SUMANDEEP VIDYAPEETH

(Declared as Deemed to be University under Section 3 of the UGC Act 1956)
Accredited by NAAC with a CGPA of 3.53 out of four-point scale at 'A' Grade
Category - I deemed to be university under UGC Act - 2018
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CURRICULUM

Doctor of Medicine
(M.D.)
MICROBIOLOGY

Attested CTC

15/2/2021

Vice-Chancellor
Sumandeep Vidyapeeth
An Institution Deemed to be University
Vill. Piparia, Taluka: Waghodia.
Dist. Vadodara-391 760. (Gujarat)

Dean

ANIENDED UP TO DECEMBER -2020

Programmeoutcome : MD

The purpose of MD education is to create specialists who would provide high quality health care and advance the cause of science through research & training. The goal of postgraduate medical education shall be to produce competent specialists and/or Medical teachers.

Programme specific outcome : MD

POS 1. Scholars shall recognize the health needs of the community, and carry out professional obligations ethically and in keeping with the objectives of the national health policy.

POS 2. Scholars shall have acquired the basic skills in teaching of the medical and paramedical professionals.

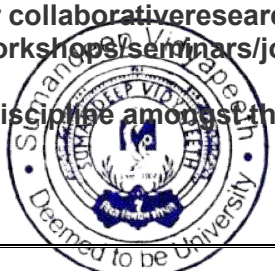
POS 3. Practice the specialty concerned ethically and in step with the principles of primary health care.

POS 4. Demonstrate sufficient knowledge of the basic sciences relevant to the concerned specialty**.**

POS 5. Develop skills in using educational methods and techniques as applicable to the teaching of medical/nursing students, general physicians and paramedical health workers.

COURSE OUTCOME (CO): A post graduate student upon successfully qualifying in the MD (Microbiology) examination shall achieved expertise to :

1. **Demonstrate competence as a clinicalmicrobiologist.**
2. **Interact effectively with the allied departments by rendering services in basic as well as advanced laboratoryinvestigations**
3. **Demonstrate and acquire knowledge about application of microbiology in a variety of clinical settings to solve diagnostic and therapeutic problems along with preventivemeasures.**
4. **Play a pivotal role in hospital infection control, including formulation of antibiotic policy and management of biomedicalwaste.**
5. **Acquire skills in conducting collaborative research in the field of Microbiology and alliedsciences.**
6. **Conduct such clinical/experimental research as would have significant bearing on human health and patientcare**
7. **Demonstrate effective communication skills required for the practice of clinical microbiology and while teaching undergraduatestudents**
8. **Establish good clinical microbiological services in a hospital and in the community in the fields of bacteriology, virology, parasitology, immunology and mycology.**
9. **Plan, execute and evaluate teaching assignments in MedicalMicrobiology.**
10. **Plan, execute, analyze and present the research work in medicalmicrobiology.**
11. **To acquire various skills for collaborativeresearch.**
12. **To participate is various workshops/seminars/journal clubs/demonstration in the allieddepartments**
13. **Uphold the prestige of the discipline amongst the fraternity ofdoctors.**



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-specialties of Bacteriology including Mycobacteriology, Virology, Parasitology, Immunology, Serology, Mycology & Molecular Diagnostics so as to be able to deal with diagnosis and prevention of infectious diseases. They will be trained in basic research methodology so that they are able to conduct fundamental and applied research.

They will also be trained in teaching methods. They will be trained in **Evidence Based Education System** and will learn to apply it in undergraduate teaching. They will be trained in searching evidence for a problem, critically appraise and apply it to the day-to-day practice.

