



D. Y. Patil University

Syllabus of MD Microbiology

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 candidates in the sub-specialities of Microbiology 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.

GOAL:

The goal of the postgraduate medical education shall be to produce a competent specialist and Medical teacher:

- Who shall 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 2 clinical 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 diagnostic Microbiology & clinical 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.



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EDUCATIONAL OBJECTIVES:

A. KNOWLEDGE:

At the end of the course the students 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 student shall be able to

1. Plan the laboratory investigations for the diagnosis of infectious diseases & correlate the findings clinically.
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.



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4. Operate routine and sophisticated instruments in the laboratory.
5. Develop microteaching skills and Pedagogy
6. Successfully implement the chosen research methodology

COURSE CONTENT (SYLLABUS)

DURATION OF COURSE:

The minimum period of training shall be three calendar years and the candidates can be admitted to this training after their full registration with the Medical Council. No exemption shall be given from this period of training of three years either for doing housemanship or for any other experience or diploma.

TRAINING PROGRAM:

The candidates joining the course must work as full time residents during the whole period of their postgraduate training. They will be required to attend a minimum of 80% of training period. Candidate shall be given full time responsibility and assignments and their participation in all facets of the educational process assured. Postgraduate students must maintain a record book of the work carried out by them and the training undergone by them during the period of training. These record books shall be checked and assessed by the faculty.

TEACHING /LEARNING METHODS:

Learning in M. D. (Microbiology) will essentially be self-learning. Following teaching-learning methods shall be followed-

Group teaching sessions:

- Journal review
- Subject seminar presentation
- Group discussion
- Slides seminars
- Clinical case presentations pertaining to infectious diseases
- Presentation of the findings of an exercise on any of the sub-specialities
- Participation in CME programs and conferences



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Hands on experience (practical training)

Practical training shall be imparted by posting the students in various subspecialties (sections) as detailed in the intrinsic and extrinsic rotation. Student shall be actively involved in day to day working of all the sections. He/she will be trained under the guidance of teachers in all the aspects of Clinical Microbiology and applied aspects of laboratory medicine including collection and transport of specimens, receiving of samples, preparation of requisite reagents, chemicals, media and glassware, processing of specimens, performing required antimicrobial susceptibility testing and reporting on the specimens, interpretation of results, sterilization procedures, bio-safety precautions, infection control practices, maintenance of equipments, record keeping and quality control in Microbiology.

Suggested schedule of rotation:

Intrinsic rotation:

1. Bacteriology(Aerobic and anaerobic)	6 months
2. Mycobacteriology	5 months
3. Hospital infection surveillance	3 months
4. Serology/Immunology	6 months
5. Mycology	4 months
6. Virology/HIV	2 months
7. Parasitology	1 month
8. Clinical Microbiology (OPD) ward rounds and ped.surg.	6 months
9. Molecular Diagnostics	1 month

Extrinsic rotation:

Clinical Pathology	2 months
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Total 36 months

Emergency duty:

Student shall be posted for managing emergency laboratory services in Microbiology. He/she will deal with all the emergency investigations in Microbiology.



Training in research methodology:

Training in research methodology shall be imparted by planning of a research project by the student under the guidance of a recognized guide to be executed and submitted in the form of a dissertation. The dissertation is aimed at training the candidate in research methods and techniques. It will include identification of a research question, formulation of a hypothesis, search and review of relevant literature, getting acquainted with recent advances, designing of research study, collection of data, critical analysis of the results and drawing conclusions. The topic shall be communicated to the university within six months of registration and at least 12 months should be spent on the research project. The dissertation shall be completed and submitted by the student six months before appearing for the final university examination.

Teaching experience:

Student shall be actively involved in the teaching of undergraduate students. He/she will be trained in teaching methods and use of audiovisual aids.

