REGULATIONS AND CURRICULUM

FOR

POSTGRADUATE DEGREE AND DIPLOMA COURSES

2010

MICROBIOLOGY

JSS UNIVERSITY

JSS MEDICAL INSTITUTIONS CAMPUS

SRI SHIVARATHREESHWARA NAGARA, MYSORE 570 015

KARNATAKA, INDIA

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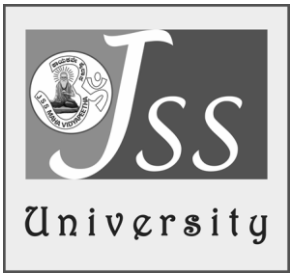

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Regulations & curriculum for Postgraduate Degree and Diploma Courses 2010

MICROBIOLOGY

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Postgraduate Medical Degree and Diploma Courses 2010

MICROBIOLOGY

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CHAPTER I

Regulations for Postgraduate Degree and Diploma Courses in Medical Sciences

1. Branch of Study

1.1 Postgraduate degree courses

Post Graduate Degree courses may be pursued in the following subjects:

a) MD (Doctor of Medicine)

i) Anaesthesiology
ii) Anatomy
iii) Biochemistry
iv) Community Medicine
v) Dermatology, Venereology and Leprosy
vi) Forensic Medicine
vii) General Medicine
viii) Microbiology
ix) Pathology
x) Paediatrics
xi) Pharmacology
xii) Physiology
xiii) Psychiatry

b) MS (Master of Surgery)

i) General Surgery
ii) Obstetrics and Gynaecology
iii) Ophthalmology
iv) Orthopedics
v) Oto-Rhino-Laryngology

1.2 Postgraduate Diploma Courses

Post Graduate Diploma Courses may be pursued in the following subjects:

a) Anesthaesiology (DA)
b) Child Health (DCH)
c) Clinical pathology (DCP)
d) Dermatology, Venerology and Leprosy (DDVL)
e) Obstetrics and Gynaecology (DGO)
f) Ophthalmology (DO)
g) Orthopaedics (D Ortho)
h) Oto-rhino-laryngology (DLO)
i) Psychiatry (DPM)

2. Eligibility for Admission

MD / MS Degree and Diploma courses : A candidate affiliated to this University and who has passed final year MBBS examination after pursuing a study in a medical college recognized by the Medical Council of India, or from a recognized medical college affiliated to any other university recognized as equivalent thereto and has completed one year compulsory rotating internship in a teaching institution or other institution recognized by the Medical Council of India, and has obtained permanent registration of any State Medical Council, shall be eligible for admission.

3. Obtaining Eligibility Certificate by the University before making admission

No candidate shall be admitted for any Postgraduate Degree/Diploma courses unless the candidate has obtained and produced the eligibility certificate issued by the University. The candidate has to make an application to the University with the following documents along with the prescribed fee:

a) MBBS pass/degree certificate issued by the university.
b) Mark cards of all the university examinations passed before MBBS course.
c) Attempt certificate issued by the Principal.
d) Certificate regarding the recognition of the medical college by the Medical Council of India
e) Completion of internship certificate.
f) In case internship was done in a non- teaching hospital, a certificate from the Medical Council of India that the hospital has been recognized for internship.
g) Registration by any state Medical Council.
h) Proof of ST/SC or Category I, as the case may be.

Candidates should obtain the eligibility certificate before the last date for admission as notified by the university.

A candidate who has been admitted to postgraduate course should register his / her name in the university within a month of admission after paying the registration fee.

4. Intake of students

The intake of students to each course shall be in accordance with the MCI and GOI permissions in this regard.

5. Course of study

5.1 Duration

a) **MD, MS Degree Courses:** The course of study shall be for a period of 3 years consisting of 6 terms.
b) **Diploma courses:** The course of study shall be for a period of 2 years consisting of 4 terms.

6. Method of training

The training of postgraduate for degree/diploma shall be residency pattern, with graded responsibilities in the management and treatment of patients entrusted to his/her care. The participation of the students in all facets of educational process is essential. Every candidate should take part in seminars, group discussions, grand rounds, case demonstration, clinics, journal review meetings, CPC and clinical meetings. Every candidate should be required to participate in the teaching and training programme of undergraduate students. Training should include involvement in laboratory and experimental work, and research studies. Basic medical sciences students should be posted to allied and relevant clinical departments or institutions. Similarly, clinical subjects' students should be posted to basic medical sciences and allied specialty departments or institutions.

7. Attendance, Progress and Conduct

7.1 A candidate pursuing degree/diploma course, should work in the concerned department of the institution for the full period as full time student. No candidate is permitted to run a clinic/laboratory/nursing home while studying postgraduate course, nor can he/she work in a nursing home or other hospitals/clinic/laboratory while studying postgraduate course.

7.2 Each year shall be taken as a unit for the purpose of calculating attendance.

7.3 Every student shall attend symposia, seminars, conferences, journal review meetings, grand rounds, CPC, case presentation, clinics and lectures during each year as prescribed by the department and not absent himself / herself from work without valid reasons.

7.4 Every candidate is required to attend a minimum of 80% of the training during each academic year of the post graduate course. Provided, further, leave of any kind shall not be counted as part of academic term without prejudice to minimum 80% attendance of training period every year.

7.5 Any student who fails to complete the course in the manner stated above shall not be permitted to appear for the University Examinations.

8. Monitoring Progress of Studies:

8.1 **Work diary / Log Book:** Every candidate shall maintain a work diary and record his/her participation in the training programmes conducted by the department such as journal reviews, seminars, etc. Special mention may be made of the presentations by the

candidate as well as details of clinical or laboratory procedures, if any, conducted by the candidate. The work diary shall be scrutinised and certified by the Head of the Department and Head of the Institution, and presented in the University practical/clinical examination.

8.2 **Periodic tests:** In case of degree courses of three years duration (MD/MS, DM, M Ch.), the concerned departments may conduct three tests, two of them be annual tests, one at the end of first year and the other at the end of the second year. The third test may be held three months before the final examination. The tests may include written papers, practical / clinical and viva voce. Records and marks obtained in such tests will be maintained by the Head of the Department and sent to the University, when called for.

8.3 In case of diploma courses of two years duration, the concerned departments may conduct two tests, one of them at the end of first year and the other in the second year, three months before the final examination. The tests may include written papers, practical / clinical and viva voce.

8.4 **Records:** Records and marks obtained in tests will be maintained by the Head of the Department and will be made available to the University or MCI.

9. Dissertation

9.1 Every candidate pursuing MD/MS degree course is required to carry out work on a selected research project under the guidance of a recognised post graduate teacher. The results of such a work shall be submitted in the form of a dissertation.

9.2 The dissertation is aimed to train a post graduate student in research methods and techniques. It includes identification of a problem, formulation of a hypothesis, search and review of literature, getting acquainted with recent advances, designing of a research study, collection of data, critical analysis, and comparison of results and drawing conclusions.

9.3 Every candidate shall submit to the Director (Academic) of the University in the prescribed proforma, a synopsis containing particulars of proposed dissertation work within six months from the date of commencement of the course, on or before the dates notified by the University. The synopsis shall be sent through proper channel.

9.4 Such synopsis will be reviewed and the dissertation topic will be registered by the University. No change in the dissertation topic or guide shall be made without prior approval of the University.

9.5 The dissertation should be written under the following headings

a) Introduction
b) Aims or Objectives of study
c) Review of Literature
d) Material and Methods
e) Results
f) Discussion
g) Conclusion
h) Summary
i) References
j) Tables
k) Annexure

9.6 The written text of dissertation shall be not less than *50* pages and shall not exceed 150 pages excluding references, tables, questionnaires and other annexure. It should be neatly typed in double line spacing on one side of paper (A4 size, 8.27" x 11.69") and bound properly. Spiral binding should be avoided. The dissertation shall be certified by the guide, head of the department and head of the Institution.

9.7 Four copies of dissertation thus prepared shall be submitted to the Registrar (Evaluation), six months before final examination, on or before the dates notified by the University.

9.8 The dissertation shall be valued by examiners appointed by the University. Approval of dissertation work is an essential precondition for a candidate to appear in the University examination.

9.9 Guide: The academic qualification and teaching experience required for recognition by this University as a guide for dissertation work is as per Medical Council of India, Minimum Qualifications for Teachers in Medical Institutions Regulations, 1998. Teachers in a medical college/institution having a total of eight years teaching experience out of which at least five years teaching experience as Lecturer or Assistant Professor gained after obtaining post graduate degree shall be recognised as post graduate teachers.