Goal:

The goal of the postgraduate medical education shall be to produce a competent Clinical Microbiologist:

- Who shall recognize the health needs of the community and carryout
  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 deliverysystem;
- Who shall be aware of the contemporary advances and developments in the field of Medical and Diagnostic Microbiology and will be able to search for evidence and be abreast with the advances and incorporate intopractice
- Who shall have acquired the spirit of scientific inquiry and is trained to use the principles of research methodology andepidemiology
- Who shall have acquired the basic skills of teaching of the medical and paramedical professionals in EBESformat

- **Educationalobjectives:**

A. Knowledge:

At the end of PG training in this discipline, the student shall be able to:-

1. Recognize the importance of microbiology in context to the health needs of the community so that he/she can state and explain clinical features, etiology, pathogenesis and methods of laboratory diagnosis of the infectious diseases and also can apply the knowledge to treatment, prevention and control of communicablediseases.
2. Play the role in implementation of national health programsresponsibly.
3. State and explain principles of immunity and immunological phenomenon which help in diagnosis of infectious and non-infectiousdiseases.
4. Establish and practice laboratory medicine for diagnosis of infectious diseases in hospital and community, in bacteriology, virology, parasitology, mycology, serology and immunology as required for the clinicalpractice.
5. Understand and practice principles of prevention and control of infectious diseases and be able to opine and contribute towards control of hospital acquired infections (HAI) and rational antibioticpolicy.
6. State and understand recent advances in the field ofmicrobiology.
7. Carry out fundamental or applied research in different branches of medicine involving microbiologicalwork.
8. Develop specialization in any suchsubspecialty.
9. Demonstrate competence in basic concepts of research methodology,epidemiology
10. Develop skills in using educational methods and techniques, applicable to teaching medical and paramedical students and general physicians. He should undertake teaching medical and paramedical assignments in the subject of medical microbiology according to EBESformat
11. Develops skills of presenting research work in the form of seminars, symposia and Journal Clubs in professional forums supported with best, critically appraisedevidence.
12. Develop skills required for evidence based researchpublications.

B. Skills:

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

1. Plan the laboratory investigations for diagnosis of infectiousdiseases
2. Perform routine & advanced laboratory procedures to arrive at the etiological diagnosis of diseases caused by bacteria, fungi, viruses andparasites.
3. Perform and interpret immunological and serologicaltests
4. Operate routine and sophisticated instruments in thelaboratory.

C. Integration:

All the post graduates after enrollment will be exposed to:

1. EBESTraining:
    a) Undergo EBES training, workshops etc. from time totime
    b) Conduct UG teaching in EBESformat
    c) Assist in Problem Based evidence searching exercise for UGstudents
2. Post Graduate Programme:Seminar
    a. PG student is required to present atleast one seminar per month on relevant topic approved by the PGteachers
    b. Incorporate well searched and critically appraised evidence in standard format and at the end of the seminar all the references will belisted
    c. Seminar will be assessed by thefacilitator
3. Post Graduate Programme: Journal Club/CasePresentation
    a. PG student is required to present atleast one journal article or an interesting case study from indexedjournal
    b. Critically appraise the article in the relevantformat
    c. A designated teacher/facilitator will assess every post graduate student for each Journal Clubpresentation

4. Short Projects forPGs:
    a. PG students are required to undertake short projects during the course of 3years
    b. Search evidence, critically appraise and useit
    c. To make 1 poster presentation and 1 oral paper/publication during the course of 3 years

- To introduce Basic life support (BLS) and Advanced Cardiac Life Support (ACLS) trainingforalltheFirstyearPostgraduateResidentDoctorsfromacademicyear2017-18.
- To introduce New chapter / topic 'Intellectual Property Rights (IPR) foralltheFirstyearPostgraduateResidentDoctorsfromacademicyear2020-2021 of duration of 4hrs (Board of Studies letter no.: SBKS/DEAN/742/2021,dated 05/06/2021 and Vide Notification of Board of Management Resolution Ref no.:SVDU/R/3051-1/2020-21, dated - 29" July 2021)

List of topics :