BROAD AREAS OF STUDY

General Microbiology; Systematic Bacteriology, Mycology, Virology, Parasitology; Serology, Immunology, molecular diagnostics and Applied Clinical Microbiology including recent advances in Microbiology.

GENERAL MICROBIOLOGY

- History and pioneers in Microbiology
- Microscopy
- Morphology of bacteria and other micro-organisms.
- Nomenclature and classification of microbes.
- Growth and nutrition of bacteria.
- Bacterial metabolism.
- Sterilization and disinfection.
- Biomedical waste disposal
- Bacterial toxins.
- Bacterial antagonism: Bacteriocins.
- Bacterial genetics, gene cloning, Hybridisation, Amplification Sequencing & enzyme digestion of nucleic acid. Genetic engineering & its applications.



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- Antibacterial substances used in treatment of infections and drug resistance in bacteria.
- Bacterial ecology-normal flora of human body, hospital environment, air, water and milk
- Host parasite relationship.
- Quality control and Quality Assurance in Microbiology. Accreditation of Microbiology lab
- Laboratory Biosafety
- Health care associated infections- prevention and control
- Recent advances in diagnostic Microbiology. Molecular diagnostic methods types of PCR
- Drug resistance in bacteria ESBL, AMPC, Beta Lactamase, Metallobeta Lactamase, Biofilm

IMMUNOLOGY AND APPLIED ASPECTS

1. The normal immune system.
2. Innate immunity.
3. Antigens., super antigens.
4. Immunoglobulins.
5. Complement.
6. Antigen and antibody reactions.
7. Hypersensitivity.
8. Cell mediated immunity.
9. Immunodeficiency.
10. Autoimmunity.
11. Immune tolerance.
12. Transplantation immunity.
13. Tumour immunity.
14. Prophylaxis and immunotherapy
15. Measurement of immunity. Immunomodulation and Immunopotentialiation
16. Immunity and immunopathogenesis of specific infectious diseases
17. Molecular Biology Techniques. For e.g. PCR, DNA probes.
18. Recent advances in immunology.

SYSTEMATIC BACTERIOLOGY

1. Isolation, description and identification of bacteria. The epidemiology, pathogenesis, antigenic characteristics and laboratory diagnosis of disease caused by them
2. Staphylococcus and Micrococcus; Anaerobic Gram positive cocci.
3. Streptococcus and Lactobacillus.
4. Neisseria, Branhamella and Moraxella.
5. Corynebacterium and other coryneform organisms.
6. Bacillus: the aerobic spore-bearing bacilli.
7. Clostridium: the spore-bearing anaerobic bacilli.



8. Non-sporing anaerobes
9. The Enterobacteriaceae.
10. Vibrios, Aeromonas, Plasiomonas, Campylobacter and Spirillum, H.pylori
11. Erysipelothrix and Listeria
12. Pseudomonas.
13. Chromobacterium, Flavobacterium, Acinetobacter and Alkaligenes.
14. Pasteurella, Francisella.
15. Haemophilus and Bordetella.
16. Brucella. Erlichia Anplasma, Listeria, Burkholderia.
17. Mycobacteria. MDR, TB
18. The spirochaetes., Treponema, Leptospira and other spirochaetes.
19. Actinomyces, Nocardia and Actinobacillus.
20. Mycoplasmatales: Mycoplasma, Ureaplasma and Acholeplasma.
21. Rickettsiae.
22. Chlamydiae.
23. Emerging and Reemerging bacterial pathogens.