9.10 Co Guide: A Co-guide may be included provided the work requires substantial contribution from a sister department or from another medical institution recognised for teaching/training by JSS University / Medical Council of India. The co-guide shall be a recognised post graduate teacher of JSS University.

9.11 Change of guide: In the event of a registered guide leaving the college for any reason or in the event of death of guide, guide may be changed with prior permission from the university.

10. Schedule of Examination

The examination for MD / MS courses shall be held at the end of three academic years (six academic terms). The examination for DM and M Ch courses shall be held at the end of three years. The examination for the diploma courses shall be held at the end of two academic years (four academic terms). For students who have already passed Post Graduate Diploma and appearing for MD examination, the examination shall be conducted after two academic years (four academic terms, including submission of dissertation) The University shall conduct two examinations in a year at an interval of four to six months between the two examination. Not more than two examinations shall be conducted in an academic year.

11. Scheme of Examination

11.1 MD / MS Degree

MD / MS Degree examinations in any subject shall consist of dissertation, written paper (Theory), Practical/Clinical and Viva voce.

11.1.1 **Dissertation:** Every candidate shall carryout work and submit a dissertation as indicated in Sl NO 9. Acceptance of dissertation shall be a precondition for the candidate to appear for the final examination.

11.1.2 **Written Examination (Theory):** A written examination shall consist of four question papers, each of three hours duration. Each paper shall carry 100 marks. Out of the four papers, the 1st paper in clinical subjects will be on applied aspects of basic medical sciences. Recent advances may be asked in any or all the papers. In basic medical subjects and para-clinical subjects, questions on applied clinical aspects should also be asked.

11.1.3 **Practical / Clinical Examination:** In case of practical examination, it should be aimed at assessing competence and skills of techniques and procedures as well as testing student's ability to make relevant and valid observations, interpretations and inference of laboratory or experimental work relating to his/her subject.

In case of clinical examination, it should aim at examining clinical skills and competence of candidates for undertaking independent work as a specialist. Each candidate should examine at least one long case and two short cases.

The total marks for Practical / clinical examination shall be 200.

11.1.4 **Viva Voce.** Viva Voce Examination shall aim at assessing depth of knowledge, logical reasoning, confidence and oral communication skills. The total marks shall be 100 and the distribution of marks shall be as under:

i) For examination of all components of syllabus 80 Marks
ii) For Pedagogy 20 Marks

If there is skills evaluation, 10 marks shall be reserved for Pedagogy and 10 marks for skill evaluation.

11.1.5 **Examiners.** There shall be at least four examiners in each subject. Out of them, two shall be external examiners and two shall be internal examiners. The qualification and teaching experience for appointment as an examiner shall be as laid down by the Medical Council of India.

11.1.6 **Criteria for declaring as pass in University Examination*.** A candidate shall secure not less than 50% marks in each head of passing which shall include (1) Theory, (2) Practical including clinical and viva-voce examination.

A candidate securing less than 50% of marks as described above shall be declared to have failed in the examination. Failed candidate may appear in any subsequent examination upon payment of fresh fee to the Registrar (Evaluation).

11.1.7 **Declaration of class:** A successful candidate passing the University examination in first attempt and secures grand total aggregate 75% of marks or more will be declared to have passed the examination with distinction, 65% but below 75% declared as First Class and 50% but below 65% declared as Second Class.

A candidate passing the University examination in more than one attempt shall be declared as Pass Class irrespective of the percentage of marks.

11.2 DM/M Ch

The examination shall consist of theory, clinical/practical and viva voce examination.

11.2.1 **Theory (Written Examination):** The theory examination shall consist of four question papers, each of three hours duration. Each paper shall carry 100 marks. Out of the four papers, the first paper will be on basic medical sciences. Recent advances may be asked in IV Paper.

11.2.2 **Practical / Clinical Examination:** In case of practical examination it should be aimed at assessing competence, skills of techniques and procedures as well as testing student's ability to make relevant and valid observations, interpretations and experimental work relevant to his / her subject.

In case of clinical examination it should aim at examining clinical skills and competence of candidates for undertaking independent work as a specialist. Each candidate should examine at least one long case and two short cases.

The maximum marks for Practical / Clinical shall be 200.

11.2.3 **Viva-Voce:** Viva Voce examination shall aim at assessing thoroughly, depth of knowledge, logical reasoning, confidence and oral communication skills. The maximum marks shall be 100.This also includes spotters like instruments, anaesthesia machines, drugs, ECG, X – ray.

11.2.4 **Examiners:** There shall be at least four examiners in each subject. Out of them, two shall be external examiners and two shall be internal examiners. The qualification and teaching experience for appointment as an examiner shall be as laid down by the Medical Council of India.

11.2.5 **Criteria for declaring as pass in University Examination*:** A candidate shall secure not less than 50% marks in each head of passing which shall include (1) Theory (2) Practical including clinical and viva voce examination.

A candidate securing less than 50% of marks as described above shall be declared to have failed in the examination. Failed candidate may appear in any subsequent examination upon payment of fresh fee to the Registrar (Evaluation).

11.3 Diploma Examination:

Diploma examination in any subject shall consist of theory (written papers), Practical / Clinical and Viva - Voce.

11.3.1 **Theory:** There shall be three written question papers each carrying 100 marks. Each paper will be of three hours duration. In clinical subjects one paper out of this shall be on basic medical sciences. In basic medical subjects and Para- clinical subjects, questions on applied clinical aspects should also be asked.

11.3.2 **Practical Clinical Examination:** In case of practical examination it should be aimed at assessing competence, skills related to laboratory procedures as well as testing students ability to make relevant and valid observations, interpretation of laboratory or experimental work relevant to his/her subject.

In case of clinical examination, it should aim at examining

clinical skills and competence of candidates for undertaking independent work as a specialist. Each candidate should examine at least one long case and two short cases.

The maximum marks for Practical / Clinical shall be 150.

11.3.3 **Viva Voce Examination.** Viva Voce examination should aim at assessing depth of knowledge, logical reasoning, confidence and oral communication skills. The total marks shall be 50. This also includes spotters like instruments, anesthesia machines, drugs, ECG, X-ray.

11.3.4 Criteria for declaring as pass in University Examination* A candidate shall secure not less than 50% marks in each head of passing which shall include (1) Theory, (2) Practical including clinical and viva voce examination.

A candidate securing less than 50% of marks as described above shall be declared to have failed in the examination. Failed candidate may appear in any subsequent examination upon payment of fresh fee to the Registrar (Evaluation).

11.3.5 **11.3.5 Declaration of distinction**. A successful candidate passing the University examination in first attempt will be declared to have passed the examination with distinction, if the grand total aggregate marks is 75 percent and above. Distinction will not be awarded for candidates passing the examination in more than one attempt.

11.3.6 **Examiners.** There shall be at least four examiners in each subject. Out of them, two shall be external examiners and two shall be internal examiners. The qualification and teaching experience for appointment as an examiner shall be as laid down by the Medical Council of India.

12. Number of Candidates per day

The maximum number of candidates for practical / clinical and viva-voce examination shall be as under:

MD /MS Course: Maximum of 6 per day.

Diploma Course: Maximum of 8 per day.

CHAPTER II

GOALS AND GENERAL OBJECTIVES OF POSTGRADUATE MEDICAL EDUCATION PROGRAM

GOAL

The goal of postgraduate medical education shall be to produce competent specialists and/or medical teachers:

1. Who 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.
2. Who shall have mastered most of the competencies, pertaining to the speciality, that are required to be practiced at the secondary and the tertiary levels of the health care delivery system.
3. Who shall be aware of the contemporary advance and developments in the discipline concerned.
4. Who shall have acquired a spirit of scientific inquiry and is oriented to the principles of research methodology and epidemiology and
5. Who shall have acquired the basic skills in teaching of the medical and paramedical professionals.

GENERAL OBJECTIVES

At the end of the postgraduate training in the discipline concerned the student shall be able to:

1. Recognize the importance to the concerned speciality in the context of the health needs of the community and the national priorities in the health section.
2. Practice the speciality concerned ethically and in step with the principles of primary health care.
3. Demonstrate sufficient understanding of the basic sciences relevant to the concerned speciality.
4. Identify social, economic, environmental, biological and emotional determinants of health in a given case, and take them into account while planning therapeutic, rehabilitative, preventive and primitive measure/strategies.
5. Diagnose and manage majority of the conditions in the speciality concerned on the basis of clinical assessment, and appropriately selected and conducted investigations.