1. Introduction-ConceptofIntellectualProperty,Historicalviewof Intellectual Property system in India and International Scenario, Evolution of Intellectual Property Laws in India, Legal basis of Intellectual Property Protection, Need for Protecting Intellectual Property, Theories on concept of property - Major IP Laws in India.
2. Types of IPR: Patents, Copyright, Trademark Industrial Designs, TradeSecrets.
3. Patents: Concept of Patent, Criteria of Patentability, Inventions NOT patentable, Process of Obtaining a Patent, Duration of Patents, Rights of Patentee, Limitation of rights, Infringement andEnforcement.
4. Copyrights: Meaning of Copyright, Copyright Vs. Moral rights, Copyrighteligibility,TermofCopyright,RegistrationofCopyright, Infringement andRemedies
5. Trademark: Meaning of Trademark, Criteria for trademark, Procedure for Trademark Registration, Term of protection, Infringement andRemedies.
6. Industrial Designs: Meaning of Industrial Designs, Rights in Industrial Designs: Nature, Acquisition and duration ofrights.

7. Trade Secrets: Meaning of Trade Secrets, Need to protectTrade secrets, Criteria of Protection, Procedure for registration, Infringement.
8. Commercialization of IPR: Traditional IP and Evolving IP, Assignment, Licensing, Cross License, Patent Pool, Negotiations, Defensive Publications, TechnicalDisclosures, Patent Pooling, Patent Trolling, Brand Management, Brand and Pricing Sttegies.

- With reference to the Notification vide no. MC!-18(1)12020-Med.1121415, dated 16.09.2020, related to 'Postgraduate Medical Education (Amendment) Regulations 2020'; all the postgraduate students pursuing MD / MS in broad specialties in SumandeepVidyapeeth Deemed to be University, as a part of course curriculum, shall undergo a compulsory Residential rotational posting in the 3rd or 4th or Sth semester of the Postgraduate programme, for a duration of three months, in the District Hospitals / District Health System, is confirmed and approved for execution.

- (Board of Studies letter no.:SBKS/DEAN/1576/2020,dated 0/10/2021 and Vide Notification of Board of Management Resolution :Ref no. SVDU/R/1271-1/2020-21, dated - 30th December 2020)

To consider and approve the tmpte Students admitted in the 2021-22 batch as per the NMC notifications vide letter F.No. NMC23(1)(25)12021/PG/053909 dated 2211212022 and Clarification issued by NMC vide tetter F. N o. N M C/23 (1) (25) 12021 I Med. I 00 1 866 d ated 1 9 I Ot t 2023 Resolution ' with reference to the NMC notifications vide letter F.No. NMC-23(1)(25)t2o21tpcto53g0g dated 2211212022 and Clarification issued by NMC vide letter F.No.NMC/23(1)(25)t2021/Med./001g66 dated 1910112023. the District Residency Program (DRP) shall be implemented for the students admitted in 2021-22 batch onwards. The said notification and clarification from NMC were considered and passed unanimously.

The communication from National Medical Commission vide no. NMC-23 (1) (25) / 2021 / PG / 053909, dated 22.12.2022 regarding Implementation of District Residency Programme, and National Medical Commission vide no. NMC-23(1)(25)/2021/Med./001866, dated 19.01.2023 regarding Clarification on implementation of District Residency Programme, is adopted for execution.

(BOS-Ref :SBKSMIRC/Dean/Outward No.1158/2022-23, Date of Academic council : 11/02/2023)

(BOM-Ref. No.: SVDU/R/2431-A/2022-23, Date of Academic council : 29/05/2023)

PG SYLLABUS & EXAM PATTERN:

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

1. History and pioneers inMicrobiology
2. Microscopy
3. Morphology of bacteria and other micro-organisms.
4. Nomenclature and classification ofmicrobes.
5. Growth and nutrition of bacteria.
6. Bacterialmetabolism.
7. Sterilization anddisinfection.
8. Biomedical wastedisposal
9. Bacterialtoxins.
10. Bacterial antagonism:Bacteriocins.
11. Bacterial genetics, genecloning.
12. Antibacterial substances used in treatment of infections and drug resistance inbacteria.
13. Bacterial ecology-normal flora of human body, hospital environment, air, water andmilk
14. Host parasiterelationship.
15. Quality control and Quality Assurance inMicrobiology.
16. LaboratoryBiosafety
17. Health care associated infections- prevention andcontrol