VIROLOGY

1. The nature of viruses
2. Classification of viruses
3. Morphology :virus structure
4. Virus replication
5. The genetics of viruses
6. The pathogenicity of viruses
7. Epidemiology of viral infections
8. Vaccines and antiviral drugs
9. Bacteriophages
10. Pox viruses
11. Herpes viruses
12. Vesicular viruses
13. Arboviruses-Japanese encephalitis, Dengue, Chikungunya and others
14. Bunyaviridae
15. Arenaviridae
16. Marburg and Ebola viruses
17. Rubella virus
18. Orbiviruses
19. Influenza virus- H1N1.
20. Respiratory disease: Rhinoviruses, adenoviruses, coronavirus
21. Paramyxoviridae



22. Enteroviruses : Polio, Echo, Coxsackie viruses
23. Other enteric viruses
24. Hepatitis viruses
25. Rabies virus
26. Slow viruses
27. Human immunodeficiency viruses
28. Oncogenic viruses
29. Teratogenic viruses
30. Viruses of gastroenteritis
31. Prion diseases
32. Emerging viral infections – SARS, Avian influenza etc.

PARASITOLOGY

1. Protozoan parasites of medical importance: Entamoeba, Giardia, Trichomonas, Leishmania, Trypanosoma, Plasmodium, Toxoplasma, Sarcocystis, Cryptosporidium, Balantidium, Isospora, Cyclospora, Microsporidium etc.
2. Helminthology: All those medically important helminths belonging to Cestoda, Trematoda and Nematoda. Cestodes: Diphyllbothrium, Taenia, Echinococcus, Hymenolepis, Dypylidium, Multiceps etc. Trematodes: Schistosomes, Fasciola, Gastrodiscoides, Paragonimus, Clonorchis, Opisthorchis etc. Nematodes: Trichuris, Trichinella, Strongyloides, Ancylostoma, Nicator, Ascaris, Toxocara, Enterobius, Filarial worms, Dracunculus, etc.
3. Ectoparasites: Common arthropods and other vectors viz., Mosquito, Sandfly, Ticks, Mite, Cyclops., Recent methods for vector control.
4. Recent advances in parasitology – Antiparasitic agents.

MYCOLOGY

1. The morphology and reproduction of fungi
2. Classification of fungi
3. Contaminant and opportunistic fungi
4. Fungi causing superficial mycoses
5. Fungi causing subcutaneous mycoses



6. Fungi causing systemic infections
7. Mycetism and Mycotoxicosis
8. Recent advances in diagnosis of fungal diseases.
9. Antifungal agents
10. Recent advances in mycology, Emerging and reemerging fungal infections.

APPLIED CLINICAL MICROBIOLOGY

1. Epidemiology of infectious diseases Epidemiological typing
2. Hospital acquired infections Hospital infection control.
3. Infections of various organs and systems of the human body
4. Molecular genetics as applicable to Microbiology
5. Automation in Microbiology
6. Rapid diagnostic techniques for microbial diseases.
7. Vaccinology: principle, methods of preparation, administration of vaccines, Newer vaccines.
8. Outbreak investigations & disaster management
9. Biological warfare
10. Automation in Microbiology.
11. Statistical analysis of data
12. Animal and Human ethics
13. Antibiotic policy.

PRACTICALS (SKILLS)

BACTERIOLOGY

Must acquire:

1. Care and operation of Microscopes viz. Light, Dark ground, Phase contrast, Inverted, Fluorescent microscopes.
2. Preparation of stains viz. Gram's, Albert's, Ziehl- Neelson and other special stains - performing of staining and interpretation of stained smears.
3. Washing and sterilization of glassware including plugging and packing.
4. Operation of incubator, autoclave, hot air oven, inspissator, distillation plant, filters like Seitz and membrane and sterility tests.