6. Plan and advice measures for the prevention and rehabilitation of patients suffering from disease and disability related to the speciality.
7. Demonstrate skills in documentation of individual case details as well as morbidity and mortality rate relevant to the assigned situation.
8. Demonstrate empathy and humane approach towards patients and their families and exhibit interpersonal behaviour in accordance with the societal norms and expectations.
9. Play the assigned role in the implementation of national health programme, effectively and responsibly.
10. Organize and supervise the chosen/assigned health care services demonstrating adequate managerial skills in the clinic/hospital or the field situation.
11. Develop skills as a self-directed learner, recognize continuing education needs; select and use appropriate learning resources.
12. Demonstrate competence in basic concepts of research methodology and epidemiology, and be able to critically analyze relevant published research literature.
13. Develop skills in using educational methods and techniques as applicable to the teaching of medical/nursing students, general physicians and paramedical health workers.
14. Function as an effective leader of a health team engaged in health care, research or training.

STATEMENT OF THE COMPETENCIES: Keeping in view the general objectives of postgraduate training, each discipline shall aim at development of specific competencies which shall be defined and spelt out in clear terms. Each department shall produce a statement and bring it to the notice of the trainees in the beginning of the programme so that he or she can direct the efforts towards the attainment of these competencies.

COMPONENTS OF THE POSTGRADUATE CURRICULUM:

The major components of the Postgraduate curriculum shall be:

- Theoretical knowledge
- Practical and clinical skills
- Thesis skills.
- Attitudes including communication skills.
- Training in research methodology.

(Source: Medical Council of India, Regulations on Postgraduate Medical Education, 2000)

CHAPTER – III

PG COURSES IN MICROBIOLOGY

M D MICROBIOLOGY

GOALS

The main goal of this course is to train students of medicine in the field of medical microbiology. Theoretical and practical training is given in the subspecialties viz bacteriology, virology, parasitology, immunology and mycology, so that they can participate in good patient care and prevention of infectious diseases in the community. They are introduced to basic research methodology, so that they can conduct fundamental and applied research. They are also trained in teaching methods which may enable them to take up teaching assignment in medical colleges/institutions.

OBJECTIVES

At the end of the course the students will be able to:

1. Establish a good "clinical laboratory medicine" in hospitals and community in the field of bacteriology, virology, parasitology, immunology and mycology.
2. Undertake teaching assignment of clinical microbiology for the students of medicine, nursing and dentistry.
3. Undergo special training in any of the above sub-specialties.
4. Carry out applied and fundamental research in various branches of medicine involving diagnostic microbiological work.

COURSE CONTENT

General Microbiology

1. History and pioneers in microbiology.
2. Microscopy.
3. Morphology of bacteria and other microorganisms.
4. Nomenclature and classification of microbes.
5. Growth and nutrition of bacteria.
6. Bacterial metabolism.
7. Sterilisation, disinfection and applied aspects in health care industry.
8. Bacterial cultivation, study of different culture media and methods.
9. Phenotypic identification of bacteria.
10. Anti microbial susceptibility, resistance and detection of different resistance mechanisms.
11. Bacterial genetics, genotypic identification, molecular methods of identifying bacteria and their clinical importance.
12. Bacterial ecology-normal flora of human body.

13. Bacteriology of hospital environment, air, water and milk.
14. Host parasite relationship.
15. Organization of clinical microbiology laboratory and quality control / quality assurance.
16. Hospital waste management: Organization for health care waste management (biomedical waste), techniques for treatment and disposal of biomedical waste and regulations on biomedical waste management, 1998.
17. Accreditation procedures.

Immunology

1. Anatomy of the human immune system.
2. Infection, infectious agents, infectious diseases, nosocomial infections and control of infection diseases.
3. Immunity and methods of immunity including vaccination.
4. Antigens – characters, types, processing and detection.
5. Immunoglobulins.
6. Immune response-theories of antibody formation and mechanisms of CMI.
7. Complement.
8. Antigen-antibody reactions.
9. Hypersensitivity.
10. Immunodeficiency.
11. Auto-immunity.
12. Immune tolerance.
13. Immunology of transplantation.
14. Tumour immunology.
15. Prophylaxis and immunotherapy.
16. Measurement of immunity.
17. Immunogenetics.

Systematic Bacteriology

1. Isolation, description and identification of bacteria.
2. Gram positive cocci: Staphylococcus, micrococcus, streptococcus and anaerobic gram positive cocci.
3. Neisseria, branhamella & moraxella.
4. Corynebacterium and other coryniform organisms.
5. Mycobacteria: M tuberculosis, atypical mycobacteria and M leprae.
6. Bacillus: the spore bearing bacilli.
7. Clostridium: The spore bearing anaerobic bacilli.
8. Enterobacteriaceae.
9. Vibrios, aeromonas, plesiomonas, campylobacter and spirillum.
10. Haemophilus and bordetella.
11. Pasteurella and francisella.

12. Brucella.
13. Actinomyces, nocardia, and actinobacillus.
14. Pseudomonas.
15. Spirochaetes.
16. Chlamydiae.
17. Rickettsiae.
18. Non sporing anerobic bacteria -bacteriodes, fusobacterium, leptotricha and lactobacillus.
19. Mycoplasmatales: Mycoplsama, ureaplasma, acholeplasma.
20. Erysipelothrix and listeria.
21. Chromobacteruium, flavobacterium, acinetobacter and alkaligens.
22. Miscellaneous bacteria.

Virology

1. The nature of viruses.
2. Classification of viruses.
3. Morphology, virus structure.
4. Viral replication.
5. The genetics of viruses.
6. Pathogenicity of viruses.
7. Epidemiology of viral infections.
8. Laboratary diagnosis of viral infections.
9. Vaccines and anti viral drugs.
10. Bacteriophages.
11. DNA viruses: Pox viruses, herpes viruses, adeno virus, papova viruses, parvo viruses and hepdna viruses.
12. RNA viruses: Myxo viruses, picorna viruses, rhabdo viruses, toga viruses, flavi viruses, bunya viruses, retro viruses, hepatitis viruses, slow viruses, oncogenic viruses, teratogenic viruses.
13. Clinical virology
    a. Viruses affecting CNS.
    b. Viruses affecting the eyes.
    c. Viruses affecting the respiratory tract.
    d. Viruses causing skin lesions and fever.
    e. Viruses causing gastroenteritis.
    f. Viruses transmitted sexually.
    g. Viruses transmitted congenitally.
    h. Viruses causing haemorrhagic fevers.
    i. Vector borne viral diseases.

Parasitology

1. General characters of parasites, hosts, sources of parasitic diseases, route of entry etc.

2. Protozoan parasites of medical importance: entamoeba, giardia, trichomonas, leishmania, trypanosoma, plasmodium, toxoplasma, sarcocystis, cryptosporidium, babesia, balantidium etc.
3. Helminthology: All those medically important helminths belonging to cestodes, trematode and nematode.
4. Cestode: Diphyllobothrium, taenia, echinococus, hymeonolepis, dipylidium, multiceps, etc.
5. Termatode: Schistosoma, fasciola, gastrodiscoides, paragonimus, clonorchis, opisthorchis, etc.
6. Nematodes: Trichuria, trichinella, strongyloides, ancylostoma, ascaris, enterobius, filarial worms, dracunculus, etc.
7. Ectoparasites: Common arthropods and other vectors.
8. Lab diagnostic procedures in parasitology.

Mycology

1. The morphology and reproduction in fungi and anti-mycotic agents,
2. Classification of fungi.
3. Contaminant and opportunistic fung.
4. Superficial mycotic infections.
5. Fungi causing subcutaneous mycoses.
6. Fungi causing systemic infections.
7. Lab diagnosis of fungal infections, antifungal susceptibility testing.

Microbiology Applied To Tropical Medicine & Pathology

1. Epidemiology of infectious diseases.
2. Hospital acquired infections.
3. Infections of various organs and systems of human body.
4. Molecular genetics as applicable to microbiology.
5. Vaccinology: Principle, methods of preparation, administration of vaccines.
6. Bioterrorism.
7. Emerging and re-emerging microbial infections.
8. Biomedical waste management.
9. Investigations of any communicable / infectious disease outbreak.
10. Microorganisms with reference to different anatomical systems:
    a. CNS microbial infections.
    b. Microbial infection of eye.
    c. Microbial infection of respiratory tract.
    d. Microbial infection of GIT.
    e. Microbial infection of skin.
    f. Microbial infection of blood.
    g. Microbial infection of reproductive tract.
    h. Microbes transmitted in utero.