IMMUNOLOGY AND APPLIED ASPECTS

2. The normal immunesystem.
3. Innateimmunity.
4. Antigens.
5. Immunoglobulins.
6. Complement.
7. Antigen and antibodyreactions.
8. Hypersensitivity.
9. Cell mediatedimmunity.
10. Immunodeficiency.
11. Autoimmunity.
12. Immunetolerance.
13. Transplantationimmunity.
14. Tumourimmunity.
15. Prophylaxis and immunotherapy
16. Measurement ofimmunity.
17. Immunity and immunopathogenesis of specific infectiousdiseases
18. Molecular Biology Techniques. For e.g. PCR, DNAprobes

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SYSTEMATIC BACTERIOLOGY

1. Isolation, description and identification of bacteria. The epidemiology, pathogenesis, antigenic characteristics and laboratory diagnosis of disease caused bythem.
2. Staphylococcus and Micrococcus; Anaerobic Gram positivecocci.
3. Streptococcus andLactobacillus.
4. Neisseria, Branhamnella andMoraxella.
5. Corynebacterium and other coryneformorganisms.
6. Bacillus: the aerobic spore-bearingbacilli.
7. Clostridium: the spore-bearing anaerobicbacilli.
8. Non-sporinganaerobes
9. Mycobacteria
10. Enterobacteriaceae.
11. Vibrios, Aeromonas, Plesiomonas, Campylobacter and Spirillum,H.pylori
12. Erysipelothrix andListeria
13. Pseudomonas
14. Chromobacterium, Flavobacterium, Acinetobacter andAlkaligens.
15. Pasteurella,Francisella.
16. Haemophilus andBordetella.
17. Brucella.
18. Spirochaetes.
19. Actinomycetes, Nocardia andActinobacillus.
20. Mycoplasmatales: Mycoplasma, Ureaplasma andAcholeplasma.
21. Rickettsiae.
22. Chlamydiae.
23. Emerging bacterialpathogens.

VIROLOGY

1. The nature ofviruses
2. Classification ofviruses
3. Morphology :virus structure
4. Virusreplication
5. The genetics ofviruses
6. The pathogenicity ofviruses
7. Epidemiology of viralinfections
8. Vaccines and antiviraldrugs
9. Bacteriophage
10. Poxviruses
11. Herpesviruses
12. Vesicularviruses
13. Togaviridae
14. Bunyaviridae
15. Arenaviridae
16. Marburg and Ebolaviruses
17. Rubellavirus
18. Orbiviruses
19. Influenzavirus
20. Respiratory disease: Rhinoviruses, adenoviruses, coronaviruses
21. Paramyxoviridae
22. Enteroviruses : Polio, Echo, Coxsackieviruses
23. Other entericviruses
24. Hepatitisviruses
25. Rabiesvirus
26. Slowviruses
27. Human immunodeficiencyviruses
28. Oncogenicviruses
29. Teratogenicviruses
30. Viruses ofgastroenteritis
31. Priondiseases
32. Emerging viralinfections

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PARASITOLOGY

1. Protozoan parasites of medical importance: Entamoeba, Giardia, Trichomonas, Leishmania, Trypanosoma, Plasmodium, Toxoplasma, Sarcocystis, Cryptosporidium, Balantidium, Isospora, Cyclospora, Microsporidiumetc.

2. Helminthology: All medically important helminths belonging to Cestoda, Trematoda and Nematoda.
   Cestodes: Diphyllobothrium, Taenia, Echinococcus,Hymenolepis, Dypyllidium, Multicepsetc.
   Trematodes: Schistosomes, Fasciola, Gastrodiscoides, Paragonimus, Clonorchis, Opisthorchis etc.
   Nematodes: Trichuris, Trichinella, Strongyloides, Ancylostoma, Necator, Ascaris, Toxocara, Enterobius, Filarial worms, Dracunculus, etc.

