow the Institute's rules applicable to other PDCC courses.
7. **Posting:** 4 months in Microbiology laboratory and 6 months in IPD Wards including general hospital & emergency. The posting of IPD would also include ward round of Nephrology, Urology, Gastroenterology, Surgical Gastroenterology, Neurology, Neurosurgery, Immunology, Radiotherapy, Surgical ICU, Endocrinology and consultation on call. In addition, the candidate will be posted for 15 days each in the departments of Pathology, Immunology, Transfusion medicine and Radiodiagnosis and imaging.


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8. **Course Faculty:** Faculty of Microbiology and of medical and surgical disciplines till the arrangement for infectious disease beds and faculty for infectious disease (one each qualified person in Internal Medicine and Pediatrics) are made available.
 9. **Requirements:** Twelve beds and two additional faculty for the course (one each in Internal Medicine and Pediatrics) in addition to existing faculty of Microbiology.
 10. **Tuition fees:** As per academic Board decision.
 11. **Academic & Teaching Activities:** Each candidate is expected to participate in journal clubs, seminars, group discussion, case discussion, morbidity-mortality meeting and combined grand round. In addition candidate will have to complete at least two 01& 02 courses of the Institute before the examination.
 12. **Evaluation:** The candidates are expected to maintain a logbook of minimum fifty (4X12 specialty) clinical cases report of the patients diagnosed and treated for infectious diseases in the hospital of SGPGI. In addition, each candidate will undergo laboratory assessment periodically by the faculty of the department following Institute procedure in this regard. The result of the internal assessment will be made available to the examiners at the time of examination. At the end of 12 calendar months there will be a certifying examination comprising of a theory examination with two papers of short questions each. Each paper will have 100 marks. Practical examination will consist of practical & viva voce. The practical will have the following:

Spotting	(10)	20 Marks
Long case	(01)	35 Marks
Short Cases	(02)	30 Marks (15 marks/ case)
Viva		15Marks

In order to qualify, the candidate must score 50% in the theory and practical separately.


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Needs: Local : Pink, National : Orange, Regional: light blue, International : green

13. **Examiners:** Institute rules will be followed in this regard. In brief, there will be two external examiners and two internal examiners at least one examiner should be a clinician from Internal medicine/Pediatrics.

Course Content:

1. Core Unit

The course consists of 4 months posting in the laboratory and 6 months posting in clinical departments which have intensive course of lectures, clinical and practical demonstrations.

Basic Knowledge

The clinical microbiology with the principles of infection: This will consist of basic reading of microbiology and its clinical application in infectious diseases. This will provide the knowledge to interpret the basic laboratory data in respect to the infectious complications caused by the organism. The details in annexure-1.

Infection control in related studies: To gain clinical experience and acquire knowledge about diagnosis and management of infections caused by all types of microbial agents. The resident will see new patients during this course (annexure -II).

Hospital hygiene, epidemiology and infection control: This topic includes: surveillance, audit, policy design and review, aspects of management, relevant epidemiological skills, outbreak control and prevention, organism typing, antibiotic prescribing, an introduction to hospital hygiene, legal and socio-economic aspects of hospital infection, the interface between the community and the hospital, and other important topics in hospital infection such as infections on the intensive care unit and in the immunosuppressed (annexure III).

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Syllabus

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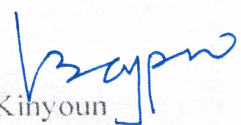
- Global GREEN
- Regional BLUE
- National ORANGE
- Local (State) PINK