SKILLS

Bacteriology

1. Cleaning, washing, sterilization methods of all containers used in bacteriology (new and used).
2. Ingredients, preparation, dispensing and pouring of media: Nutrient agar, blood agar, Mac Conkey agar, sugars, triple sugar iron agar (TSI) etc.
3. Preparation of different staining solutions.
4. Preparation of all reagents required for biochemical reactions.
5. Operation and maintenance of autoclave, hot air oven, distillation plant, filters like Seitz and membrane and sterility tests.
6. Washing and sterilisation of glassware.
7. Preparation of reagents: Oxidase, kovac etc.
8. Disposal of contaminated materials.
9. Testing of disinfectants: Phenol coefficient and in use test.
10. Quality control of media, reagents etc.
11. Aseptic practice in lab and safety precautions.
12. Care and maintenance of common laboratory equipments.
13. Preparation of antibiotic discs, performance of Kirby Bauer, Stokes etc, estimation of minimal inhibitory / bactericidal concentrations by tube/plate dilution methods.
14. Tests for a beta lactamases and other enzymes.
15. Collection and transportation of specimens for microbiological investigations to the lab.
16. Techniques of anaerobiosis.
17. Identification of bacteria of medical importance upto species level (except anaerobes which could be upto generic level).
18. Preparation of stains viz, Grams, Alberts, Capsules, spores, Ziehl Neelsen etc and performing staining procedure, identification and interpretation.
19. Care and operation of microscopes viz light, dark ground, phase contrast and fluorescent microscopes, electron microscopy.
20. Care and breeding of lab animals viz mice, rats, guinea pigs rabbits, and also experiments on various laboratory animals.
21. Skin tests Mantoux, lepromin, Casoni's etc.
22. Conjugation experiments.
23. Serum antibiotic assay.
24. Phage typing of bacteria.
25. Enterotoxigenecity.
26. Sero grouping of streptococci.
27. Antibiotic susceptibility test for Mycobacteria.

Immunology

1. Collection and preservation of serum.
2. Preparation of antigens.
3. Preparation of adjuvants and rising of antisera in animals.
4. Performance of common serological tests.
5. Immunodiffusion and CIEP.
6. ELISA.
7. Radial immuno diffusion.
8. Immuno electrophoresis.
9. CD4, CD8 counts.

Mycology

1. Collection and processing of clinical specimen for fungi.
2. Special techniques like Woods lamp examination, hair baiting techniques, slide cultures.
3. Stock culture maintainance.
4. Animal pathogenicity test for Cryptococcus and Candida

Parasitology

1. Examination of faeces for ova and cysts: Direct and Concentration methods.
2. Egg counting techniques.
3. Examination of pheripheral blood, urine, CSF, and other fluids for parasites.
4. Examination and identification of histopathology slides for parasitic infection.
5. Serological tests for parasitic diseases.
6. Preservation of parasites.
7. Examination of faeces for ova, cysts and larvae.
8. Permanent staining techniques for parasites.
9. In-vitro culture for parasites, viz malarial parasites and amoeba.
10. Maintenance of toxoplasma.
11. Fecal culture for diagnosis of nematode larvae.

Virology

1. Preparation and identification of CPE in various tissue cultures.
2. Serological tests for viral infections.
3. Chick embryo techniques.
4. Handling of experimental animals and collection of various samples for evidence of viral infection in animals.
5. Laboratory diagnosis of HIV infection and AIDS.
6. Laboratory diagnosis of hepatitis.
7. Prevention and laboratory safety measures.

METHODS OF TRAINING

Each candidate is posted to different sections on rotation. They should get acquainted with the basic microbiology for first three months. The next three months they are expected to submit a synopsis on dissertation topic that has been chosen by them.

Duration of degree course: 3 Years (6 terms)

The training is given under the following headings:

1. **Seminars** shall be conducted once a week on the theory question topic
2. **Culture seminars & serological tests**. Culture seminars and discussions are held once a week, which helps in systematic way of identification of all the routine bacteria for first few months followed by identification of rare cultures.
3. **Clinical sample seminars** are held once a month by processing the clinical samples in identification of the microbe causing that condition.
4. **Animal experiments, egg inoculation** are conducted periodically.
5. **Journal clubs** are conducted every week-choosing topics from recent journals.
6. **Symposia** are conducted once in every semester.
7. **Teaching** of undergraduate students.
8. **Slide seminars.**
9. **Dissertation**: Preparation of dissertation under the guidance of a recognised teacher.
10. **Postings** to other institutions.
11. **Guest lectures.**
12. **Clinical meetings:** The candidates are encouraged to take part in clinical meetings and discussions.

The MD postgraduate students are trained to conduct practical demonstration classes for undergraduates in their 2nd year of study. They are expected to take theory lectures for undergraduates during their final year.

Schedule of training:

I term	Each student shall undergo orientation in various sections in microbiology during the first 3 months so as to get familiarised with the basic knowledge in the subject. At the end of the next 3 months, the student shall have to submit the synopsis of the dissertation.
II term	Culture seminars - pure culture of all bacilli and animal experiments
III term	Culture seminars on clinical samples like stool, pus etc and serological tests-methodology.

IV term Training in mycology, parasitology, UG teaching — theory for smaller batches and practicals and demonstrations.

V term Virology experiments.

UG teaching - theory and practicals for smaller batches. submission of dissertation.

VI term Slide seminars, mock examinations.

Posting In Other Departments

Students will be posted for allied and applied departments during the period of III, IV and V terms, total period not exceeding 3 months. The departments are:

1. Virology & Vaccinology etc. - 1 month
2. Clinical Pathology - 1 month
3. Clinical Biochemistry - 1 month

The candidates are posted to different institutions for applied microbiology like virology, vaccinology etc.

The students shall maintain a log book for the period of his/her postings to other departments / institutions and get the certificate from the Departmental Head at the end of postings.

MONITORING LEARNING PROGRESS Please see Chapter IV

1. The Progress of the student is monitored by conducting periodical assessment tests
2. The Student shall maintain a log book and assessment records (specimen Check lists are given in Chapter IV) are maintained by the Guide/s and Head of the Department.

DISSERTATION

1. The topic selected for dissertation shall be on the applied aspects of microbiology
2. The synopsis should be submitted at the end of the first six months of the course, as notified by the University.
3. For details, please see sl no 9, chapter - 1.
4. The dissertation shall be submitted to the Registrar (Evaluation),six months prior to final University examination or on the date notified by the University.
5. Acceptance of dissertation is an essential precondition for appearing in the final.

SCHEME OF EXAMINATION

Theory consists of four papers each of 100 marks	400 Marks
Practical conducted for 3 days	200 Marks
Viva-voce	100 Marks

A. THEORY

There shall be four question papers, each of three hours duration. Each paper shall consist of two long essay questions, each question carrying 20 marks and 6 short essay questions each carrying 10 marks. Total marks for each paper will be 100. Questions on recent advances may be asked in any or all the papers*.

Details of distribution of topics for each paper will be as follows:

PAPER I	General microbiology and immunology
PAPER II	Systematic bacteriology
PAPER III	Mycology and virology
PAPER 1V	Parasitology

* The topics assigned to the different papers are generally evaluated under those sections. However a strict division of the subject may not be possible and some overlapping of topics is inevitable. Students should be prepared to answer overlapping topics.

B. PRACTICAL

Duration of examination: 3 days (as per the scheme enclosed) Marks: 200

The examination will consists of the following exercises conjointly conducted and evaluated by four examiners (2 internals and 2 externals)

1. Exercise in clinical bacteriology.
2. Isolation and identification of bacteria from various clinical samples.
3. Exercise in bacteriological techniques.
4. Isolation and identification of bacteria from a pure culture.
5. Identification of various fungi, and slide culture.
6. Exercise in virological techniques.
7. Exercise in parasitology.
8. Histopathology: Identification of slides.
9. Serology exercise in bacteriology and virology.
10. Applied bacteriological techniques: Staining or serology exercise.
11. Immunology exercise.

C. VIVA-VOCE Marks: 100

The Viva voce examination consists of question on bacteriology, mycology, virology, immunology, and parasitology topics. It will also include recent advances, history and scope of microbiology.

1. Viva-voce examination: (80 Marks)
   Students will be examined by all the examiners together about comprehension, analytical approach, expression and interpretation of data. Student shall also be given case reports, charts for interpretation. It includes discussion on dissertation.

2. Pedagogy Exercise: (20 Marks)

A topic shall be given to each candidate along with the practical examination question paper on the first day. Student is asked to make a presentation on the topic on the second day for 8-10 minutes.