3. Ectoparasites: Common arthropods and other vectors viz., Mosquito, Sandfly, Ticks, Mite,Cyclops

MYCOLOGY

1. The morphology and reproduction of fungi and antimycoticagents
2. Classification offungi
3. Contaminant and opportunisticfungi
4. Fungi causing superficialmycoses
5. Fungi causing subcutaneousmycoses
6. Fungi causing systemicinfections
7. Antifungalagents
8. Mycetismus (Mycotoxicosis)

APPLIED CLINICAL MICROBIOLOGY

1. Epidemiology of infectiousdiseases
2. Hospital acquiredinfections
3. Infections of various organs and systems of the humanbody
4. Molecular genetics as applicable toMicrobiology
5. Automation inMicrobiology
6. Rapid diagnostic techniques for microbialdiseases.
7. Vaccinology : principle, methods of preparation, administration ofvaccines
8. Outbreak investigations & disastermanagement
9. Biologicalwarfare

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USE OF LABORATORY ANIMALS & CARE

Various animals used in research, procedures involved, animal house, care of animals and animalethics

PRACTICALS(SKILLS)

In addition to the skills mentioned below in the various areas of clinical Microbiology:

1. In the practical skills every PG student will be exposed to at least one encounter of role modeling in which a consultant after raising a relevant query will search for its evidence and demonstrate evidence searching methodologies, its importance and utility to the student.
2. PGs shall acquire the skill to Search for the evidence for any advances in the field of Medical Microbiology, critically appraise it and implement it in the day-to-day working in the laboratory wherever possible.
3. PGs shall acquire the skill to keep abreast with the changing recent guidelines in various areas of Clinical Microbiology from time-to-time like CLSI guidelines, guidelines pertaining to biomedical waste disposal and other infectiousdiseases

BACTERIOLOGY

Must acquire:

4. Care and operation of Microscopes viz. Light, Dark ground, Phase contrast, Inverted, Fluorescentmicroscopes.
5. Preparation of stains viz. Gram's, Albert's, Ziehl- Neelsen and other special stains - performing of staining and interpretation of stainedsmears.
6. Washing and sterilization of glassware including plugging andpacking.
7. Operation of incubator, autoclave, hot air oven, inspissator, distillation plant, filters like Seitz and membrane, other laboratory instruments,and sterilitytests.
8. Care and maintenance of common laboratoryequipments.
9. Preparation and pouring of liquid and solid media - Nutrient agar, Blood agar, Mac-Conkey agar, sugars, TSI agar, Robertson's cooked meat, Lowenstein- Jensen's, selective mediaetc.
10. Preparation of reagents and theirprocurement.
11. Tests for beta-lactamases including ESBLs andMBL.
12. Collection of specimens for Microbiological investigations such as blood, urine, throat swab, rectal swab, stool,pus,
13. Surveillancespecimens.
14. Preparation, examination and interpretation of direct smears from clinical specimens, viz. Pus/urine for bacteria – Gram stain, Sputum for AFB – ZN &auramine O, slit smears for *M..leprae,*-ZN stain, conjunctival smear for Chlamydiae –Giemsa/Iodine.
15. Techniques of anaerobiosis – Gas-pak system, anaerobic jars-evacuation & filling with H_2,CO_2
16. Identification of bacteria of medical importance upto species level (except anaerobes – up to genericlevel)
17. Quantitative analysis of urine by pour plate method and semi quantitative analysis by standard loop test for significantbacteriuria

18. Plating of clinical specimens on media for isolation, purification, identification and quantitation.
19. Tests for motility: hanging drop, Craigie's tube, dark ground microscopy forSpirochaetes – Treponema&Leptospira.
20. In-vitro toxigenicity tests – Elek test, Nagler'sreaction
21. 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 to identification of bacteria up to species level
22. 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 Mycobacteriumtuberculosis
23. Skin tests like Mantoux, Leprominetc.
24. Testing of disinfectants- Phenol coefficient and 'in use'tests.
25. Quality control of media reagents etc. and validation of sterilizationprocedures.
26. Aseptic practices in laboratory and safetyprecautions.
27. Disposal of contaminated material likecultures.
28. Bacteriology of food, water, milk,air
29. Maintenance of stock cultures.