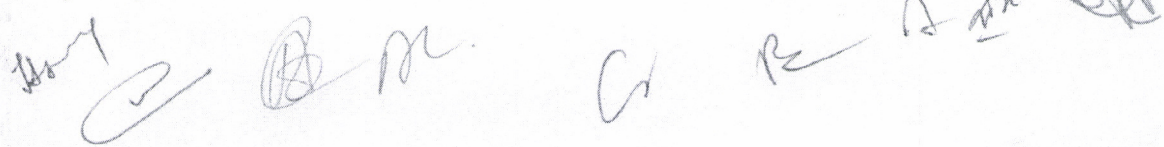
1. Basic laboratory techniques in bacteriology
 - 1.1 Sample collection e.g., throat swab, nasal swab, blood sample etc.
 - 1.2 Microscopy, Culture techniques, Antibiotic susceptibility testing including interpretation of antibiograms
 - 1.3 Media preparation and sterilization
 - 1.4 Automation: MALDI TOF MS, Vitek 2, Automated bacterial ID system
 - 1.5 Maintenance of stock culture and lyophilization
 - 1.6 Storage of chemotherapeutic agents and antibiotic assays
 - 1.7 Techniques of air, water food and OT sample surveillance
 - 1.8 Stool assays for *Clostridium difficile* toxin detection

2. Basic laboratory techniques in Virology
 - 2.1 Sample collection e.g., sampling for Tzanck smear
 - 2.2 Serological techniques like ELISA, Immunochromatographic tests e.g. for HIV
 - 2.3 Molecular techniques like PCR, RT-PCR for viral pathogens
 - 2.4 Tissue culture and other methods of virus isolation
 - 2.5 Animal experiments

3. Basic laboratory techniques in Mycology
 - 3.1 Sample collection e.g., skin scrapings, transport and processing of biopsy samples
 - 3.2 Culture isolation and identification techniques for fungi
 - 3.3 Antifungal susceptibility testing and interpretation

4. Basic laboratory techniques in Parasitology
 - 4.1 Preparation and staining of peripheral blood films, calculation of aparasitemic index
 - 4.2 Smear examination and culture techniques
 - 4.3 Rapid diagnostic techniques
 - 4.4 Stool microscopy for detection of various ova and cysts, modified Kinyoun staining for opportunistic parasites like *Cryptosporidium*, *Cystoisospora* and *Cyclospora* and culture examination for enteropathogenic bacteria


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Local (State)	PINK

5. **Basic laboratory techniques in Immunology**

- 5.1 Tests for humoral immunity
- 5.2 Tests for cell mediated immunity
- 5.3 Tests for autoimmunity

6. **Fundamentals of Microbiology including molecular biology**

- 6.1 Safety measures and use of bio-safety cabinets
- 6.2 **Quality control, quality assurance**
- 6.3 Sterilization and disinfections in the laboratory and wards
- 6.5 **Hospital epidemiology**
- 6.6 Screening for MRSA and Carbapenemase resistant Enterobacteriaceae
- 6.5 Microbial immunity and vaccines study
- 6.6 Pathogenesis-of infectious diseases
- 6.7 Biological standardization
- 6.8 Bio-statistics.
- 6.9 Computerization
- 6.10 Use of HIS for validation of patient reports and ordering tests

7. **Automation in Microbiology** e.g., BACTEC culture, MALDI-TOF, VITEK-2

8. **Molecular techniques**

- 8.1 PCR
- 8.2 DNA hybridization
- 8.3 Recombinant DNA technology
- 8.4 Laboratory techniques in Genetics

Clinical Course

- 8.4.1 **Diagnosis & management of pyrexia of unknown origin (PUO)**
- 8.4.2 **Management & diagnosis of acquired immunodeficiency syndrome (AIDS)**
- 8.4.3 Antifungal antimicrobial prophylaxis during neutropenia & immunodeficiency
- 8.4.4 **Diagnosis & management of bacteria & fungemia.**
- 8.4.5 Pathogenesis of infections related to intravascular

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catheterization & their management.