Maximum marks for	Theory	Practical	Viva-voce	Total
MD Microbiology	400	200	100	700

RECOMMENDED BOOKS:

1. Samuel Baron, Medical Microbiology, Yd Edn, 1991, Churchill Livingstone Inc.
2. Edmin H Lennette, Laboratory Diagnosis of Viral Infections, 2nd Edn, 1992, Newyork Marcel Dekker, Inc.
3. Gordon Cook, Manson's Tropical Diseases, 20"' Edn, 1996, London, ELBS.
4. John G Holt et al, Bergey;s Manual of Determinative Bacteriology, 9th Edn, 1994, Maryland, Williams & Wilkins.
5. Albert Balows, Manual of Clinical Microbiology, 5th Edn, 1991, Washington D.C, American Society for Microbiology.
6. Ellen Jo Baron et al; Bailey & Scott's Diagnostic Microbiology, 9th Edn, 1994, Missouri, Mosby
7. Douglas D Richman, Clinical Virology, 1997, Newyork, Churchill Livingstone.
8. Bob A Freeman, Burrows Textbook of Microbiology, 2151 Edn, 1979, W.B Saunders.
9. Brian I Duerden & B S Drasar, Anaerobes in Human Disease, 1991, Great Britain, Edward Arnold,
10. 10. Elmer W Koneman et al, Introduction to Diagnostic Microbiology, 1994, Philadelphia, J B Lippincott Company.
11. 11. Bernard N Fields et al, Field Virology, Vol.11 3rd End, 1996, Philiadelphia, Lippincott-Ramen.
12. 12. Bernard Fields et al, Field's Virology, Volume 2, 3' edn, 1996, Philadelphia, Lippincott - Raven.
13. Danial Greenwood et al, Medical Microbiology, A guide to Microbial Infections, Pathogenesis, Immunity, Laboratory Diagnosis and Control, 15' Edn, 1997, London, Churchill Livingstone.
14. J G College et al, Mackie & McCartney Practical Medical Microbiology, 14th Edn, 1996, London, Churchill Livingstone.
15. John V Bennett & Philip S Brachman, Hospital Infections, 3Fd Edn, 1992, Little Brown.
16. Noel R Rose et al, Manual of Clinical Laboratory Immunology, 4th edn, 1992, Washington D.C, American Society for Microbiology.
17. William E Paul; Fundamental Immunology, 3' Edn, 1993, Newyork, Raven Press.
18. Ivan Roitt, Essential Immunology
19. Stites, Clinical Basic Immunology
20. Parasitology: Paul Chester Beaver, Rodney Clifton Jung, Eddie Wayne cipp. Clinical parasitology : 1984, Philadelphia Lea and Febiger.

JOURNALS:

1. Journal of Medical Microbiology, Lippincott-Raven Publishers, Pathological Society of Great Britain & Ireland, 1998.
2. Clinical Infectious Diseases. Pub: The University of Chicago Press, Chicago, Illinois 60637, 1998.
3. Clinical Microbiology Reviews. Pub: The American Society for Microbiology.
4. Microbiology & Molecular Biology Reviews (mmbr). Pub: American Society for Microbiology, 1999.

5. Journal of Clinical Microbiology (JCM); Pub: American Society for Microbiology, 1999.
6. The Journal of Infectious Diseases. Pub: The University of Chicago Press, 1998.
7. Journal of Communicable Diseases, Pub: The Indian Society for Malaria and other communicable disease. 1999.
8. Infectious Disease Clinics of North America. Pub: W B Saunde Company, A Division of Harcourt Brace & Company, 1999.
9. Indian Journal of Medical Microbiology, Pub: Indian Associates of Medical Microbiologists, 1999.
10. The Indian Journal of Medical Research. Pub: Indian Council of Medical Research, New Delhi. 1999.
11. Annual Review of Microbiology. Pub: Annual Reviews Inc. Palo Alto. California, USA. 1997.

ADDITIONAL READING:

1. Compendium of recommendations of various committees on Health and Development (1943-1975). DGHS, 1985 Central Bureau of Health Intelligence, Directorate General of Health Services, min. of Health and Family Welfare, Govt. of India, Nirman Bhawan, New Delhi. P - 335.
2. National Health Policy, Min. of Health & Family Welfare, Nirman Bhawan, New Delhi, 1983
3. Santosh Kumar, The elements of Research, writing and editing 1994, Dept. of Urology, JIPMER, Pondicherry
4. Srinivasa D K etal, Medical Education Principles and Practice, 1995. National Teacher Training Centre, JIPMER, Pondicherry
5. Indian Council of Medical Research, "Policy Statement of Ethical considerations involved in Research on Human Subjects", 1982, I.C.M.R, New Delhi.
6. Code of Medical Ethics framed under section 33 of the Indian Medical Council Act, 1956. Medical Council of India, Kotla Road, New Delhi.
7. Francis C M, Medical Ethics, J P Publications, Bangalore, II edn., 2004.
8. Indian National Science Academy, Guidelines for care and use of animals in Scientific Research, New Delhi, 1994.
9. International Committee of Medical Journal Editors, Uniform requirements for manuscripts submitted to biomedical journals, N Engl J Med 1991; 424-8
10. Kirkwood B R, Essentials of Medical Statistics, 151 Ed., Oxford: Blackwell Scientific Publications 1988.
11. Mahajan B K, Methods in Bio statistics for medical students, 5th Ed. New Delhi, Jaypee Brothers Medical Publishers, 1989.
12. Raveendran and B Gitanjali, A Practical approach to PG dissertation, New Delhi, J P Publications, 1998.

DIPLOMA IN MICROBIOLOGY

GOALS

The main goal of this course is to train students of medicine in the field of medical microbiology. Theoretical and practical training is given in the subspecialties viz bacteriology, virology, parasitology, immunology and mycology, so that they can participate in good patient care and prevention of infectious diseases in the community.

OBJECTIVES

At the end of the course the students will be able to establish a good "clinical laboratory medicine" in hospitals and community in the field of bacteriology, virology, parasitology, immunology and mycology.

COURSE CONTENT

General Microbiology

1. History and pioneers in microbiology.
2. Microscopy.
3. Morphology of bacteria and other microorganisms.
4. Nomenclature and classification of microbes.
5. Growth and nutrition of bacteria.
6. Bacterial metabolism.
7. Sterilisation, disinfection.
8. Bacterial toxins.
9. Bacterial genetics.
10. Antibiotics and drug resistance in bacteria
11. Normal flora of human body, hospital environment, air, water and milk.
12. Hosts parasite relationship.

Immunology

1. Normal immune system.
2. Innate immunity.
3. Antigens.
4. Complement.
5. Antigen-antibody reactions.
6. Cell mediated immunity.
7. Hypersensitivity.
8. Immunodeficiency.
9. Auto-immunity.
10. Immuno tolerance
11. Prophylaxis and immunotherapy.

Systematic Bacteriology

1. Isolation, description and identification of bacteria.
2. Staphylococcus and micrococcus : The anaerobic gram positive cocci.
3. Streptococcus and lactobacillus.
4. Neisseria.

5. Corynebacterium and other coryniform organisms.
6. Bacillus, the anaerobic spore bearing bacilli.
7. Clostridium : The spore bearing anaerobic bacilli.
8. Enterobacteriaceae.
9. Vibrios, aeromonas, plesiomonas, campylobacter and spirillum.
10. Haemophilus and bordetella.
11. Pasteurella and Francisella.
12. Brucella.
13. Mycobacteria.
14. Actinomyces, nocardia and actinobacillus.
15. Pseudomonas.
16. The spirochaetes.
17. Chlamydiae.
18. Rickettsiae.
19. The bacteriodaceae: bacteriodes, fusobacterium and leptotricha.
20. Mycoplasmatales : mycoplasma, ureaplasma, acholeplasma,
21. Miscellaneous bacteria.

Virology

1. The nature of viruses.
2. Classification of viruses.
3. Morphology: virus structure.
4. Viral replication.
5. Pathogenicity of viruse.
6. Epidemiology of viral infections.
7. Vaccines and anti viral drugs.
8. Bacteriophages.
9. Pox viruses.
10. Herpes viruses.
11. Influenzae viruses.
12. Respiratory diseases.
13. Paramyxoviridae.
14. Enteroviruses: Polio.
15. Hepatitis viruses.
16. Rabies virus.
17. Slow viruses.
18. Human immunoedficiency viruses.
19. Oncogenic viruses.
20. Viruses of gastroenteritis.

Parasitology

1. Protozoan parasites of medical importance: Entamoeba, giardia, trichomonas, leishmania, trypanosoma, plasmodium, toxoplasma, sarcocystis, crytosporidium, babesia, balantidium etc.