5. Care and maintenance of common laboratory equipments like water bath, centrifuge, refrigerators, incubators etc.
6. Preparation and pouring of liquid and solid media - Nutrient agar, Blood agar, MacConkey agar, sugars, TSI agar, Robertson's cooked meat, Lowenstein- Jensen's, selective media.
7. Preparation of reagents – oxidase, Kovac, etc.
8. Tests for beta-lactamases including ESBLs.
9. Collection of specimens for Microbiological investigations such as blood, urine, throat swab, rectal swab, stool, pus, OT specimens.
10. Preparation, examination and interpretation of direct smears from clinical specimens, viz. Sputum for AFB – ZN & auramine O, slit smears for *M. leprae*, -ZN stain, conjunctival smear for Chlamydiae – Giemsa/Iodine.
11. Culture sensitivity of mycobacteria with sputum irritation conc. Methods.
12. Techniques of anaerobiosis – Gas pack system, anaerobic jars-evacuation & filling with H₂, CO₂
13. Identification of bacteria of medical importance upto species level (except anaerobes – upto generic level)
14. Quantitative analysis of urine by pour plate method and semiquantitative analysis by standard loop test for significant bacteriuria.
15. Plating of clinical specimens on media for isolation, purification identification and quantitation.
16. Tests for motility: hanging drop, Craigie's tube, dark ground microscopy for Spirochetes – Treponema & Leptospira.
17. In-vitro toxigenicity tests – Elek test, Nagler's reaction
18. Special tests – Bile solubility, chick cell agglutination, sheep cell haemolysis, niacin and catalase tests for mycobacterium, satellitism, CAMP test, catalase test and slide agglutination tests, and other as applicable identification of bacteria upto species level
19. Preparation of antibiotic discs; performance of antimicrobial susceptibility testing by Kirby-Bauer disk diffusion method; estimation of Minimum inhibitory /Bactericidal concentrations by tube/plate dilution methods. Tests for drug susceptibility of Mycobacterium tuberculosis



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20. Skin tests like Mantoux, Lepromin etc.
21. Testing of disinfectants- Phenol coefficient and 'in use' tests.
22. Quality control of media reagents etc. and validation of sterilization procedures.
23. Aseptic practices in laboratory and safety precautions.
24. Disposal of contaminated material like cultures.
25. Bacteriology of food, water, milk, air
26. Maintenance of stock cultures.

Desirable to acquire:

1. Care and breeding of laboratory animals viz. Mice, rats, guinea pigs and rabbits.
2. Techniques of withdrawal of blood from laboratory animals including sheep.
3. Inoculation of infective material in animals by different routes.
4. Animal pathogenicity /toxigenicity tests for *C.diphtheriae*, *Cl.tetani*, *S. pneumoniae*, *S.typhimurium*, *K. pneumoniae* etc.
5. Performance of autopsy on animals.
6. Isolation of plasmids and Conjugation experiments for transfer of drug resistance
7. Serum antibiotic assays eg. Gentamicin
8. Phage typing for staphylococci, *S.typhi* etc.
9. Bacteriocine typing eg. Pyocine, Proteocin etc.
10. Enterotoxigenicity tests like rabbit ileal loop, intragastric inoculation of mouse, Sereny's test.
11. Mouse foot pad test for *M.leprae*
12. BACTEC, PCR

IMMUNOLOGY/ SEROLOGY

1. Collection of blood by venepuncture, separation of serum and preservation of serum for short and long periods.
2. Preparation of antigens from bacteria or tissues for widal, Weil-Felix, VDRL, etc. and their standardisation.
3. Preparation of adjuvants like Freund's adjuvant.



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4. Raising of antisera in laboratory animals.
5. Performance of serological tests viz. Widal, Brucella tube agglutination, indirect haemagglutination, VDRL, Paul-Bunnell, Rose-Waaler, IFA.
6. Immunodiffusion in gels, counter immunoelectrophoresis- visualization and interpretation of bands.
7. Performance and interpretation of Enzyme linked immunosorbent assay.
8. Latex and staphylococcal co-agglutination tests.

Desirable to acquire:

1. Leucocyte migration inhibition test.
2. T-cell rosetting.
3. Flow Cytometry
4. Radial immunodiffusion.
5. Immunoelectrophoresis.
6. Neutrophil phagocytosis.