- 8.4.6 Pathogenesis & pathophysiology of meningitis and encephalitis.
- 8.4.7 Management & diagnosis of acute flaccid paralysis including Guillain-Barre syndrome.
- 8.4.8 Diagnosis & management of acute rashes and eruptions.
- 8.4.9 Management & diagnosis of acute respiratory infection.
- 8.4.10 Transplant associated infections (Kidney & BMT)
- 8.4.11 Ventilator associated respiratory infection.
- 8.4.12 Diagnosis & management of upper gastrointestinal tract infection.
- 8.4.13 Management of diagnosis acute and chronic diarrhoea, gastroenteritis.
- 8.4.14 Collection of USG guided samples & investigation
- 8.4.15 Diagnosis and Management of deep seated chronic infections:
- 8.4.16 Diagnosis and Management of infection in comatose patients/infected road accidents.
- 8.4.17 Diagnosis and Management of sexually transmitted and pelvic inflammatory disease
- 8.4.18 Diagnosis and management of all post operative infection.
- 8.4.19 Diagnosis & management of infection cancer patient

Diagnosis & management of infection in patient with acute leukemia and lymphoma Infection in the elderly.

- Infection acquired directly or indirectly from animals or from arthropod vectors
- Pharmacology of antimicrobials.
- Immunology of infectious disease & vaccines.

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Clinical Course

- 8.4.20 Diagnosis & management of pyrexia of unknown origin (PUO)
- 8.4.21 Management & diagnosis of acquired immunodeficiency syndrome (AIDS).
- 8.4.22 Antifungal antimicrobial prophylaxis during neutropenia & immunodeficiency.
- 8.4.23 Diagnosis & management of bacteria & fungemia.
- 8.4.24 Pathogenesis of infections related to intravascular catheterization & their management.
- 8.4.25 Pathogenesis & pathophysiology of meningitis and encephalitis
- 8.4.26 Management & diagnosis of acute flaccid paralysis including Guillain-Barre syndrome.
- 8.4.27 Diagnosis & management of acute rashes and eruptions.
- 8.4.28 Management & diagnosis of acute respiratory infection.
- 8.4.29 Transplant associated infections (Kidney & BMT)
- 8.4.30 Ventilator associated respiratory infection.
- 8.4.31 Diagnosis & management of upper gastrointestinal tract infection.
- 8.4.32 Management of diagnosis acute and chronic diarrhoea, gastroenteritis.
- 8.4.33 Collection of USG guided samples & investigation
- 8.4.34 Diagnosis and Management of deep seated chronic infections:
- 8.4.35 Diagnosis and Management of infection in comatose patients/ infected road accidents.
- 8.4.36 Diagnosis and Management of sexually transmitted and pelvic inflammatory disease
- 8.4.37 Diagnosis and management of all post operative infection.
- 8.4.38 Diagnosis & management of infection cancer patient

- 8.4.39 Diagnosis & management of infection in patient with acute leukemia and lymphoma
- 8.4.40 Infection in the elderly.
- 8.5 Infection acquired directly or indirectly from animals or from arthropod vectors
- 8.6 Pharmacology of antimicrobials.
- 8.7 Immunology of infectious disease & vaccines.

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Annexure - I

Check list for candidate in Infectious Disease

Do daily:

- a). Examine assorted Gram stains
- b). Interpret fungal stains
- c). Enquire about problem/ interesting cases
- d). Review on your own, then with pathologist of unknown slides.

Do regularly, as the case comes up:

- a). Screen GMS smears for *Pneumocystis carinii*
- b). Screen Giemsa smears for malaria and other parasites.

Do/ watch atleast once:

Date	Completed	
		(a) Set-up-station for Gram stain & AFB stain
		(b) 1 st day read outs the culture plates of interested case
		(c) Follow up the diagnosis of the different cases.
		(d) USG guided sample collection
		(e) Perform different special staining
		(f) Blood cultures
		(g) Fungus culture
		(h) Media preparation
		(i) TB concentration /TB smear & culture
		(j) Routine reporting & sample processing
		(k) Virology
		(i) Toxin assay
		(ii) Routine viral cultures/FA staining
		(iii) ELISA & viral serology
		(iv) Shell vials/FA staining
		(l) Identification of fungi from clinical smears direct patient and culture
		(m) Serology Lab for routine tests including ELISA
		(n) Molecular Biology
		(i) PCR & its application

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	(ii) Hybridization
	(o) Pathology
	(i) Pathology of infectious diseases including histopathology and cytopathology
	(p) Transfusion Medicine
	(i) Transfusion associated infection
	(ii) HIV Screening
	(iii) HCV Screening

Ward rounds: PDCC students will take history, conduct examination, clinically evaluate and suggest right tests order and interpret them. This should also cover calls from other specialties and emergency.