2. Helmintholoyg: All those medically important helminths belonging to cestodes, trematode and nematode.

Cestode	:	Diphylloborthrium, taenia, echinococus, hymeonolepis, dipylidium, multiceps etc.
Trematode	:	Schistosomea, fasciola, gastrodiscoides, paragonimus. clonarchis, opisthorchis, etc.
Namatodes	:	Trichuria, trichinella, strongyloides, ancylostoma, ascaris enterobius, filarial worms, dracunculus, etc.
Ectoparasities:		Common arthropods and other vectors.

Mycology

1. The morphology and reproduction in fungi and anti-mycotic agents,
2. Classification of fungi.
3. Contaminant and opportunistic fung.
4. Superficial mycotic infections.
5. Fungi causing subcutaneous mycoses.
6. Fungi causing systemic infections.

SKILLS

Bacteriology (Must Acquire)

1. Preparation and pouring of media: Nutrient agar, blood agar, Mac Conkey's agar, Sugars, Kligleriron agar, Robortsons cooked meat, Lowenstein Jensen, Sabaouad.
2. Operation and maintenance of autoclave, hot air oven, distillation plant, filters like Seitz and membrane and sterility tests.
3. Washing and sterilisation of glassware.
4. Preparation of reagents: oxidase, kovac etc.
5. Disposal of contaminated materials.
6. Testing of disinfectants: Phenol coefficient and in use tests.
7. Quality control of media, reagents etc.
8. Aseptic practice in lab and safety precautions.
9. Care and maintenance of common laboratory equipments.
10. Preparation of antibiotic discs, performance of Kirby Bauer, Stokes etc, estimation of minimal inhibitory / bactericidal concentrations by tube/plate dilution methods.
11. Tests for a beta lactamases.
12. Collection of specimens for microbiological investigations.
13. Techniques of anaerobiosis.
14. Identification of bacteria of medical importance upto species level.
15. Preparation of stains viz Grams, Alberts, Capsules, spores, Ziehl Neelsen etc and performing staining procedure and interpretation.
16. Care and operation of microscopes viz light, dark ground, phase contrast and fluorescent microsccopes, electron microscopy.

17. Care and breeding of lab, animals viz mice, rats, guinea pigs and rabbits and also experiments on various laboratory animals.
18. Skin tests, Mantoux, lepromin, Casoni's etc.

Mycology (Must Acquire)

1. Collection and processing of clinical specimen for fungi.
2. Special techniques like Woods lamp examination, hair baiting techniques, slide cultures.
3. Stock culture maintainance.
4. Animal pathogenicity test for Cryptococcus and Candida.

Parasitology (Must Acquire)

1. Examination of faeces for ova and cysts
2. Direct and Concentration methods.
3. Egg counting techniques.
4. Examination of pheripheral blood, urine, CSF, and other fluids for parasites.
5. Examination and identification of histopathology slides for parasitic infection.
6. Serological tests for parasitic diseases.
7. Preservation of parasites.

METHODS OF TRAINING

Duration of degree course: 2 Years (4 terms)

The training is given under the following headings:

1. **Seminars** shall be conducted once a week on the theory question topic
2. **Culture seminars & serological tests**. Culture seminars and discussions are held once a week, which helps in systematic way of identification of all the routine bacteria for first few months followed by identification of rare cultures.
3. **Clinical sample seminars** are held once a month by processing the clinical samples in identification of the microbe causing that condition.
4. **Animal experiments, egg inoculation** are conducted periodically.
5. **Journal clubs** are conducted every week-choosing topics from recent journals.
6. **Symposia** are conducted once in every semester.
7. **Slide seminars.**
8. **Postings** to other institutions.
9. **Clinical Meeting:** The candidates are encouraged to take part in Clinical Meeting and discussions.
10. **Guest lectures.**

Candidates is posted to different sections on rotation. They are allowed to get acquainted with the basic microbiology for first three months.

Schedule of training:

I term	Each student shall undergo orientation in various sections in microbiology during the first 3 months so as to get familiarised with the basic knowledge in the subject.
II term	Culture seminars - pure culture of all bacilli and animal experiments. Culture seminars on clinical samples like stool, pus etc and serological tests-methodology.
III term	Training in mycology, parasitology, virology experminents
IV term	Slide seminars, mock examinations

Posting in Other Departments

Postings to other departments: The candidates are posted to other departments as stated below. The total period of posting will not exceed four months.

1. Clinical pathology - 2 month
2. Clinical Biochemistry - 2 month
3. Virology & Vaccinilogy- Optional

The students shall maintain a log book for the period of his/her postings to other departments / institutions and get the certificate from the Departmental Head at the end of postings.

Monitoring Learning Progress Please see Chapter IV

a) The progress of every student is monitored by assessment of participation in departmental service and training activities and by conducting periodical assessment tests and symposia.

b) Every student shall maintain a log book for recording his/her participation is the training programme. The log book shall be scrutinised and certified by head of department every term

c) Records are maintained by the Head of the Department.

SCHEME OF EXAMINATION

A. THEORY

There shall be three question papers, each of three hours duration. Each paper shall consist of two long essay questions, each question carrying 20 marks and 6 short essay questions each carrying 10 marks. Total marks for each paper will be 100. Questions on recent advances may be asked in any or all the papers*.

Details of distribution of topics for each paper will be as follows:

PAPER I General microbiology and immunology
PAPER II Systemic bacteriology, virology & mycology
PAPER III Parasitology and applied microbiology

* The topics assigned to the different papers are generally evaluated under those sections. However a strict division of the subject may not be possible and some overlapping of topics is inevitable. Students should be prepared to answer overlapping topics.

B. PRACTICAL

Duration of examination: 2 days (as per the scheme enclosed). Marks: 150

The examination will consists of the following exercises conjointly conducted and evaluated by four examiners (2 internals and 2 externals)

1. Exercise in clinical bacteriology: Isolation and identification of Bacteria from a clinical specimen. (An inoculated plate may be given with a mixture of two organisms).
2. Exercise in bacteriological techniques: Isolation and identification of bacteria given in pure culture.
3. Animal experiment: Any one of the following exercises: Bleeding of Rabbit / Guinea pig. Inoculation into mouse and isolation of the pathogen, post mortem examination of laboratory infected animal
4. Identification of fungi (two)
5. Exercise in Parasitology: Examination of stool for ova and cyst by direct and concentration techniques. Blood smear examination for malarial parasite.
6. Identification of slides.
7. Applied bacteriological techniques like special staining.
8. Exercise in Serology – Any of the serological techniques used in clinical medicine.

C. VIVA-VOCE: Marks: 50

It consists of all components of course contents including recent advances and conducted conjointly in all the examiners.

1) Viva-Voce Examination: (50 Marks)

Students will be examined by all the examiners together about students comprehension, analytical approach, expression and interpretation of data. Student shall also be given case reports, charts for interpretation.

Maximum marks for	Theory	Practical	Viva-voce	Total
Diploma in Microbiology	300	150	50	500

RECOMMENDED BOOKS:

1. Samuel Baron, Medical Microbiology, 3rd Edn, 1991, Churchill Livingstone Inc.
2. Edmin H Lennette, Laboratory Diagnosis of Viral Infections, 2"d Edn, 1992, Newyork Marcel Dekker, Inc.
3. Gordon Cook, Manson's Tropical Diseases, 20th Edn, 1996, London, ELBS.
4. John G Holt et al, Bergey;s Manual of Determinative Bacteriology, 9th Edn, 1994, Maryland, Williams & Wilkins.
5. Albert Balows, Manual of Clinical Microbiology, 5th Edn, 1991, Washington D.C, American Scociety for Microbiology
6. Ellen J0 Baron et al; Bailey & Scott's Diagnostic Microbiology, 0mEdn, 1994, Missouri, Mosby
7. Douglas D Richman, Clinical Virology, 1997, Newyork, Churchill Livingstone.
8. Bob A Freeman, Burrows Textbook of Microbiology, 21st Edn, l979,W.BSaunders.
9. Brian Il)uenleu 8tD S Drasar, Anaerobes in Human Disease, 1991, Great Britain, Edward Arnold.
10. Elmer W Koneman et al, Introduction to Diagnostic Microbiology, 1994, Lippincott Company.
11. BeouaniN Fields et al, Field Virology, Vol. ll3mEnd, 1990, Bernard Fields et al, Field's Virology, Volume 2, 3' edn, 1996` Philadelphia, Lippincott - Raven.
12. Danial Greenwood et al, Medical Microbiology, A guide to Microbial Infections, Pathogenesis, Immunity.
13. Laboratory Diagnosis and Control. 15th Edn, 1997, London, Churchill Livingstone.
14. J G College et al, Mackie 8z McCartney Practical Medical Microbiology, 14th Edn, 1996, London, Churchill Livingstone.
15. John V Bennett & Philip S Brachman, Hospital Infections, 3 Edn, 1992, Little Brown.
16. Noel R Rose et al, Manual of Clinical Laboratory Immunology, 4th edn, 1992, Washington D.C, American Society for Microbiology.
17. William E Paul; Fundamental Immunology, 3" Edn, 1993, Newyork, Raven Press.