MYCOLOGY

Must acquire:

1. Collection of specimens for mycology.
2. Direct examination of specimens by KOH, Gram, Kinyoun's, Giemsa, Lactophenol cotton blue stains.
3. Examination of histopathology slides for fungal infections.
4. Isolation and identification of pathogenic yeasts and moulds and recognition of common laboratory contaminants.
5. Special techniques like Wood's lamp examination, hair baiting, hair perforation, paraffin baiting and slide culture.
6. Maintenance of stock cultures.
7. Animal pathogenicity tests viz. Intracerebral and intraperitoneal inoculation of mice for cryptococcus.



PARASITOLOGY

Must acquire:

1. Examination of faeces for parasitic ova and cysts etc. by direct and concentration methods (e.g. salt floatation and formol – ether methods) and complete examination for other cellular features. Cold Z.N. staining.
2. Egg counting techniques for helminths.
3. Examination of blood for protozoa and helminths by wet mount, thin and thick stained smears.
4. Examination of other specimens for e.g. urine, C.S.F., bone marrow etc. for parasites.
5. Histopathology sections – examination and identification of parasites.
6. Performance of stains – Leishman, Giemsa, Modified Acid Fast, Toluidine Blue O.
7. Identification of common arthropods and other vectors viz. Mosquito, sand fly, ticks, mite and Cyclops.
8. Collection of specimens.
9. Preservation of parasites – mounting, fixing, staining etc.

Desirable to acquire:

1. In-vitro culture of parasites like entamoeba, leishmania, P.falciparum.
2. Maintenance of toxoplasma gondii in mice.
3. Preparation of media – NIH, NNN etc.
4. Copro-culture for larva of hook worms.
5. Antigen preparation viz. Entamoeba , Filarial , Hydatid for serological tests like IHA and skin test like Casoni's .
6. Permanent staining techniques like iron haematoxylin

VIROLOGY

Must acquire:

1. Preparation of glassware for tissue culture(washing, sterilization)
2. Preparation of media like Hanks, MEM.



3. Preparation of clinical specimens for isolation of viruses.
4. Serological tests-ELISA and rapid tests for HIV, RPHA for HbsAg, Haemagglutination inhibition for influenza, AGD and counterimmunoelectrophoresis for detection of viral antigens or antiviral antibodies.
5. Chick embryo techniques- inoculations and harvesting.

Desirable to acquire:

1. Preparation of Monkey Kidney Cells (Primary) maintenance of continuous cell lines by subcultures. Preservation of cell cultures.
2. Recognition of CPE in tissue cultures.
3. Performance of haemadsorption, haemagglutination, immunofluorescence, neutralization tests for identification of viruses.
4. Handling of mice, rats, guinea pigs, rabbits for collection of blood, pathogenicity test etc.

SUGGESTED READING:

BOOKS:

Reference books (Please refer the most recent edition)

1. Topley and Wilson's Microbiology and Microbial infections. 8 volumes 2005, 10th edition
2. Color Atlas and Textbook of Diagnostic Microbiology: Elmer W Koneman -2006, 6th edition
3. Mandell, Douglas and Bennett's Principles and Practice of Infectious Diseases -2004, 6th edition
4. Microbiology and Clinical Practice: Shanson-1999, 3rd edition
5. Immunology: Janis Kuby- 2003.
6. Basic Clinical Immunology. Fudenburg, Stites, Caldwell, Weils.
7. Control of Hospital Infection- A practical handbook (most recent edition)-2000, 4th edition
8. Bailey and Scott's Diagnostic Microbiology.
9. Text book of Parasitology. Chatterjee K.D.
10. Microbiology in Clinical Practice. Shanson D.C.