Desirable toacquire:

1. Care and breeding of laboratory animals viz. Mice, rats, guinea pigs andrabbits.
2. Techniques of withdrawal of blood from laboratory animals includingsheep.
3. Inoculation of infective material in animals by differentroutes.
4. Animal pathogenicity /toxigenicity tests for C.diphtheriae, Cl.tetani, S.pneumoniae, S.typhimurium, K.pneumoniae*etc.*
5. Performance of autopsy onanimals.
6. Isolation of plasmids and Conjugation experiments for transfer of drugresistance
7. Serum antibiotic assays eg.Gentamicin
8. Phage typing for Staphylococci, S.typhi*etc.*
9. Bacteriocin typing eg. Pyocin, Proteocinetc.
10. Enterotoxigenicity tests like rabbit ileal loop, intragastric inoculation of mouse, Sereny's test.
11. Mouse foot pad test forM.leprae

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IMMUNOLOGY/ SEROLOGY

Must acquire:

1. Collection of blood by venepuncture, separation of serum and preservation of serum for short and longperiods.
2. Preparation of antigens from bacteria or tissues for widal, Weil-Felix, VDRL, etc. and theirstandardization.
3. Preparation of adjuvants like Freund'sadjuvant.
4. Raising of antisera in laboratoryanimals.
5. Performance of serological tests viz. Widal, Brucella tube agglutination, indirect haemagglutination, VDRL, Paul-Bunnel, Rose-Waaler,IFA.
6. Immunodiffusion in gels, counter immunoelectrophoresis- visualization and interpretation ofbands.
7. Performance and interpretation of Enzyme linked immune sorbent assay & Westernblot.
8. Latex and staphylococcal co-agglutinationtests.

Desirable to acquire:

1. Leucocyte migration inhibitiontest.
2. T-cellrosetting.
3. FlowCytometry
4. Radialimmunodiffusion.
5. Immunoelectrophoresis.
6. Neutrophilphagocytosis.

MYCOLOGY

Mustacquire:

1. Collection of specimens formycology.
2. Direct examination of specimens by KOH, Gram, Kinyoun's, Giemsa, Lactophenol cotton bluestains.
3. Examination of histopathology slides for fungalinfections.
4. Isolation and identification of pathogenic yeasts and moulds and recognition of common laboratorycontaminants.
5. Special techniques like Wood's lamp examination, hair baiting, hair perforation, paraffin baiting and slideculture.
6. Maintenance of stockcultures.
7. Animal pathogenecity tests viz. Intracerebral and intraperitoneal inoculation of mice for Cryptococcus.

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PARASITOLOGY

Must acquire:

1. Examination of faeces for parasitic ova and cysts etc. by direct and concentration methods (salt floatation and formol ether methods) and complete examination for other cellularfeatures.
2. Egg counting techniques forhelminths.
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. forparasites.
5. Histopathology sections – examination and identification ofparasites.
6. Performance of stains – Leishman, Giemsa, Modified Acid Fast, Toluidine BlueO.
7. Identification of common arthropods and other vectors viz. Mosquito, sand fly, ticks, mite andCyclops.
8. Collection ofspecimens.
9. Preservation of parasites – mounting, fixing, stainingetc.
10. To prepare smear, stain with relevant stains. Examine smear. Report and interpret results. Serology of malariadiagnosis

Desirable to acquire:

1. In-vitro culture of parasites like Entamoeba, Leishmania,P.falciparum.
2. Maintainance of Toxoplasma gondii inmice.
3. Preparation of media – NIH, NNNetc.
4. Copro-culture for larva of hookworms.
5. Antigen preparation viz. Entamoeba , Filarial , Hydatid for serological tests like IHA and skin test like Casoni's.
6. Permanent staining techniques like ironhaematoxylin

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 ofviruses.
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 antiviralantibodies.
5. Chick embryo techniques- inoculation andharvesting.
6. Handling of mice, rats, guinea pigs, rabbits for collection of blood, pathogenicity test etc.