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Annexure - II

Hospital infection control

- I. Epidemiology of hospital infections: Environmental factors in Infectious Diseases, Emerging and re-emerging diseases like dengue, Ebola. Epidemic alert: Notification and reportable diseases, Recognition of Bioterrorism, Control strategies (levels of prevention and modes of intervention, source reduction, vaccination, integrated vector control and diagnosis and treatment) especially with regard to malaria, kala azar, scrub typhus), International instruments (International Health Regulations and international disease surveillance) and WHO regulations and guidelines
- II. Outbreak investigation
 1. Organisms causing hospital acquired infections
 2. Systems based approach to HAI
 3. Organization, role, responsibilities and resource implications of effective infection control.
 4. Surveillance strategies for hospital infection.
 6. Statistics in infection control
 7. Strategies for infection control (eg. Policies, review and audit)
 8. Handling information technology for control of infection
 9. Antibiotic policies, pharmacists role, review and audit
 10. Management of hospital waste.


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Biostatistics: Research Methodology

Subject specific competencies:

The candidate must have following competencies:

1. Ability to diagnose and guide antimicrobial therapy of all infectious diseases, adopting proper examination, modern methods of investigation.
2. Ability to integrate knowledge of global and local epidemiology, geographical habitats, reservoirs and modes of transmission of infections of public health importance and plan preventive measures
3. Ability to promote Team work & Good communication including confidentiality, empathy and social justice
4. Ability to plan and execute infection control practices in hospital settings
5. Ability to coordinate the interdisciplinary and social interaction

Knowledge domain:

At the end of the PDCC course in Infectious Diseases, the students should acquire the following competencies:

1. Knowledge necessary to obtain a meticulous history on patients suspected of having an infection.
2. Knowledge necessary to perform a general and systemic physical examination of patients with infectious problems.
3. Knowledge necessary to generate a relevant and appropriate differential diagnosis compatible with a particular clinical syndrome and be able to elucidate typical microorganisms contributing to the same.
4. Knowledge to order appropriate tests.
5. Knowledge to recognize a possible need for specialist consultations in special case scenarios.
6. Knowledge of the common infectious diseases with regard to clinical manifestations, etiologic agents and be able to generate a differential diagnosis.
7. Ability to choose the right antimicrobial, rational combinations of antibiotics where required keeping in mind the clinical syndrome
8. Knowledge of drugs of choice for most microorganisms and chemoprophylaxis when required.
9. Knowledge of indications and contraindications for active and passive immunization of infectious diseases including comprehensive knowledge of the National Immunization Programme including travel related immunization.
10. Knowledge of drugs of choice for most microorganisms and chemoprophylaxis required.

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- 10. Knowledge of indications and contraindications for active and passive immunization of infectious diseases including comprehensive knowledge of the National Immunization Programme including travel related immunization.
- 11. Knowledge of reportable infectious diseases and proper documentation and procedures required for reporting them.

The syllabus is based on (a) Syndromic or Systemic and (b) Organism based approach.

SYNDROMIC APPROACH TO INFECTIOUS DISEASES

Fever:

- 1. FUO and Acute febrile illnesses
- 2. Fever with rash, exanthematous fever of children

Upper respiratory tract infections

- 1. Sinusitis
- 2. Common cold
- 3. Pharyngitis, retropharyngeal and parapharyngeal infections
- 4. Laryngitis and croup
- 5. Ear infections including otitis and mastoiditis
- 6. Epiglottitis
- 7. Manifestations of different systemic infections in oral cavity, neck and head
- 8. Local infections of neck, oral cavity and head
- 9. Pleuro- pulmonary and bronchial infections
- 10. Infections associated with COPD and cystic fibrosis
- 11. Bronchiolitis
- 12. Acute bronchitis
- 13. Pneumonia (acute and chronic) including CAP and atypical pneumonia
- 14. Lung abscess
- 15. Pleural effusion and empyema