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11. Beaver's Parasitology Textbook
12. Text book of medicine - Harrison
13. Manual of clinical microbiology – Murray

Further Reading

1. Mycology - Rippons
2. Essentials of Immunology- Roitt
3. Virology- Clinical Virology by Rich
4. Gradwohl's Clinical Laboratory Methods and Diagnosis.
5. Biochemical tests for the Identification of Medical Bacteria- MacFaddin JF
6. Manual of Clinical Microbiology- ASM press

Journals

1. Indian Journal of Medical Microbiology
2. Clinical Microbiology Reviews
3. Journal of Clinical Microbiology
4. Journal of Medical Microbiology
5. Journal of AIDS
6. Journal of Hospital Infection
7. Indian Journal of Tuberculosis and Lung Diseases.
8. Indian Journal of Medical Research
9. JAAC
10. Parasitology Today
11. Journal of Infection
12. Infection Control and Hospital Epidemiology
13. Indian Journal of Tuberculosis
14. Journal of Associations of Physicians of India
15. Lancet-Infectious Diseases
16. Emerging Infectious Diseases-online
17. New England Journal of Medicine- online
18. British Medical Journal



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19. Scandinavian Journal of Infectious Diseases
20. ICMR Bulletin
21. AIDS Research & Review
22. MMWR
23. Tubercle
24. WHO Bulletin
25. Journal of American Medical Association
26. Paediatric infectious diseases
27. Indian Journal of Leprosy
28. International Journal of Leprosy
29. Immunology
30. American journal of Epidemiology
31. Online National & International Journals

Important Websites:

1. Center for Disease Control -www.cdc.gov
2. World Health Organization- www.who.int
3. Infectious Disease Society of America- www.idsociety.org
4. United Nations Program on HIV/ AIDS- www.unaids.org
5. Johns Hopkins Infectious Diseases- www.hopkins-id.edu
6. National Library of medicine- www.pubmed.com
7. MD Consult- www.mdconsult.com
8. Global Infectious Disease epidemiology network- www.gideononline.com
9. National AIDS Control Organization- www.nacoindia.org
10. Tuberculosis Research Centre- www.trc-chennai.org



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UNIVERSITY EXAMINATIONS

After successful completion 3 Years' residency

Theory Examination: Each paper 100 marks – 3 hrs duration

	Sections with marks
Paper I	General Microbiology & Immunology Section - 'A' (40 marks), 2 long questions Section - 'B' (60 marks) 6 short notes Total = 100 marks
Paper II	Systemic Bacteriology & clinical Microbiology. Section - 'A' (40 marks), 2 long questions Section - 'B' (60 marks) 6 short notes Total = 100 marks
Paper III	Mycology & Virology Section - 'A' (40 marks), 2 long questions Section - 'B' (60 marks) 6 short notes Total = 100 marks
Paper IV	Parasitology Section - 'A' (40 marks), 2 long questions Section - 'B' (60 marks) 6 short notes Total = 100 marks
	TOTAL THEORY = 400

Minimum passing marks in each head 40% and aggregate: 50% in all papers

Practical Examination:

Day	Exercise/Viva	Maximum Marks
Day 1	A) LONG EXERCISE Bacteriology case	40
	B) SHORT EXERCISES	
	1) Short Bacteriology case	30
	2) Ziehl Neelson staining ex.sputum concentration	30
Day 2	3) Exercise in Virology egg. Inoculation / ELISA, HIV	30
	A) LONG EXERCISE CONTD.-.	
	B) SHORT EXERCISES	
	Exercise in Mycology slide culture	30
	Exercise in Parasitology concentration methods.	40
Day 3	Serology/Immunology widal /VDRL	40
	A) LONG EXERCISE CONTD.-.	
	B) SHORT EXERCISES	
	Identification of slides	30
	Animal experiment Viva Demonstration and Viva	30
	Total of short cases	300
	C) ORAL(VIVA VOCE) Viva-80 Microteaching -20	100
	TOTAL A,B,C	400

Minimum passing marks: 50% separate in clinical and viva



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PRACTICAL:

DURATION: Practical examination shall be conducted on THREE consecutive days. The time shall be adjusted by the examiners to cover all exercises.