Desirable toacquire:

1. Preparation of Monkey Kidney Cells (Primary) maintenance of continuous cell lines by subcultures. Preservation of cellcultures.
2. Recognition of CPE in tissuecultures.
3. Performance of haemadsorption, haemagglutination, immunofluorescence and neutralization tests for identification ofviruses.

Exam Pattern for P.G. Courses
MD Microbiology
Degree Courses

Theory	4Papers	4×100Total	400 Marks
Practicals	3days	Total	600 Marks
		GrandTotal	1000 Marks

Theory 4 Papers – 100 marks each– 3 hourseach

Passing Standard – 50% in Theory in eachpaper.

50% in Practical

No Internal Marks

Dissertation:

At the end of six months from the commencement of MD Degree course, the student shall finally choose a topic for dissertation with the help of guide. A small pilot work may be carried out to see the feasibility of the proposed work. Due certificate must be obtained from Institutional Ethics Committee before commencing the study by submitting asynopsis.

A short presentation regarding the study may be done in front of the teaching staff of the department by the PG student for suggestions etc.

The work must be spread over a minimum period of six months to 1 year as the case may be. After compilation of data and writing the dissertation, the dissertation must be submitted to the university in four hard bound copies dully signed by guide, Head of the department and Dean; six months prior to the expected date of university examination for the candidate.

University shall separately appoint one/two external examiners (depending on the number of PG students) for examining dissertations. One copy of dissertation shall be sent by university to the examiner. The external examiner should confidentially return the copy and his/her report to the university within one month of receipt of the dissertation copy. The completion of this process with favourable report from the external examiner is one of the eligibility criteria for the PG student to appear in the university examination.

At the time of practical exam university shall make two copies of stamped dissertation available for the other examiners to go through.

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Scheme of Examination (MD Course)

Theory Examination: (400 Marks)

Paper number	Topics	Marks	Time
I	General Bacteriology, Immunology, Applied Microbiology	100	3 Hours
II	Systematic Bacteriology	100	3 Hours
III	Virology, Parasitology, Mycology	100	3 Hours
IV	Recent advances in Medical Microbiology	100	3 Hours

Note: The distribution of topics in each paper is arbitrary. There may be overlapping of relevant topics in question papers

Each Paper shall have 5 Questions, all questions compulsory & no options.

Question-1: Long Question (1 or 2 parts)	20 marks
Question-2: Long Question (1 or 2 parts)	20 marks
Question-3: Long Question (1 or 2 parts)	20 marks
Question-4: Notes— (1 or 2 parts)	20 marks (2*10 marks=20)
Question-5: Short notes – (4)	20 marks (4*5 marks=20)

Practical Examination: (450 Marks + 150 marks viva voce) = 600 marks
Duration: Three days

Exercise number	Description	Marks	Time	Assessment
1	Long case (Clinical History along with Bacterial mixture) – Isolate, identify the organisms & Report AST.	225	Total 3 days exercise	All Four examiners
2	a. Short case (Pure Bacterial culture identification) b. SerologyExercise c. Parasitology d. Virology e. Mycology f. Slidesidentification g. Lab animals / Egg inoculation h. Pedagogy(Optional)	50 50 25 20 25 25 25 05	1 day First or second day First or second day First or second day First or second day First or second day First or second day First or second day	All Four examiners
3	Viva voce	150	45 minutes On day three.	All Four examiners

Received CTC

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