JOURNALS:

1. Journal of Medical Microbiology, Lippincott-Raven Publishers, Pathological Society of Great Britain & Ireland, 1998.
2. Clinical Infectious Diseases. Pub: The University of Chicago Press, Chicago, Illinois 60637, 1998.
3. Clinical Microbiology Reviews. Pub: The American Society for Microbiology.
4. Microbiology & Molecular Biology Reviews (mmbr). Pub: American Society for Microbiology, 1999.
5. Journal of Clinical Microbiology (JCM); Pub: American Society for Microbiology, 1999.
6. The Journal of Infectious Diseases. Pub: The University of Chicago Press, 1998.

7. Journal of Communicable Diseases, Pub: The Indian Society for Malaria and other communicable disease. 1999.
8. Infectious Disease Clinics of North America. Pub: W B Saunde Company, A Division of Harcourt Brace & Company, 1999.
9. Indian Journal of Medical Microbiology, Pub: Indian Associates of Medical Microbiologists, 1999.
10. The Indian Journal of Medical Research. Pub: Indian Council of Medical Research, New Delhi. 1999.
11. Annual Review of Microbiology. Pub: Annual Reviews Inc. Palo Alto. California, USA. 1997.

ADDITIONAL READING:

1. Compendium of recommendations of various committees on Health and Development (1943-1975). DGHS, 1985 Central Bureau of Health Intelligence, Directorate General of Health Services, min. of Health and Family Welfare, Govt. of India, Nirman Bhawan, New Delhi. P - 335.
2. National Health Policy, Min. of Health & Family Welfare, Nirman Bhawan, New Delhi, 1983
3. Santosh Kumar, The elements of Research, writing and editing 1994, Dept. of Urology, JIPMER, Pondicherry
4. Srinivasa D K etal, Medical Education Principles and Practice, 1995. National Teacher Training Centre, JIPMER, Pondicherry
5. Indian Council of Medical Research, "Policy Statement of Ethical considerations involved in Research on Human Subjects", 1982, I.C.M.R, New Delhi.
6. Code of Medical Ethics framed under section 33 of the Indian Medical Council Act, 1956. Medical Council of India, Kotla Road, New Delhi.
7. Francis C M, Medical Ethics, J P Publications, Bangalore, II edn., 2004.
8. Indian National Science Academy, Guidelines for care and use of animals in Scientific Research, New Delhi, 1994.
9. International Committee of Medical Journal Editors, Uniform requirements for manuscripts submitted to biomedical journals, N Engl J Med 1991; 424-8
10. Kirkwood B R, Essentials of Medical Statistics, 151 Ed., Oxford: Blackwell Scientific Publications 1988.
11. Mahajan B K, Methods in Bio statistics for medical students, 5th Ed. New Delhi, Jaypee Brothers Medical Publishers, 1989.
12. Raveendran and B Gitanjali, A Practical approach to PG dissertation, New Delhi, J P Publications, 1998.

CHAPTER IV

Monitoring Learning Progress

It is essential to monitor the learning progress of each candidate through continuous appraisal and regular assessment. It not only helps teachers to evaluate students, but also students to evaluate themselves. The monitoring shall be done by the staff of the department based on participation of students in various teaching / learning activities. It may be structured and assessment be done using checklists that assess various aspects. Model checklists are given in this chapter which may be copied and used.

The learning out comes to be assessed should include:

1. Personal Attitudes.
2. Acquisition of Knowledge.
3. Clinical and operative skills and
4. Teaching skills.

1. <u>Personal Attitudes</u>: The essential items are:

a. Caring attitude.
b. Initiative.
c. Organisational ability.
d. Potential to cope with stressful situations and undertake responsibility.
e. Trust worthiness and reliability.
f. To understand and communicate intelligibly with patients and others.
g. To behave in a manner that establishes professional relationships with patients and colleagues.
h. Ability to work in a team.
i. A critical enquiring approach to the acquisition of knowledge.

The methods used mainly consist of observation. It is appreciated that these items require a degree of subjective assessment by the guide, supervisors and peers.

2. <u>Acquisition of Knowledge</u>: The methods used comprise of 'Log Book' which records participation in various teaching / learning activities by the students. The number of activities attended and the number in which presentations are made are to be recorded. The log book should periodically be validated by the supervisors. Some of the activities are listed. The list is not complete. Institutions may include additional activities, if so, desired.

a. **Journal Review Meeting (Journal Club).** The ability to do literature search, in depth study, presentation skills, and use of audio- visual aids are to be assessed. The assessment is made by faculty members and peers attending the meeting using a checklist (see Model Checklist – I, Chapter IV)

b. **Seminars / Symposia.** The topics should be assigned to the student well in advance to facilitate in depth study. The ability to do literature search, in depth study, presentation skills and use of audio- visual aids are to be assessed using a checklist (see Model Checklist-II, Chapter IV)

c. **Clinico-pathological conferences.** This should be a multidisciplinary study of an interesting case to train the candidate to solve diagnostic and therapeutic problems by using an analytical approach. The presenter(s) are to be assessed using a check list similar to that used for seminar.

d. **Medical Audit.** Periodic morbidity and mortality meeting shall be held. Attendance and participation in these must be insisted upon. This may not be included in assessment.

3. Clinical skills:

a. **Day to Day work:** Skills in outpatient and ward work should be assessed periodically. The assessment should include the candidates' sincerity and punctuality, analytical ability and communication skills (see Model Checklist III, Chapter IV).

b. **Clinical meetings:** Candidates should periodically present cases to his peers and faculty members. This should be assessed using a check list (see Model checklist IV, Chapter IV).

c. **Clinical and Procedural skills:** The candidate should be given graded responsibility to enable learning by apprenticeship. The performance is assessed by the guide by direct observation. Particulars are recorded by the student in the log book. (Table No.3, Chapter IV)

4. Teaching skills: Candidates should be encouraged to teach undergraduate medical students and paramedical students, if any. This performance should be based on assessment by the faculty members of the department and from feedback from the undergraduate students (See Model checklist V, Chapter IV)

5. **Periodic tests:** In case of degree courses of three years duration, the department may conduct three tests, two of them be annual tests, one at the end of first year and the other in the second year. The third test may be held three months before the final examination. In case of diploma courses of two

year duration, the departments may conduct two tests. One of them at the end of first year and the other in the second year, three months before the final examination. The tests may include written papers, practical / clinical and viva voce.

6. Work diary: Every candidate shall maintain a work diary and record his/her participation in the training programmes conducted by the department such as journal reviews, seminars, etc. Special mention may be made of the presentations by the candidate as well as details of clinical or laboratory procedures, if any conducted by the candidate.

7. Records: Records, log books and marks obtained in tests will be maintained by the Head of the Department and will be made available to the University or MCI.

8. Log book: The log book is a record of the important activities of the candidates during his training. Internal assessment should be based on the evaluation of the log book. Collectively, log books are a tool for the evaluation of the training programme of the institution by external agencies. The record includes academic activities as well as the presentations and procedures carried out by the candidate. Format for the log book for the different activities is given in Tables 1, 2 and 3 of Chapter IV. Copies may be made and used by the institutions.

Procedure for defaulters: Every department should have a committee to review such situations. The defaulting candidate is counseled by the guide and head of the department. In extreme cases of default the departmental committee may recommend that defaulting candidate be withheld from appearing the examination, if she/he fails to fulfill the requirements in spite of being given adequate chances to set him or herself right.