EXERCISES: The practical examination will consist of following exercises conjointly conducted and evaluated by the four examiners (Two internals and two externals).

EXERCISES:

A. Long Exercise:

Exercise in Clinical Bacteriology: Problem Solving Exercise: where a brief history along with relevant clinical findings should be given. Student should be asked to list relevant investigations required & clinical specimen to be given. Isolation and identification of bacteria from the given clinical specimen and antimicrobial sensitivity of the isolated organism to be performed.

B. Short Exercises:

1. Exercise in Bacteriological/Mycobacteriological Techniques:

Identification of bacteria (aerobe/anaerobe/Mycobacteria) in given pure culture.

2. Ziehl-Neelson Staining :

Preparation of smear; staining of prepared / given smear and reporting on findings. This exercise shall include acid - fast staining for tubercle bacilli or lepra bacilli or modified acid fast staining (for e.g. parasites/spores).

3. Exercise in Virology:

The following exercises to be performed –

A) Embryonated egg inoculation / harvesting

A) ELISA for HIV/ ELISA for detection of HBsAg, any rapid test for HIV antibodies or any other serological test for detection of viral antigen / antibody (eg. CIEP).

4. Identification of fungi in minimum two given cultures – one yeast and one mould.

5. Exercise in Parasitology.

Any one of the following exercises to be performed –

- Examination of stool for ova/cyst by direct/ concentration method.
- Preparation of peripheral smear and staining by Leishman stain.
- Reporting of parasites in the prepared/given smear.



6. Exercise in Immunology/Serology:

- Any one of the Serology/Immunology techniques commonly used in diagnostic clinical microbiology to be performed. Serological test – (For e.g. Latex agglutination(ASO, CRP, RA etc.), tube agglutination (Widal, Brucella, Paul-Bunnell etc.), slide flocculation (VDRL), Passive haemagglutination(e.g. TPHA), RPHA (e.g. for HBsAg), Dot blot assay (e.g. HIV Rapid test).

NOTE: The test to be performed in this exercise should be different in serological / immunological principle from that performed in Exercise 3.

7. Animal experiment:

Details regarding care, handling and experimentation on animals shall be evaluated through simulations. Any common experimental procedure given to the student shall be subject to strict adherence to rules regarding handling, care and experimentation of animals.

8. Identification of microbiological findings in the given set of slides – parasitology, immunology, mycology, bacteriology or histopathology slides (10 slides).

Parallel testing of given exercise shall be done at the examination centre for checking the quality of chemicals, media, reagents and the test material.

ORAL (VIVA -VOCE)

Student will be examined by all the examiners together regarding his knowledge of basic aspects and recent advances in the field of microbiology and its subspecialties. Student will be assessed about his comprehension, analytical approach, expression, interpretation of data and his approach in solving the problem. Oral examination will also include presentation and discussion on dissertation.



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STUDENT'S RECORD BOOK
POSTGRADUATE DEGREE COURSE
M.D. (MICROBIOLOGY)
DEPARTMENT OF MICROBIOLOGY

STUDENT'S RECORD BOOK

Students undergoing postgraduate training in M.D. (Microbiology) are required to maintain a record of their academic and service activities to provide an account of progress made by them.

Residents are required to carry the record book and get the entries made regularly. Faculty is responsible for countersigning the entries made by the student. The record book has to be submitted to the Head of the Department at the end of the course. The internal assessment is partly calculated on the basis of progress made by the student during his tenure in the department as detailed in the syllabus.

The aim of this course is to train the students of Medicine in the field of Medical and Diagnostic Microbiology including molecular diagnostics. Knowledge and practical skills shall be acquired by the candidates 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 are trained in basic research methodology so that they are able to conduct fundamental and applied research. They are also trained in teaching methods so that they can take up teaching assignments.

GOAL :

The goal of the postgraduate medical education shall be to produce a competent specialist and Medical teacher:

- Who shall 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 and 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



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- 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.