Urinary tract infections

Sepsis syndromes

Intra - abdominal infections

- 1. Peritonitis and intraperitoneal abscesses
- 2. Infections of liver and biliary system including liver abscess
- 3. Pancreatic infections
- 4. Splenic abscess
- 5. Acute and chronic appendicitis
- 6. Diverticulitis, typhlitis

Principles and syndromes of enteric infections including acute and chronic diarrhea

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1. Enteric fever and other causes of abdominal symptoms with fever
2. Malabsorption syndromes
3. Food poisoning
4. Lower abdominal pain syndromes including Pelvic inflammatory disease and prostatitis
5. H. pylori infection

Cardiovascular infections

1. Infections of endocardium, prosthetic valve, non- valvular cardiovascular devices

CNS infections:

1. Approach to a patient with CNS infections
2. Meningitis: acute and chronic
3. CSF shunt infection
4. Encephalitis
5. Infections causing Brain SOLs and abscesses

Osteomyelitis, infections of native joint and prostheses

Syndromic approach to STIs

Eye infections including endophthalmitis, uveitis and chorioretinitis

Multisystem sepsis syndromes, septic shock and disseminated infections

Pyomyositis, skin and soft tissue infections

Nosocomial Infections or Medical Device Related Infections o Organization for infection control

Disinfection, sterilization, disposal of hospital waste

Isolation and quarantine

Nosocomial UTI (catheter-associated urinary tract infection - CAUTI)

Nosocomial Pneumonia (health care—associated pneumonia – HCAP; Ventilator-associated pneumonia - VAP)

Catheter related infections (Central Line-Associated Bloodstream Infection- CLABSI)

Viral hepatitis & other transfusion- transplantation transmitted infections

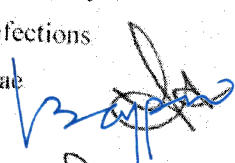
Infection in Special Hosts: Immunocompromised (congenital and acquired)


Management of infections in cancer patients including febrile neutropenia o Infections in transplant recipients: solid organ, hematopoietic stem cell

Surgical and trauma related infection: Bite, Burn, post operative fever

ETIOLOGICAL AGENTS OF INFECTIOUS DISEASES

1. Viral Diseases: arbo-viral illnesses including Dengue, Yellow fever, KFD, Chikungunya, Hantavirus, WNV, JE, Tick borne encephalitis, Syndromes associated with Arboviral infections
2. Herpes viridae and its infections (HSV, CMV, EBV, HSV6&7, KSAV, VZV), Poxviridae
3. Hepatitis causing viruses including Hepatitis E
4. Corona virus and SARS
5. Mumps and measles viruses
6. Rhabdoviruses


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- 7. Ebola and Marburg virus and other viral haemorrhagic fevers
- 8. Adenovirus
- 9. Papillomavirus
- 10. JC, BK other polyoma viruses
- 11. Influenza and parainfluenza
- 12. Zoonotic paramyxoviruses like Nipah, Hendra, RSV, Polio, Coxsackie, Echo, Enteroviruses
- 13. HIV: history, epidemiology, virology, immunology, disease spectrum including pulmonary, gastroenterological and neurological manifestations of HIVOI,
- 14. Bacterial Diseases: Gram positive organisms; Gram negative organisms
- 15. Anaerobic infections
- 16. Mycobacteria: Tuberculosis: primary, secondary, pulmonary, extrapulmonary (as per anatomical structures), MDR and XDR TB
- 17. Leprosy, Non-Tuberculous Mycobacteria
- 18. Brucellosis, Chlamydial diseases, Mycoplasma
- 19. Rickettsial diseases
- 20. Syphilis, Leptospirosis other spirochetes, Nocardia, Actinomycosis 4. Mycoses • Superficial mycoses, Subcutaneous mycoses
- 21. Deep mycoses including endemic systemic mycoses
- 22. Protozoal diseases: Entamoeba, Free living amoeba, Malaria, Babesia, Leishmaniasis, Toxoplasmosis, Trypanosomiasis, Giardiasis, Trichomoniasis, Cryptosporidium and other HIV associated protozoa
- 23. Helminthic infections: Geohelminths, Tissue and blood nematodes, Cestodes, Trematodes 7.
- 24. Ectoparasitic diseases: Lice (pediculosis), scabies, myiasis, Mites including Chiggers, Tick

GENERAL

- 1. Immunization: Pediatric age group, adult, travelers
- 2. Travel Medicine
- 3. Bioterrorism
- 4. Outbreak Investigation in Hospital and Community
- 5. National Health Programmes Related to Communicable Diseases
- 6. Pharmacotherapeutics in Infectious Diseases
- 7. Neglected Tropical Diseases

Recommended Reading

Books (latest edition)

- 1. Forbes B, Sahm D, Weissfeld A. Bailey and Scott's Diagnostic Microbiology, Mosby, St. Louis.
- 2. Koneman EW, Allen SD, Janda WM, Schreckenberger PC, Winn WC. Color Atlas and Textbook of Diagnostic Microbiology, J.B. Lippincott, Philadelphia.

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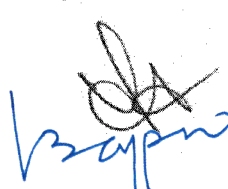
3. Murray PR, Baron EJ, Pfaller MA, Tenover FC, Tenover FC, Tenover FC, Yolken RH. Manual of Clinical Microbiology, American Society for Microbiology.
4. Garcia LS, Bruckner DA. Diagnostic Medical Parasitology, American Society for Microbiology.
5. Mackie & McCartney Practical Medical Microbiology by J.G. Collee, A.G. Fraser
6. Mandell, Douglas, and Bennett's Principles and Practice of Infectious Diseases: by John E. Bennett, Raphael Dolin, Martin J. Blaser
7. Manson's Tropical Diseases by Jeremy Farrar; Peter J. Hotez; Thomas Junghanss; Gagandeep Kang; David Laloo; Nicholas J. Wh
8. Harrison's Infectious Diseases, by Dennis L. Kasper; Anthony S. Fauci
9. Hunter's Tropical Medicine and emerging infectious disease by Edward T. Ryan, David R. Hill, Timothy P. Endy
10. Clinical Immunology Principles and Practices by Robert Rich
11. Anaerobic Bacteriology, Clinical and Laboratory practice by A. Trevorwillis
12. Topley & Wilson, Principles of Bacteriology, Virology and Immunity by M.T. Parker and L.H. Collier
13. Topley and Wilson's Microbiology and Microbial infection by Brian W. J. Mahy, Graham Selby Wilson, and William Whiteman Carlton
14. Text book of Medical Mycology by Jagadish Chander
15. Atlas of Fungal infection by Carol A. Kauffman
16. Bennett and Brachman's Hospital Infection, 6th edition, William R Jarvis.

Journals:

1. Indian Journal of Medical Research
2. Indian journal of Medical Microbiology
3. Journal of Clinical Microbiology
4. Lancet Infectious disease
5. Antimicrobial Agents and Chemotherapy.
6. J Medical Mycology
7. Mycoses
8. New England Journal of Medicine (NEJM)
9. Nature Review s Microbiology
10. Clin Microbiol Reviews

E-learning resources & links: Important websites suggested to MD Microbiology students

1. Clinical key access to various Microbiology journals <https://www.clinicalkey.com>
2. UpToDate <http://www.uptodate.com>
3. <https://www.ncdc.in/>
4. <https://main.icmr.nic.in/>
5. <https://www.who.int/>
6. <https://www.cdc.gov/>
7. <https://idsp.mohfw.gov.in/>


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- 8. <https://ncvbdc.mohfw.gov.in/>
- 9. <http://www.est.up.gov.in/>
- 10. <https://dst.gov.in/>
- 11. <https://www.mohfw.gov.in/>
- 12. <https://dbtbharat.gov.in/>

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