CHAPTER IV (Contd)

Format of Model Check Lists

Check List-I

MODEL CHECK-LIST FOR EVALUATION OF JOURNAL REVIEW PRESENTATIONS

Name of the Student:

Name of the Faculty/Observer:

Date:

Sl No	Items for observation during presentation	Poor 0	Below Average 1	Average 2	Good 3	Very Good 4
1.	Article chosen was					
2.	Extent of understanding of scope & objectives of the paper by the candidate					
3.	Whether cross references have been consulted					
4.	Whether other relevant publications consulted					
5.	Ability to respond to questions on the paper / subject					
6.	Audio-visual aids used					
7.	Ability to defend the paper					
8.	Clarity of presentation					
9.	Any other observation					
	Total Score					

Check List – II

MODEL CHECK-LIST FOR EVALUATION OF SEMINAR PRESENTATIONS

Name of the Student:

Name of the Faculty/Observer:

Date:

Sl No	Items for observation during presentation	Poor 0	Below Average 1	Average 2	Good 3	Very Good 4
1.	Whether other relevant publications consulted					
2.	Whether cross references have been consulted					
3.	Completeness of Preparation					
4.	Clarity of Presentation					
5.	Understanding of subject					
6.	Ability to answer questions					
7.	Time scheduling					
8.	Appropriate use of Audio-Visual aids					
9.	Overall Performance					
10.	Any other observation					
	Total Score					

Check List - III

MODEL CHECK LIST FOR EVALUATION OF

CLINICAL WORK IN WARD / OPD

(To be completed once a month by respective Unit Heads, including posting in other departments)

Name of the Student:

Name of the Faculty/Observer:

Date:

Sl No	Points to be considered	Poor 0	Below Average 1	Average 2	Good 3	Very Good 4
1.	Regularity of attendance					
2.	Punctuality					
3.	Interaction with colleagues and supportive staff					
4.	Maintenance of case records					
5.	Presentation of cases during rounds					
6.	Investigations work up					
7.	Beside manners					
8.	Rapport with patients					
9.	Counseling patient's relatives for blood donation or Postmortem and Case follow up.					
10.	Overall quality of ward work					
	Total Score					

Check List - IV

EVALUATION FORM FOR CLINICAL PRESENTATION

Name of the Student:

Name of the Faculty:

Date:

Sl No	Points to be considered	Poor 0	Below Average 1	Average 2	Good 3	Very Good 4
1.	Completeness of history					
2.	Whether all relevant points elicited					
3.	Clarity of Presentation					
4.	Logical order					
5.	Mentioned all positive and negative points of importance					
6.	Accuracy of general physical examination					
7.	Whether all physical signs elicited correctly					
8.	Whether any major signs missed or misinterpreted					
9.	Diagnosis: Whether it follows follows logically from history and findings					
10.	Investigations required ▪ Complete list ▪ Relevant order ▪ Interpretation of investigations					
11.	Ability to react to questioning Whether it follows logically from history and findings					
12.	Ability to defend diagnosis					
13.	Ability to justify differential diagnosis					
14.	Others					
	Total Score					

Check List - V

MODEL CHECK LIST FOR EVALUATION OF TEACHING SKILL PRACTICE

Sl No		Strong Point	Weak Point
1.	Communication of the purpose of the talk		
2.	Evokes audience interest in the subject		
3.	The introduction		
4.	The sequence of ideas		
5.	The use of practical examples and/or illustrations		
6.	Speaking style (enjoyable, monotonous, etc., specify)		
7.	Attempts audience participation		
8.	Summary of the main points at the end		
9.	Asks questions		
10.	Answers questions asked by the audience		
11.	Rapport of speaker with his audience		
12.	Effectiveness of the talk		
13.	Uses AV aids appropriately		

Check List - VI

MODEL CHECK LIST FOR DISSERTATION PRESENTATION

Name of the Student:

Name of the Faculty:

Date:

Sl No	Points to be considered divine	Poor 0	Below Average 1	Average 2	Good 3	Very Good 4
1.	Interest shown in selecting a topic					
2.	Appropriate review of literature					
3.	Discussion with guide & other faculty					
4.	Quality of Protocol					
5.	Preparation of proforma					
	Total Score					

Check List - VII

CONTINUOUS EVALUATION OF DISSERTATION WORK BY GUIDE / CO GUIDE

Name of the Student:

Name of the Faculty:

Date:

Sl No	Items for observation during presentations	Poor 0	Below Average 1	Average 2	Good 3	Very Good 4
1.	Periodic consultation with guide/co-guide					
2.	Regular collection of case Material					
3.	Depth of analysis / discussion					
4.	Departmental presentation of findings					
5.	Quality of final output					
6.	Others					
	Total Score					

LOG BOOK

Table 1: Academic activities attended

Name: Admission Year:

College:

Date	Type of Activity Specify Seminar, Journal Club, Presentation, UG teaching	Particulars

LOG BOOK

Table 2: Academic presentations made by the student

Name: Admission year:

College:

Date	Topic	Type of Presentation Specify Seminar, Journal Club, Presentation, UG teaching

LOG BOOK

Table 2: Diagnostic and Operative procedures performed

Name: Admission year:

College:

Date	Name	ID No.	Procedure	Category O, A, PA, PI*

*** Key:**

O **-** Washed up and observed

A - Assisted a more senior Surgeon

PA - Performed procedure under the direct supervision of a senior Surgeon

PI - Performed independently

Model Overall Assessment Sheet

Name of the College: **Academic Fear:**

Sl No	Faculty Member & Others	Name of Student and Mean Score									
		A	B	C	D	E	F	G	H	I	J
1.											
2.											
3.											
4.											
5.											
	Total Score										

Chapter V

Medical Ethics

Sensitisation and Practice

Introduction

There is now a shift from the traditional individual patient- doctor relationship and medical care. With the advances in science and technology and the needs of patients, their families and the community, there is an increased concern with the health of society. There is a shift to greater accountability to the society. Doctors and health professionals are confronted with many ethical problems. It is, therefore necessary to be prepared to deal with these problems. To accomplish the Goal and General Objective stated in Chapter II and develop human values it is urged that ***ethical sensitisation*** be achieved by lectures or discussion on ethical issues, clinical discussion of cases with an important ethical component and by including ethical aspects in discussion in all case presentation, bedside rounds and academic postgraduate programmes.

Course Contents

1. Introduction to Medical Ethics

- What is Ethics?
- What are values and norms?
- Relationship between being ethical and human fulfillment.
- How to form a value system in one's personal and professional life.
- Heteronomous Ethics and Autonomous Ethics.
- Freedom and personal Responsibility.

2. Definition of Medical Ethics

- Difference between medical ethics and bio-ethics
- Major Principles of Medical Ethics
  - Beneficence = fraternity
  - Justice = equality
  - Self determination (autonomy) = liberty

3. Perspective of Medical Ethics

- The Hippocratic Oath.
- The Declaration of Helsinki.
- The WHO Declaration of Geneva.
- International code of Medical Ethics. (1993)
- Medical Council of India Code of Ethics.

4. Ethics of the Individual

- The patient as a person.
- The Right to be respected.
- Truth and Confidentiality.
- The autonomy of decision.
- The concept of disease, health and healing.
- The Right to health.
- Ethics of Behaviour modification.
- The Physician – Patient relationship.
- Organ donation.

5. The Ethics of Human life

- What is human life?
- Criteria for distinguishing the human and the non-human.
- Reasons for respecting human life.
- The beginning of human life.
- Conception, contraception.
- Abortion.
- Prenatal sex-determination.
- In vitro fertilization (IVF).
- Artificial Insemination by Husband (AIH).
- Artificial Insemination by Donor (AID).
- Surrogate motherhood.
- Semen Intra-fallopian Transfer (SIFT).
- Gamete Intra-fallopian Transfer (GIFT).
- Zygote Intra-fallopian Transfer (ZIFT).
- Genetic Engineering.

6. The Family and Society in Medical Ethics

- The Ethics of human sexuality.
- Family Planning perspectives.
- Prolongation of life.
- Advanced life directives – The Living Will
- Euthanasia
- Cancer and Terminal Care

7. Profession Ethics

- Code of conduct.
- Contract and confidentiality.
- Charging of fees, Fee-splitting.
- Prescription of drugs.
- Over-investigating the patient.

- Low – Cost drugs, vitamins and tonics.
- Allocation of resources in health care.
- Malpractice and Negligence.

8. Research Ethics

- Animal and experimental research / humaneness.
- Human experimentation.
- Human volunteer research — Informed Consent Drug trials.

9. Ethical workshop of cases

- Gathering all scientific factors.
- Gathering all human factors.
- Gathering all value factors.
- Identifying areas of value — conflict, setting of priorities
- Working out criteria towards decisions.

Recommended Reading

1. Francis C.M., Medical Ethics, 1 Ed, 1993, Jaypee Brothers, New Delhi, p 189, Rs. 150/-

2. Good Clinical Practices : GOI Guidelines for clinical trials on Pharmaceutical Products in India (www.cdsco.nic.in)

3. INSA Guidelines for care and use of Animals in Research – 2000.

4. CPCSEA Guidelines 2001 (www.cpcsea.org.)

5. Ethical Guidelines for Biomedical Research on Human Subjects, 2000, ICMR, New Delhi.

6. ICMR Guidelines on animal use 2001, ICMR, New Delhi.