EDUCATIONAL OBJECTIVES:

KNOWLEDGE:

At the end of the course the students shall be able to

1. State the etiology pathogenesis and methods of laboratory diagnosis and apply that knowledge in the treatment, prevention and control of communicable diseases caused by micro-organisms.
2. State 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 and immunology.
4. Organise the prevention and control of communicable diseases in the community.
5. 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.
6. Carry out fundamental or applied research in the branches of medicine involving microbiological work.
7. Develop specialization in any of the above subspecialties.
8. Undertake teaching assignments in the subject of Microbiology.

(B) Skills

At the end of the course the student shall be able to

1. Plan the laboratory investigations for diagnosis of infectious diseases
2. Perform laboratory procedures to arrive at the etiological diagnosis of diseases caused by bacteria, fungi, viruses and parasites.
3. Perform and interpret immunological and serological tests
4. Operate routine and sophisticated instruments in the laboratory.



D. Y. Patil University

PASSPORT

SIZE

PHOTOGRAPH

PERSONAL BIO-DATA

FULL NAME OF STUDENT -----

DATE OF JOINING -----

DATE OF BIRTH -----

PERMANENT ADDRESS -----

TEL.NO. (O)----- (R) ----- MOBILE -----

LOCAL/GUARDIAN ADDRESS -----

CAMPUS ADDRESS ----- HOSTEL ROOM NO.-----

BLOOD GROUP -----

EDUCATIONAL QUALIFICATIONS

Sr.No.	Degree	Institution/University	Year of passing	Awards/Distinctions



D. Y. Patil University

SERVICE RECORD

Sr.No.	Position	Name of Hospital/Institute	From	To	Remarks

POSTING SCHEDULE

MONTH	YEAR AND SIGNATURE OF FACULTY							
	YEAR	SIGN.	YEAR	SIGN.	YEAR	SIGN.	YEAR	SIGN.
JANUARY								
FEBRUARY								
MARCH								
APRIL								
MAY								
JUNE								
JULY								
AUGUST								
SEPTEMBER								
OCTOBER								
NOVEMBER								
DECEMBER								



D. Y. Patil University

JOURNAL CLUB

DATE	TOPIC	JOURNAL	PRESENTED/ATTENDED	SIGN. OF FACULTY

SEMINARS

DATE	TOPIC	ATTENDED/ PRESENTED	REFERENCES IF PRESENTED	SIGN.

GROUP DISCUSSIONS

DATE	TOPIC	IF PARTICIPATED	REFERENCES OF STUDY	SIGN.

SLIDE SEMINARS

DATE	SLIDE/S	CLINICAL DATA	PRESENTED/ATTENDED	SIGN.

ASSIGNED EXERCISES

DATE	NATURE OF EXERCISE	RESULTS	SIGN.

UNDERGRADUATE TEACHING ASSIGNMENTS

DATE	U.G. BATCH	TOPIC	LECT./DEMO/SEMINAR	SIGN.



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RECORD OF INTRINSIC & EXTRINSIC POSTINGS

POSTING	PERIOD	PROCEDURES CARRIED OUT	No. OF SAMPLES PROCESSED & REPORTED	SIGN.

THESIS/DISSERTATION

Name of the Student:

Topic of Thesis:

Guide:

Co-guide/s:

Protocol presented on:

Progress of Thesis:

Semester	Work done	Sign. Of Guide
1st		
2nd		
3rd		
4th		
5th		

Thesis Presented on:

Thesis submitted on:

SCIENTIFIC CONTRIBUTIONS

Name of the Student:

CME/Workshops attended:

Sr.No.	Name of CME/Workshop	Venue	Date	Sign. Of Faculty



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Conferences attended:

Sr.No.	Name of conf. & Venue	Paper Presented Yes/No	If yes, Title of Paper

Publications:

Awards: