Ordinance Governing

Post Graduate Degree Courses (Pre-Paraclinical)

***

Syllabus / Curriculum

2017 - 18

EMPOWERING PROFESSIONALS

KLE
ACADEMY OF HIGHER EDUATION AND RESEARCH
Deemed-be-University u/s 3 of the UGC Atc, 1956

Accredited 'A' Grade by NAAC (2nd Cycle)
Placed in Category 'A' Grade by MHRD(GoI)

KLE ACADEMY OF HIGHER EDUCATION AND RESEARCH

JNMC Campus, Nehru Nagar, Belagavi - 590 010. Karnataka, INDIA.
Phone : +91 0831-2444444, 2493779 FAX : +91 0831-2493777
E-mail : info@kledeemeduniversity.edu.in Website : http://www.kledeemeduniversity.edu.in

Edition Year : 2017

Director, Academic Affairs
Email: diracademic@kledeemeduniversity.edu.in

KLE Academy of Higher Education & Research
JNMC Campus, Nehru Nagar,
Belagavi-590010
Ph: 0831-2444444
e-mail:info@kledeemeduniversity.edu.in

Price Rs: 360/-only

Printed at:
OMEGA OFFSET
4574, Shetty Galli, Belgaum.
☎ : 2424124, 2433429
Fax : 4204124

KLE
ACADEMY OF HIGHER EDUATION AND RESEARCH
Deemed-to-University u/s 3 of the UGC Act, 1956
EMPOWERING PROFESSIONALS

VISION

To be an outstanding University of excellence ever in pursuit of newer horizons to build self reliant global citizens through assured quality educational programs.

MISSION

- To promote sustainable development of higher education consistent with statutory and regulatory requirements.
- To plan continuously provide necessary infrastructure, learning resources required for quality education and innovations.
- To stimulate to extend the frontiers of knowledge, through faculty development and continuing education programs.
- To make research a significant activity involving staff, students and society.
- To promote industry / organization, interaction/collaborations with regional/national / international bodies.
- To establish healthy systems for communication among all stakeholders for vision oriented growth.
- To fulfill the national obligation through rural health missions.

OBJECTIVES

The objectives are to realize the following at university and its constituent institutions:

- To implement effectively the programs through creativity and innovation in teaching, learning and evaluation.
- To make existing programs more careers oriented through effective system of review and redesign of curriculum.
- To impart spirit of enquiry and scientific temperament among students through research oriented activities.
- To enhance reading and learning capabilities among faculty and students and inculcate sense of life long learning.
- To promulgate process for effective, continuous, objective oriented student performance evaluation.
- To ordinate periodic performance evaluation of the faculty.
- To incorporate themes to build values. Civic responsibilities & sense of national integrity.
- To ensure that the academic, career and personal counseling are in-built into the system of curriculum delivery.
- To strengthen, develop and implement staff and student welfare programs.
- To adopt and implement principles of participation, transparency and accountability in governance of academic and administrative activities.
- To constantly display sensitivity and respond to changing educational, social, and community demands.
- To promote public-private partnership.

INSIGNIA

The Emblem of the University is a Philosophical statement in Symbolic.

The Emblem...

A close look at the emblem unveils a pillar, a symbol of the "University of Excellence" built on strong values & principles.

The Palm and the Seven Stars...

The Palm is the palm of the teacher- the hand that acts, promises & guides the students to reach for the Seven Stars...

The Seven Stars signify the 'Saptarishi Dnyanamandal", the Great Bear-a constellation made of Seven Stars in the sky, each signifying a particular Domain. Our culture says: The true objective of human birth is to master these Knowledge Domains.

The Seven Stars also represent the Saptarishis, the founders of KLE Society whose selfless service and intense desire for "Dnyana Dasoha" laid the foundation for creating the knowledge called KLE Society.

Hence another significance of the raised palm is our tribute to these great Souls for making this University a possibility.

Empowering Professionals...

'Empowering Professionals', inscription at the base of the Emblem conveys that out Organization with its strength, maturity and wisdom forever strive to empower the student community to become globally competent professionals. It has been a guiding force for many student generations in the past, and will continue to inspire many forth coming generations.

KLE Academy of Higher Education & Research

(Formerly known as KLE UNIVERSITY)

[Established under Section 3 of the UGC Act, 1956 vide Government of India Notification No. F. 9-19/2000-U.3(A)]

Accredited 'A' Grade by NAAC (2nd Cycle) **Placed in Category 'A' by MHRD(GoI)**

JNMC Campus, Nehru Nagar, Belagavi-590 010, Karnataka State, India

Ph: 0831-2444444/2493779 Fax : 0831-2493777 Web: http:// www.kledeemeduniversity.edu.in E-mail: info@kledeemeduniversity.edu.in

Ref. No. KLEU/AC/17-18/D-216 (8) 25th April 2017

NOTIFICATION

Sub: **Ordinance governing the syllabus/curriculum for Post Graduate Degree Courses (Medicine)**

Ref : Minutes of the meeting of the Academic Council of the KAHER held on 21st April 2017.

In exercise of the powers conferred under Rule A-04 (i) of the Memorandum of Association of the KAHER, the Academic Council of the KAHER is pleased to approve the Ordinance governing the syllabus / curriculum for the following **Post-Graduate Degree Course MD/MS (Medicine)** in its meeting held on **21st April 2017.**

- **Anatomy**
- **Physiology**
- **Biochemistry**
- **Pathology**
- **Microbiology**
- **Pharmacology**
- **Forensic Medicine & Toxicology**
- **Community Medicine**

The Ordinance shall be effective for the students admitted to **Post Graduate Degree Course (Medicine)** under the faculty of Medicine in the constituent college of the KAHER viz. Jawaharlal Nehru Medical College, Belagavi from the academic session 2017-18 onwards.

By Order

REGISTRAR

To

The Dean
Faculty of Medicine,
J.N. Medical College,
BELAGAVI.

CC to :

1. The Secretary, University Grants Commission, New Delhi,
2. The Secretary to Chancellor, KAHER, Belagavi.
3. The Special Officer to Vice-Chancellor, KAHER, Belagavi.
4. All Officers of the KAHER - Academic Affairs / Examination Branch.

Contents

CHAPTER - I

Regulations for Post Graduate Degree Courses in Medical Sciences

1. Branches of Study:

Postgraduate Degree Courses

The following courses of studies may be pursued.

A. M.D. (Doctor of Medicine)

1. Anatomy
2. Physiology
3. Biochemistry
4. Pathology
5. Microbiology
6. Pharmacology
7. Forensic Medicine and Toxicology
8. Community Medicine

and such other subjects which may be introduced in future from time to time and recognized by Medical Council of India.

2. Eligibility for Admission

SELECTION OF POSTGRADUATE STUDENTS

A. Students for postgraduate medical courses shall be selected strictly on the basis of their academic merit.

B. For determining the academic merit, the KAHER shall adopt the following procedures for degree courses:-

i. On the basis of the merit as determined by centralised competitive test held at National level ie NEET-PG (National eligibility cum entrance test) conducted by National Board of Examination.

2.1 A candidate affiliated to KAHER and who has passed final year M.B.B.S. examination after pursuing a study in a medical college recognized by Medical Council of India, from a recognized Medical College affiliated to any other KAHER 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 KAHER before making Admission

No candidate shall be admitted for any postgraduate degree course unless the candidate has obtained and produced the eligibility certificate issued by the KAHER. The candidate has to make an application to the KAHER with the following documents along with the prescribed fee:

1. MBBS pass / degree certificate issued by the KAHER.
2. Marks cards of all the KAHER examinations passed during MBBS course.
3. Attempt Certificate issued by the Principal.
4. Certificate regarding the recognition of the medical college by the Medical Council of India.
5. Completion ofjoternship certificate.
6. 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.
7. Registration by any State Medical Council.

Candidates should obtain the Eligibility Certificate before the last date for admission as notified by the KAHER.

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

4. Intake of Students

The intake of students to each course shall be in accordance with the MCI approval.

5. Course of the Study

Duration :

a) M.D. Degree Courses

The course of study shall be for a period of 3 years consisting of 6 terms.

Exemption of one year period for holder of recognised postgraduate diploma -

There shall be exemption one year period for holders of recognised postgraduate diploma who undertake postgraduate degree course in the same subject.

6. Method of training

The training of postgraduate for degree shall be a full time pattern. 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.

7. Attendance, Progress and Conduct

7.1 A candidate pursuing degree course should work in the concerned department of the institution for the full period as a full time student. No candidate is permitted to run a clinic/laboratory/nursing home 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 .alid 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 nd 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 KAHER 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 (Please see chapter IV for model check lists and log book specimen copy). 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 scrutinized and certified by the Head of the Department and Head of the Institution and presented in the KAHER practical/clinical examination.

8.2 Periodic tests: In case of degree courses of three years duration, the concerned departments 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. The tests may include written papers, practicals, clinicals and viva voce. Records and marks obtained in such tests will be maintained by the Head of the Department and sent to the KAHER, when called for.

8.3 Records: Records and marks obtained in tests will be maintained by the head of the Department and will be made available to the KAHER or MCI.

9. Dissertation

9.1 Every candidate pursuing MD degree course is required to carry out work on a selected research project under the guidance of a recognized 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, comparison of results and drawing conclusions.

9.3 Every candidate shall submit to the Registrar (Academic) of the KAHER 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 KAHER. The synopsis shall be sent through the proper channel.

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

9.5 Tne dissertation should be written under the following headings:

i. Introduction

ii. Aims or Objectives of study

iii. Review of Literature

iv. Material and Methods

v. Results

vi. Discussion

vii. Conclusion

viii. Summary

ix. References

x. Tables

xi. Annexures

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 annexures. 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 Institute.

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

9.9 Guide: The academic qualification and teaching experience required for recognition by this KAHER 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 recognized :?: graduate teachers.

9.10 A Co-guide may be included provided the work requires substantial contribution from a sister department or from another medical institution recognized forteaching/ training by KLE KAHER/ Medical Council of India. The co-guide shall be a recognized post graduate teacher of KLE KAHER.

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

10. Schedule of Examination

The examination for M.D courses shall be held at the end of three academic years (six academic terms). The KAHER shall conduct two examinations in a year at 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 M.D. Degree

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

11.1.1 Dissertation: Every candidate shall carry out work and submit a dissertation as indicated in SL NO.9. Acceptance of dissrtation shall be a precondition for the candidate to appear for the final examination.

Theory Examination for Degree (Written Paper)

(There shall be 4 theory papers, each of 3 hours duration, carrying 100 marks each).

Type of Questions	Number of questions	Marks for each question	Total Marks
Long Essay questions	02	20	40
Short Essay questions	06	10	60
GRAND TOTAL			**100**

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 shall be covered in 4th paper. 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 students 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 300.

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 on dissertation topic 20 Marks

Candidate is asked to make a presentation for 8 - 10 minutes either on a topic : . en in the beginning of clinical examination or on the dissertation topic.

11.1.5 Criteria for declaring as pass in KAHER 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 separately.

A candidate securing less than 50% of marks as described above shall be declared liave failed in the examination.. Failed candidate may appear in any subsequent examination upon payment of fresh fee to the Controller of Examinations.

11.1.6 Declaration of distinction: A successful candidate passing the KAHER 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.

12. Number of Candidates perday The maximum number of candidates for practical/ clinical and viva-voce examination for degree course shall be 6 per day.

CHAPTER-II

Goals and General Objectives of Postgraduate Medical Education Programme

Goal

The goal of postgraduate medical education shall be to produce a competent specialist and / or a medical teacher

(i) who shall recognize the health needs of the community, and carry out professional obligations ethically and in keeping with the objectives at We National Health Policy;

(ii) 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;

(iii) who shall be aware of the contemporary advances and developments in the discipline concerned;

(iv) who shall have acquired a spirit of scientific inquiry and is oriented to the principles of research methodology and epidemiology; and

(v) who shall have acquired the basic skills in teaching the medical and paramedical professionals.

General Objectives

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

i) Recognize the importance of the concerned speciality in the context of the health need of the community and the national priorities in the health sector.

ii) Practice the speciality concerned ethically and in step with the principles of primary health care.

iii) Demonstrate sufficient understanding of the basic sciences relevant to the concerned speciality.

iv) 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 promotive measures/strategies.

v) Diagnose and manage majority of the conditions in the speciality concerned on the basis of clinical assessment, and appropriately selected and conducted investigations.

vi) Plan and advice measures for the prevention and rehabilitation of patients suffering from disease and disability related to the specialty.

vii) Demonstrate skills in documentation of individual case details as well as morbidity and mortality data relevant to the assigned situation.

viii) Demonstrate empathy and humane approach towards patients and their families and exhibit interpersonal behaviour in accordance with the social norms and expectations.

ix) Play the assigned role in the implementation of national health programmes, effectively and responsibly.

x) Drganize and supervise the chosen/assigned health care services demonstrating adequate managerial skills in the clinic/hospital or the field situation.

xi) Develop skills as a self-directed learner, recognize continuing educational needs; re ect and use appropriate learning resources.

xii) Demonstrate competence in basic concepts of research methodology and epidemiology, and be able to critically analyse relevant published research literature.

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

xiv) 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 PG Curriculum

The major components of the PG curriculum shall be:

- Theoretical knowledge

- Practical / clinical Skills

- Training in Thesis.

- Attitudes, including communication.

- Training in research methodology.

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

CHAPTER-III

COURSE DESCRIPTION

M.D. (Doctor of Medicine)

1. Anatomy
2. Physiology
3. Biochemistry
4. Pathology
5. Microbiology
6. Pharmacology
7. Forensic Medicine and Toxicology
8. Community Medicine

POST GRADUATE DEGREE COURSE

M.D. IN ANATOMY

I. GOALS:

The postgraduate course (M.D. in Anatomy) should enable a medical graduate to become a competent specialist, acquire knowledge and skills in educational technology for teaching medical and health sciences and conduct research in bio-medical sciences.

II. OBJECTIVES:

1. Knowledge-

At the end of the course, the postgraduates in Anatomy shall be able to:

a. Demonstrate comprehensive knowledge and understanding of gross and microscopic structure of human body and skills to demonstrate special dissection and histological techniques.

b. Comprehend normal disposition, interrelationships, functional and applied anatomy of the various structures of the body.

c. Describe development of human body to provide an anatomical basis for understanding the structure and correlate with functions both in health and in disease presentations.

d. Demonstrate knowledge of basic and systemic embryology including genetic inheritance and sequential development of organs and systems.

e. Recognize critical stages of development and the effects of common teratogens, genetic mutations and environmental hazards.

f. Explain developmental basis of major variations and abnormalities.

2. Skills-

a. Dissection of the human body.

b. Histological techniques, including processing, sectioning and staining of tissues.

c. Teaching skills.

d. Adequate skills in using audio-visual aids and communication techniques.

e. Basic computer skills.

3. Human values, ethical practice and communication abilities-

a. Professional honesty and integrity are to be fostered.

b. Apply high moral and ethical standard while carrying out human or animal research.

c. Good communication skills are to be developed.

d. Develop leadership skills and also ability to work as a team member when required.

III. COURSE CONTENTS:

Theory

1. History of Medicine and History of Anatomy.
2. Gross Human Anatomy including Sectional Anatomy and Applied Anatomy.
3. Elements of Anatomy.
4. Surface Living Anatomy.
5. General Embryology including Growth, Development & Teratology.
6. Systemic Embryology including Teratology.
7. Neuroanatomy.
8. Comparative Anatomy.
9. Principles of Physical Anthropology.
10. Human Genetics.
11. General and Systemic histology, Histological techniques and Principles of microscopy.
12. Museum techniques, Embalming techniques including Medicolegal aspects, and knowledge of Anatomy Act.
13. Radiology and principles of newer imaging techniques.

14. Interpretation of CT Scan, Sonography and MRI.

15. Medical Ethics.

Practical schedule

1. During the course the postgraduate students should dissect the entire human cadaver.

2. They should embalm and maintain the record of embalming work done.

3. They should prepare and mount at least 10 museum specimens.

4. In Histology section-

   - Collection of tissue, fixing, block making, section cutting; use of different types of microtomes and preparation of general and systemic slides.

   - Haematoxylin & Eosin

     (i) Preparation of stains.

     (ii) Staining techniques.

   - Knowledge of special staining techniques using Silver nitrate, PAS, Osmium tetroxide , Van Gieson and others.

   - Embryo (Chick embryo) mounting. Serial sections of embryo should be taken & stained with Haematoxylin & Eosin.

   - Knowledge of light microscopy and electron microscopy.

   - Detailed microscopic study of all the tissues (General and Systemic slides).

IV. TEACHING AND LEARNING ACTIVITIES:

A. Theoretical teaching:

1. Lectures are kept to a minimum. The candidates shall attend all the Undergraduate theory and practical classes regularly (for one batch of students). Lectures may be didactic or integrated.

2. Journal club: recommended to be held once a week. All the post-graduate students are expected to attend and actively participate in discussion and enter in the log book the relevant details. The presentations would be evaluated using checklists and would carry weightage for internal assessment. A timetable

with names of the students and the moderator should be announced in advance.

3. Subject seminar: recommended to be held once a week. All the PG students Are expected to attend and actively participate in discussion and enter in the log book the relevant details. The presentations would be evaluated using checklists and would carry weightage for internal assessment. A timetable with names of the students and the moderator should be announced in advance.

4. Teaching skills: Postgraduate students must teach undergraduate students (Medical, Nursing) by taking demonstrations, tutorials, lectures etc. Assessment is made by using a checklist by medical faculty as well as by students. Record of their participation is to be kept in log book. Training of postgraduate students in Educational science and technology is recommended.

5. Continuing Medical Education Programmes (CME): Recommended that at least one state level CME programme should be attended by each student during the course.

6. Conferences: Attending conferences is compulsory. Post-graduate student should attend one national and one state level conference during the course.

7. Research activities: The Post-graduate students to be encouraged to carry out research activities in the department other than dissertation work.

B. Clinical/Practical training:

Rotational postings- After the submission of the synopsis of the dissertation, posting of the student shall be made to the Genetics and Radio-diagnosis departments, for a period of one month wherever facilities are available, during the III year of the course.

At the end of the posting, a certificate has to be obtained from the concerned heads of the departments for satisfactory learning.

V. OTHER CRITERIA TO BE FULFILLED FOR THE DEGREE COURSE:

1. Internal evaluation:

During the course of three years, the department will conduct three tests. Two of them will be annual, one at the end of first year and other at the end of second year. The third test will be a preliminary examination which may be held three months before the final examination. The test may include the written papers, practicals and viva-voce. Records and marks obtained in such

tests will be maintained by the head of the department and will be sent to the University when called for.

Results of all evaluations should be entered into student's diary and departmental file for documentation purposes. Main purpose of periodic examination and accountability is to ensure expertise of students with practical and communication skills.

2. Maintenance of Log Book:

Every candidate shall maintain a Log book/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 practical or histology laboratory procedures, if any, conducted by the candidate. All the procedures performed by the post graduate students should be entered in the log book. The Log book shall be scrutinized and certified by the Head of the Department and Head of the Institution, and presented in the University practical examination.

3. Dissertation:

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

For details regarding DISSERTATION Refer 9.1 to 9.11 of Chapter-I.

VI. SCHEME OF EXAMINATION:

Candidates will be allowed to appear for examination only if overall attendance (Minimum 80%) and internal assessment are satisfactory and dissertation is accepted.

A. Theory : 400 Marks

There shall be four papers, each of three hours duration. Total maximum marks of each paper will be 100. Questions on recent advances may be asked in any or all the papers. The format of each paper will be same as shown below.

Type of Questions	No. of Questions	Marks for each question	Total Marks
Long essay	02	20	40
Short essay	06	10	60
Grand Total			100

Paper – I a) Gross Human Anatomy.

b) General Anatomy.

c) History of Anatomy.

Paper- II a) Embryology

b) Comparative Anatomy

c) Principles of Physical Anthropology.

Paper- III a) Histology – General & Systemic

b) Histological, Museum and Embalming techniques.

c) Human Genetics.

Paper – IV a) Applied Anatomy

b) Neuroanatomy.

c) Cross Sectional Anatomy & Newer Imaging Techniques

Note : Question on recent advances may be asked in any or all of the papers. The distribution of chapters/topics shown against the papers are suggestive only and may overlap or change.

B. Practical Examination: 300 Marks

Gross anatomy – 150

Histology – 150

i) Gross Anatomy

To dissect the human cadaver in 3 hours and display for discussion the allotted dissection exercise.

Distribution of Marks:

Surface Living Anatomy	- 20
Dissection	- 80
Discussion	- 50
Total	- 150 Marks

ii) Histology :

1. Identification and discussion of 10 stained sections 10 x 6 = 60 Marks

   Which includes Neuroanatomy , Embryology and Genetics.

2. i) Preparation of paraffin block }

   ii) Taking serial section from blocks provided. } 40Marks

   iii) Staining of the given section with Haematoxylin } & Eosin and discussion

3. Discussion on techniques 50 Marks

   Total 150 Marks

C. Viva Voce : 100 Marks

1) Viva-Voce Examination - [80 marks]

   This includes all the components of the syllabus along with specimens, skiagrams, including newer imaging techniques, bones and models including one problem solving exercise and discussion on dissertation topic submitted for the examination

2) Pedagogy: Demonstration of teaching skills/techniques - [20 Marks]

   A topic will be given to each candidate on the first day. Student is asked to make a presentation on the topic on the second day for 20 minutes.

D. Maximum Marks:

Maximum marks for M.D. ANATOMY	Theory	Practical	Viva	Grand Total
	400	300	100	800

VII. RECOMMENDED BOOKS (LATEST EDITIONS):

Sl. No.	Name of the Textbook	Authors	Publisher
GROSS ANATOMY			
1	GRAY'S ANATOMY.	SUSAN STANDRING	ELSEVIER, CHURCHILL LIVINGSTONE.
2	LAST'S ANATOMY, REGIONAL AND APPLIED.	SINNATHAMBY. CS	CHURCHILL LIVINGSTONE.
3	GRANTS METHOD OF ANATOMY.	BASMAJIAN.JV, SLONECKER. CE	BI. WAVERLY PVT. LTD
4	CLINICAL ANATOMY FOR MEDICAL STUDENTS.	SNELL. RS	LWW
HISTOLOGY			
1	HAM'S HISTOLOGY.	HAM. AW, CORMACK. HD	J.B.LIPPINCOTT COMPANY.
2	HANDBOOK OF HISTOPATHOLOGICAL AND HISTOCHEMICAL TECHNIQUES	CULLING C.F.A	BUTTERWORTH
3	dI FIORE'S ATLAS OF HUMAN HISTOLOGY.	EROSCHENKO. VP	LWW
EMBRYOLOGY			
1	LANGMAN'S MEDICAL EMBRYOLOGY.	SADLER. TW.	LWW
2	ESSENTIALS OF HUMAN EMBRYOLOGY.	LARSEN W.J	CHURCHILL LIVINGSTONE.
NEUROANATOMY			
1	FUNCTIONAL NEUROANATOMY.	AFIFI AK, ERGAM	McGRAW-HILL
2	CLINICAL NEUROANATOMY FOR MEDICAL STUDENTS	SNELL.RS	LWW
HUMAN GENETICS			
1	EMERY'S ELEMENTS OF MEDICAL GENETICS.	MULLER.RF, YOUNG. ID	ELSEVIER
2	PRINCIPLES OF MEDICAL GENETICS.	THOMAS.DG, FRANCIS.SC,DAVID.G	WOLTERS KLUWER HEALTH
EMBALMING			
1	EMBALMING-PRINCIPLES AND LEGAL ASPECTS	AJMANI M.L.	JAYPEE BROTHERS
2	EMBALMING	JAYAVELU V. T.	BI,CHURCHILL LIVINGSTONE

VIII. RECOMMENDED JOURNALS:

Sl. No.	Name of the Journal
1	CLINICAL ANATOMY
2	JOURNAL OF ANATOMICAL SOCIETY OF INDIA
3	JOURNAL OF ANATOMY
4	ACTA ANATOMICA
5	AMERICAN JOURNAL OF ANATOMY
6	AMERICAN JOURNAL OF PHYSICAL ANTHROPOLOGY
7	JOURNAL OF MORPHOLOGY, EMBRYOLOGY
8	ANATOMICAL RECORD
9	ANNUAL REVIEW OF GENETICS
10	AMERICAN JOURNAL OF MEDICAL GENETICS

Recommended additional Text & Reference Books (Latest editions)

1. Lee McGregor's Synopsis of Surgical Anatomy by Decker GAG, dU Plessis DJ.
2. Moore K.L. Clinically Oriented Anatomy 5 Ed. 2006.
3. Vertebrates Comparative Anatomy 3/e. 2002.
4. Netter Atlas of Human Anatomy 4/e 2006

Histology:

1. Ross et al. Histology A text & Atlas with correlated cell & Molecular Biology.
2. Basic Histology text & Atlas . By Jenqueira.

Embryology :

1. Moore & Persaud. The Developing Human.

POST GRADUATE DEGREE COURSE
M.D. IN PHYSIOLOGY

I. GOALS:

The postgraduate course in M.D. Physiology should enable a medical graduate to be:-

i) A competent Physiologist.

ii) A good medical teacher in Physiology, practicing the required skill of teaching.

II. OBJECTIVES:

The following objectives are laid out to achieve the goals of the course. These objectives are to be achieved by the time the candidate completes the course. The objectives may be considered under these subheadings.

1. Knowledge

2. Skills

3. Human values, ethical practice and communication abilities.

1. Knowledge:

- To demonstrate comprehensive knowledge and understanding of general and systemic physiology.
- To comprehend and understand physiological basis of health and disease affecting various organ systems.

2. Skills:

- Select and usage of appropriate teaching techniques and resources.
- To critically evaluate published journal literature, and effectively use the library facilities including computer, C.D. Room and literature search.

3. Human values, ethical practice and communication abilities:

- Adoption of ethical principles in all aspects of his/her practice; professional honesty and integrity are to be fostered. Care is to be delivered irrespective of the social status, caste, creed or religion of the patients.

- To provide leadership and get the best out of his team in a congenial working atmosphere.
- To apply high moral and ethical standard while carrying out human or animal research.
- To be humble and accept the limitations in his knowledge and skill and to ask for help from colleagues when needed.
- To carryout relevant research.
- To function as an effective member of teaching team or research team.
- To carryout professional obligations ethically and keeping in view of National Health Policy.

III. COURSE CONTENTS:-

THEORY

1. Introduction and scope of Physiology.
2. History of Medicine with special reference to Physiology.
3. Comparative Physiology.
4. Systemic Physiology.
5. General Physiology at cellular, sub cellular and molecular level.
6. Clinical and Applied Physiology.
7. Exercise and Sports Physiology.
8. Environmental Physiology, including altitude physiology & space physiology
9. Chrono Physiology – New born, adult and physiology of aging.
10. Behavioral Physiology – Yoga, Meditation.

Laboratory animal ethics — Guidelines for care and use of animals in scientific research.

— Breeding and experiments on animals (control and supervision), 1998 under prevention of cruelty to animals Act 1960.

PRACTICAL TRAINING

A. Human Physiology:

I. Clinical Physiology :—

(i) Elementary principles of clinical examination.

(ii) General examination.

(iii) Methods of Inspection / palpation / percussion / auscultation.

(iv) Method of recording.

1. Cardiovascular system

   (i) Clinical examination of circulatory system

   (ii) Examination of the pulse, blood vessels and measurements of blood pressure.

2. Respiratory system

   (i) Clinical examination of respiratory system.

3. Abdominal system

   (i) Clinical examination of abdomen.

4. Central Nervous system

   (i) Clinical examination of the nervous system and its physiological basis.

   (ii) Examination of higher mental functions.

   (iii) Motor functions.

   (iv) Reflex functions.

   (v) Sensory function.

   (vi) Outline of the examination of cranial nerves.

   (vii) Clinical examination of the special senses.

   (viii) Tests of hearing and deafness.

   (ix) Clinical examination of the eye and pupillary reflex

   (x) Visual acuity

(xi) Perimetry

(xii) Accommodation

(xiii) Colour vision

(xiv) Fundoscopy.

(xv) To estimate audio visual reaction time.

(xvi) EMG - Ergography

II. Laboratory Procedures

1. Haemotology :

   (i) Haemocytometry

   (ii) Determination of Reticulocyte count, platelet count, Total WBC count, RBC count, Eosinophil count in normal and diseased states.

   (iii) Differential count of WBC.

   (iv) Heamoglobinometry.

   (v) Blood grouping and Cross matching.

   (vi) Determination of bleeding time, clotting time & Prothrombin time.

   (vii) Hemolysis & Fragility test.

2. Cardio vascular System :

   (i) Electro cardiography & its interpretation.

   (ii) Record Heart rate variability.

3. Respiratory System:

   (i) Spirometry - computerized spirometer.

   (ii) Assessment of ventilatory functions.

   (iii) Stethography.

   (iv) Resuscitation and artificial respiration.

4. Clinical Biochemistry :

   (i) Urinalyasis of normal and abnormal constituents.

   (ii) Estimation of blood sugar.

B. Animal Experiments: (Graphs & Charts discussion)

(i) Amphibian

G.S. preparation – study of simple muscle curve.

1. Effect of freeload & After Load & optimal load.
2. Effect of continuous, repeated stimulation (study of phenomenon of fatigue).
3. Length tension diagram.

Amphibian heart experiments -

4. 1) Normal cardiogram & effect of temperature 2) Effect of stannius ligature & study of properties of cardiac muscle 3) Summation of subminimal stimulus 4) Long refractory period & all or none law 6) Extra systole & compensatory pause & beneficial effect.
5. Regulation of heart, Vagus dissection & effects of vagal stimulation.
6. Perfusion of isolated frog's heart—
   a) Effect of ions Na+, K+, Ca++. b) Effect of drugs –Adrenaline, Acetylcholine & Atropine.
7. Decerebrate and Spinal frog.

(ii) Mammalian

1. General management of mammalian experiments.
2. To study perfusion of mammalian heart –

   - Effect of drugs – Adrenaline, Acetylcholine & Atropine.

3. To study intestinal movement and tone in Rabbit, Effect of drugs – Adrenaline and Acetylcholine

IV. TEACHING AND LEARNING ACTIVITIES:

A. Theoretical Teaching:

1. Lectures: Lectures are to be kept to a minimum. Certain selected topics can be taken as lectures. Lectures may be didactic or integrated.

2. Journal Club: Recommended to attend and actively participate in discussion and enter in the log book the relevant details. The presentations would be

evaluated using check lists and would carry weightage for internal assessment. A time table with names of the students and the moderator should be announced in advance.

3. **Subject Seminar:** Recommended to be held once a week. All the PG students are expected to attend and actively participate in discussion and enter in the log book relevant details. A record of presentation should be maintained. The presentations would be evaluated using check lists and would carry weightage for internal assessment. A timetable for the subject with names of the students and the moderator should be announced in advance.

4. **Case Discussion:** Recommended to be held once a week. All the PG students are excepted to attend and actively participate in discussion and enter in the log book relevant details. The presentations would be evaluated using check lists and would carry weightage for internal assessment. A timetable for the presentation with names of the students should be announced in advance.

5. **Teaching Skills:** Post-graduate students must teach under graduate students (eg. Medical, Nursing) by taking demonstrations, bedside clinics, tutorials, lectures etc. Assessment is made using a checklist by medical faculty as well as by the students. Record of their participation is to be kept in Log Book. Training of postgraduate students in Educational Sciences and Technology is recommended.

6. **Continuing Medical Education Programmes (CME):** Recommended that at least one state level CME programme should be attended by each student during the course.

7. **Conferences:** Attending conference is compulsory. Post-graduate student should attend one national and one state level conference during the course.

8. **Research Activities:** The post-graduate students to be encouraged to carry out research activities in the department other than dissertation work.

B) Clinical / Practical Training:

1. Rotational Posting in other Departments:

The candidates shall attend all the undergraduate theory and practical classes regularly (for one batch of students). During the second year of the course postings may be made to other clinical and para clinical subjects in co-ordination with concerned departments, only in the forenoon sessions as follows:

1. Cardiology dept. – Two weeks

   Learn to operate ECG apparatus, Echo, Doppler, Cardiac monitor,

   Learn the methodology of cardiac catheterization. Resuscitation technique, Interpretation of ECG and other records.

2. Neurology – Two weeks

   Observe and understand Neuro – physiological techniques (clinical Physiology).

   — Clinical Examination of patient.

   — Use of EEG, EMG and Interpretation of EEG, EMG & other Investigation data.

3. Medical Gastroenterology – Two weeks

   To observe Endoscopic Techniques.

   Clinical examination of the patient.

4. Clinical Biochemistry – Two weeks

   To understand the principles of clinical biochemical tests and interpretation of data.

   — Liver function tests.

   — Renal function tests.

   — Gastric function tests.

   — Glucose tolerence tests.

   — Estimation of serum calcium.

5. Haematology Dept. – Two weeks.

   To learn blood investigations.

6. Blood Bank – Blood grouping and cross matching – Two weeks

   To learn collection, storage and transfusion of blood.

7. Department of Anatomy — Two weeks

   (Histology Laboratory) Staining techniques, moulding of specimens, slide identification characteristics.

8. Biostatistics and Research Methodology – Two weeks

   To attend workshop on research methodology – 3 Days.

9. OBG posting – Two weeks

   i. Methods to determine ovulation time.

   - Basal Body Temperature Chart.
   - Cervical smear.
   - Vaginal smear.

   ii. Clinical examination during pregnancy including antenatal checkup and investigations.

   iii) Pregnancy diagnostic test – Immunogical test.

   iv) Sperm count.

10. Chest Medicine – Two weeks

    To learn in laboratory - Lung Function tests & Interpretation of result.

11. General Medicine – Two weeks

    - Clinical examination of the patients.
    - Investigation procedures:
      - Drawing of blood and storage.
      - Lumbar puncture.
    - Interpretation of Data

      -X – Ray

      -ECG

      -Biopsy report

      -Biochemical results.

      -Endocrinology Postings.

      ·Radio Immuno Assay techniques.

      ·Ophthalmology for fundoscopy and measurement of intraocular pressure, refractometry & Perimetry.

12. Others :

(i) Construction of Dietary chart for –

1) Growing Children.

2) Hypertensive Patients.

3) CAD

4) Diabetes mellitus patients.

(ii) Tests for physical fitness –

1) 2 km. walk

2) Harvard step test.

3) Bicycle ergometry.

4) Treadmill protocols leading to determination of Vo2 max.

5) Cardio respiratory response to whole body exercise.

Total six months of clinical postings. At the end of these postings, a certificate has to be obtained from the concerned Heads of the Department about satisfactory or otherwise.

During three years of the course, the Postgraduate students shall participate in teaching the undergraduate students in practicals, tutorials & group discussions.

V. OTHER CRETERIA TO BE FULFILLED FOR THE DEGREE COURSE:

1. Internal evaluation:

During the course of three years, the department will conduct three tests. Two of them will be annual, one at the end of the first year and other at the end of the second year. The third test will a preliminary examination which may be held three months before the final examination. The test may include the written papers, practical / clinical and viva-voce. Record and marks obtained in such tests will be maintained by the head of the department and will be sent to the university when called for.

Results of all evaluation should be entered into P.G's diary and departmental file for documentation is to ensure clinical expertise of students with practical and communication skills and balance broader concept of diagnostic and therapeutic challenges.

2. Maintenance of Log Book:

Every candidate shall maintain a log book/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. All the procedures performed by the post graduate students should be entered in the Log book. The Log book shall be scrutinized and certified by the Head of the Department and Head of the Institution, and presented in the University practical examination.

3. Dissertation work:

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

For details regarding DISSERTATION Refer 9.1 to 9.11 of Chapter-I.

VI. SCHEME OF EXAMINATION:

Candidates will be allowed to appear for examination only if attendance (Minimum 80%) and internal assessment are satisfactory and dissertation is accepted.

A. Theory: 400 Marks

There shall be four papers, each of three hours duration. Total marks of each paper will be 100. Questions on recent advances may be asked in any or all the papers. The format of each paper will be same as shown below.

Type of Questions	No. of Questions	Marks for each question	Total marks.
Long essay	02	20	40
Short essay	06	10	60
Grand Total			100

Paper I:

General physiology, Biopotential, Transport across cell membrane, Biophysical Principles, Comparative physiology, History of Medicine with special reference to physiology.

Paper II:

Systemic physiology including applied aspects of Blood, Respiratory physiology, Cardiovascular, Digestive, Excretory system, Exercise & Sports physiology & Environmental physiology.

Paper III:

Systemic physiology including applied aspects of central nervous system, Muscle and Nerve Physiology, Endocrines physiology.

Paper IV:

Reproductive physiology, special senses, Clinical physiology, Chrono physiology, Behavioral physiology with Yoga & Meditation.

Note: The distribution of chapters/topics shown against the papers are suggestive only and may overlap or change.

B. Practical Examination: 300 Marks

i)	a. Human experiment	—— 75 marks.
	b. Frogs/Rabbit/Rat	—— 25 marks.
ii)	a. Haematology	—— 50 marks.
	b. Histology	—— 20 marks
iii)	Clinical physiology	
	Clinical examination of a given subject	
	Discussion on investigations	
	Interpretation of laboratory findings.	
	Physiological principles in diagnosis	—— 75 marks.

iv) Clinical Biochemistry: —— 25 marks.

v) Charts- —— 30 marks.

300 Marks.

C. Viva-voce Examination: 100 Marks

1. The Viva-voce would be on all components of all syllabus. —— 80 marks.

2. Pedagogy exercise and Log book —— 20 marks.

   i) Candidate is asked to make a presentation for 8-10 minutes on a topic given in the beginning of the Practical examination —— 10 Marks

   ii) Candidate is asked to make a presentation for 8-10 min on the dissertation of topic and review of the log book. —— 10 Marks

D. Maximum Marks:

Maximum marks for	Theory	Practical	Viva	Grand Total
M.D. Physiology	400	300	100	800

VII. RECOMMENDED BOOKS: (LATEST EDITIONS)

Sl.No.	Name of the Textbook	Author	Publisher
1	Text book of medical Physiology	Arthur C.Guyton	Prism Publisher, Bangalore
2.	Review of Medical Physiology	Willinam Ganong	Appleton and Lange
3.	Concise Medical Physiology	Choudhari	New Central Books, Calcutta.
4.	Text book of Physiology	A.K.Jain	Avichal Publishing company, N.Delhi
5.	Understanding Medical Physiology	BIJLANI	Jaypee brothers, New Delhi.
6.	Physiological basis of Medical practice	West-Best & Taylor's	Williams & Wilkins Baltimore/ London
7.	Text book of Medical Physiology	Indu Khurana	Elsevier Health Sciences
8.	Principles of Medical Physiology	Subyasachi Sirkar	Thime Publisher
9.	Comprehensive Text book of Medical Physiology Vol. I & II	G. K. Pal	Jaypee brothers
10.	Medical Physiology	Walter Boron	Saunder Publication
11.	Samson Wright's Applied Physiology	Samson Wright's	Oxford University press
12.	Berne and Levy	Bruce M Koeppen	Elsevier
13.	Basic Physiology for the health science	SHLKURT (Evald E)	Little Brown, Boston
14.	Principles of Anatomy & Physiology	TORTORA	Harper Collins Ref. College Publication.

VIII. RECOMMENDED JOURNALS:

Sl.No.	Name of the Textbook
1	American Physiological Society, Journal of Applied Physiology.
2.	By American Physiological Society, Physiological Reviews.
3.	American Physiological Society, Annual Review of Physiology.
4.	American Physiological Society, Advances in Physiology Education
5.	American Physiological Society, Recent advances in Physiology.
6.	British Publication, Journal of Physiology
7.	Association of Physiologists & Pharmacologists of India, Indian Journal of Physiology.
8.	Indian council of Medical Research-Indian Journal of Medical Research.

M.D. IN BIOCHEMISTRY

I. Goal:

The post graduate course M. D. (Biochemistry) should enable a student in acquiring exhaustive knowledge in Biochemical technology both in theory and practical so as to be in a position to apply the same and correlate the various Biochemical parameters in health and disease.

II. Objectives:

Knowledge: At the end of the course, post graduate student in biochemistry shall:

1. Work as a teacher in medical faculty both at undergraduate and postgraduate level
2. Supervise modern laboratory techniques and procedures in clinical Biochemistry in the hospital.
3. Pursue her/his interest to undergo further specialization
4. Guide thesis work both at Postgraduate and Doctoral level

Skills:

1. Carry out and conduct basic and clinical levelresearch work.
2. Suggest, evaluate, interpret biochemical investigations in a given clinical situation and apply her/his learning of biochemistry in clinical problem study.

Specific Learning Objectives:

1. Understand the concept of Biochemistry regarding the Bio-molecules

   (Carbohydrates, Proteins, Lipids, Vitamins, Minerals, Nucleic acids and Enzymes)
2. Have knowledge of intermediary metabolism of the above and regulation of the individual metabolism.
3. Possess knowledge of impairment in metabolism including inborn errors of metabolism.
4. Demonstrate / understand the role of Nutrition in health & disease.
5. Apply biochemical knowledge in normal and disease states.

6. Have knowledge regarding the analysis of biological fluids for its chemical constituents and correlating the same in health and disease.

7. Develop skills of performing and interpreting the advanced biochemical techniques like, Chromatography, Electrophoresis, Colorimetry, Spectrophotometery,Flame photometry, Cell fractionation, Radioimmunoassay, ELISA & Molecular Biology techniques.

3. Human values, Ethical practice and Communication abilities

- Adopt ethical principles in all aspects of his/her practice; professional honesty and integrity are to be fostered. Care is to be delivered irrespective of the social status, caste, creed or religion of the patient.
- Develop communication skills, in particular the skill to explain various options available in management and to obtain a true informed consent from the patient.
- Provide leadership and get the best out of his team in a congenial working atmosphere.
- Apply high moral and ethical standard while carrying out human or animal research.
- Be humble and accept the limitations in his knowledge and skill and to ask for help from colleagues when needed,
- Respect patient's rights and privileges including patient's right to information and right to seek a second opinion.

III. COURSE CONTENTS:

Theory

PAPER - I

A. PHYSICAL, ORGANIC ASPECTS OF BIOHEMISTRY AND BIOCHEMICAL TECHNIQUES.

i) Electrolytes, pH,buffer system, colloids, law of mass action, surface tension, osmosis anddiffusion,oxidation and reduction, bioenergetics.

ii) Molecular weight determination: Normality, molarity, molality, equivalent weight.

iii) Analytical Biochemistry & Instrumentation: Principles & application of colorimetry, spectrophotometry, fluorometry, radio isotopic techniques,

atomic absorption spectroscopy, osmometry centrifugation, nephelometry, chemiluminiscence, ELISA and point of care testing devices

iv) Bioseparative techniques:

- Chromatography- Column, Paper, TLC, GLC, HPLC, Affinity etc
- Electrophoresis - Paper, Agarose, SDS, PAGE, Immunoelectrophoresis, Isoelectric focussing etc.

v) Structure, physical & chemical properties of the following:

a) Carbohydrates: Monosaccharides, Disaccharides, Oligosaccharides and polysaccharides and their derivatives.

b) Lipids: Simple , compound and derived lipids

c) Proteins and Amino acids: Peptides, polypeptides,Protein structure: Conformation, interactions and structure activity relationship, Hemoglobin, myoglobin, immunoglobulins, collagen and proteoglycans, levels of organization of proteins with reference to insulin & Hb.

d) Nucleic Acids: Purine, Pyrimidine, their derivatives, nucleic acids, nucleosides & nucleotides.

B. BIO-STATISTICS

i) Statistical methods in research, mean, SD, SE, P distribution.Basic principles and concepts of biostatistics both parametric and non parametric as applied to health sciences like concepts of probabilities, law of chance, binomial expression, student ttest/ analysis of variance, regression analysis, coefficient of correlation, evaluation of new diagnostic procedure etc.

PAPER – II

A. CELL PHYSIOLOGY.

i) Structure of cell, general and specific features, cytoskeleton, nucleus, nucleolus, mitochondria and endoplasmic reticulum, ribosomes, golgi complex, lysosomes, plasma membranes, gap junctions, cell division-mitosis and meiosis, cell cycle.

ii) Ultra centrifugation, cell fractionation and differentiation of cellular and subcellular organelles and their applications.

iii) Biomembranes, receptors, membrane bound substances, mechanisms of transport across the cell membranes.

B. TISSUE BIOCHEMISTRY

i) Muscular contraction, nerve conduction, coagulation of blood.

ii) Metabolism in specialized tissues like erythrocytes, lens, nervous tissue etc.

iii) Plasma proteins and functions.

C. IMMUNOCHEMISTRY AND IMMUNOLOGY

Immunoglobulins and antigen-antibody reaction, immunodiffusion techniques, immunological techniques like HLA Typing, FISH etc.

D. MOLECULAR BIOLOGY AND HUMAN GENETICS.

i) DNA & RNA as genetic materials, replication of DNA, transcription, messenger, transfer and ribosomal RNA, their structure and function, regulation and expression of genes, translation

ii) Genetic engineering

iii) Molecular biology of viruses and molecular basis of cancer.

iv) All Molecular Biology techniques: Recombinant DNA Technology, PCR, DNA fingerprinting, RFLP, Blotting techniques, Hybridoma technology, Cloning, gene therapy, Human genome project.

v) Immunogenetics, cytogenetics, genetic counseling, medical ethics.

vi) Mechanism of action of cytotoxic drugs and antibiotics.

vii) Clinical Toxicology and Detoxification/ xenobiotics.

PAPER - III

A. ENZYMES.

i) General properties, classification and nomenclature, kinetic model, Km value, factors influencing enzyme action, specificity, mechanism of enzyme action, enzyme kinetics, enzyme inhibition and clinical application, regulation of enzyme action, isolation, isoenzymes, coenzymes, clinical enzymology.

B. VITAMINS AND MINERALS:

i) Structure, sources, daily requirements, physiological role and deficiency manifestations of vitamins, hypo and hyper vitaminosis.

ii) Mechanisms of action of coenzymes.

iii) Mineral metabolism and role of micro and macrominerals.

C. DIGESTION AND ABSORPTION OF FOOD AND OTHER NUTRIENTS.

D. INTERMEDIARY METABOLISM:

i) Methods of studying intermediary metabolism.

ii) Intermediary metabolism of carbohydrates, lipids, proteins, aminoacids, and nucleic acids in human system.

iii) Metabolic interrelationships and metabolism in well fed state and starvation.

E.Biological oxidation and Electron transport chain

F. INBORN ERRORS OF METABOLISM.

Inborn errors of carbohydrates, lipids, amino acids,protein, nucleic acids and mineral metabolism.

PAPER - IV

A. HUMAN NUTRITION:

Principal food components, Calorific value and RQ(respiratory quotient) of food stuffs, BMR(basal metabolic rate), SDA(specific dynamic action), energy &nutritional requirements, dietary fibres, nitrogen balance, biological value of proteins, balanced diet, diet formulation in health and disease, mixed diet, nutritional supplements, food toxins and additives, parenteral nutrition, disorders of nutrition;under-nutrition(Protein Energy Malnutrition (PEM) and Kwashiorkar), obesity, laboratory diagnosis of nutritional disorders, National Nutritional programmes

Nutrition in disease states : DM, HTN, liver&kidneydisorders.

B. FLUID, ELECTROLYTE AND ACID BASE METABOLISM AND RELATED DISORDERS

C. ENDOCRINOLOGY:

i) Classification and general mechanism of action of hormones.

ii) Biogenesis secretion, control, transport and mode of action of following-hypothalamic peptides, adenohypophyseal and neurohypophyseal hormones, thyroid, parathyroid hormones, calcitonin, pancreatic hormones, adenocortical and medullary hormones, gonadal hormones, gastrointestinal hormones, opioid peptides, endorphins,.

iii) Biochemistry of conception, reproduction and contraception.

iv) Biochemical changes in pregnancy.

v) Neuromodulators and their mechanism of action, physiological significance.

D. Good laboratory practices

i. Standard practices and procedures.

ii. Laboratory instrumentation and calibration

iii. Documentation in Laboratory

iv. Quality assurance programme in Laboratory

v. Standard Laboratory safety practices.

vi. Various accreditation bodies and processes

E. CLINICAL BIOCHEMISTRY ALONG WITH INVESTIGATIVE ASPECTS:

- Diabetes mellitus and secondary degenerative changes associated with diabetes mellitus, galactosemia, mucopolysacchridoses, reducing substances in urine and aids to laboratory diagnosis of these disorders.
- Ketosis, atherosclerosis, fatty liver, lipoidoses, hyperlipoproteinemias, hypolipoproteinemias and laboratory diagnosis.
- Aminoacidurias, uremia, phenyl ketonuria, hemoglobinopathies, immunoglobulinopathies, porphyrias, anemias and their laboratory diagnosis.
- Mal-absorption syndromes and their laboratory diagnosis.
- Gastric and pancreatic function tests.
- Renal function tests.

- Body fluid(CSF/ascitic/plural/pericardial/amniotic/lymphatic and synovial fluid)analysis
- Hepatobiliary function tests and jaundice.
- Clinical enzymology.
- Endocrinal disorders and laboratory diagnosis.
- Diseases of circulatory system, hemopoietic system.
- Diseases of heart, kidneys-principles of peritoneal and hemodialysis.
- Diseases of digestive systems and related organs like liver, pancreas etc.
- Diseases of lungs, musculoskeleton system.
- Diseases of central nervous system.
- Hereditary disorders.
- Immunological disorders.
- Radioimmunoassays and enzyme immunoassay and their clinical applications.
- Biochemical tests of cancer, tumor markers.
- Disorders of calcium and phosphorus metabolism
- Investigative aspects of all diseases mentioned above in the course content.

PRACTICALS

- Analytical balance
- Colorimetry
- Spectrophotometry
- pH measurement
- Preparation of different molar and normal solutions
- Preparation of buffers
- Urinalysis for normal & abnormal constituents- renal stone analysis
- Analysis of CSF and any other fluid.

- Titration of amino acid- Formol titration &pK values.
- Estimation of proteins by Biuret method
- Estimation of blood glucose
- Estimation of blood urea
- Estimation of creatinine
- Estimation of uric acid
- Estimation of calcium and phosphorus
- Estimation of cholesterol.
- Estimation of bilirubin(total and direct)
- Estimation of SGOT, SGPT
- Estimation of Alkaline and acid phosphatase
- Estimation of vitamins A, E, C.
- Thyroid and other hormone analysis by ELISA/ RIA.
- Estimation of LDH, GGT, amylase and CK isoenzymes.
- Study of enzyme activity and kinetics
- Different techniques of Paper chromatography
- Thin layer chromatography
- Ion exchange chromatography.
- Gel electrophoresis.
- Separation of LDH/ alkaline phosphatase isoenzymes by PAGE.
- Estimation of ethyl alcohol in blood & urine.
- Estimation of glycosylated hemoglobin, troponins,myoglobin, microalbumin.
- Biochemical screening tests for inborn errors of metabolism
- Reagent Kit validation
    - Precision study
    - Accuracy

- Linearity determination
- Limits of detection
- Recovery

IV. TEACHING AND LEARNING ACTIVITIES:

A. Theoretical Teaching:

1. **Lectures:** Lectures are to be kept to a minimum. Certain selected topics can be taken as lectures. Lectures may be active and integrated.

2. **Journal Club:** Recommended to be held once a week. All the PG students are expected to attend and actively participate in discussion and enter in the Log Book the relevant details. The presentations would be evaluated using check lists and would carry weightage for internal assessment. A time table with names of the students and the moderator should be announced in advance.

3. **Subject Seminar:** Recommended to be held once a week. All the PG students are expected to attend and actively participate in discussion and enter in the Log Book relevant details. The presentations would be evaluated using check lists and would carry weightage for internal assessment. A timetable for the subject with names of the students and the moderator should be announced in advance.

4. **Case Discussion:** Recommended to be held once a week. All the PG students are expected to attend and actively participate in discussion and enter in the Log Book relevant details. The presentations would be evaluated using check lists and would carry weightage for internal assessment. A timetable for the case presentation with names of the students should be announced in advance.

5. **Ward Rounds:** Ward rounds may be service or teaching rounds.

a) Service Rounds: Postgraduate students should do service rounds every day for the care of the patients. Newly admitted patients should be worked up by the post graduate student and presented to the faculty members the following day.

b)Teaching Rounds: Every unit should have 'grand rounds' for teaching purpose at the bed side. A diary should be maintained for day-to-day activities by the post-graduate students.

Entries of (a) and (b) should be made in the Log book.

6. **Skills:** Post-graduate students must teach under graduate students (eg. Medical, Nursing) by taking demonstrations, bedside clinics, tutorials, lectures etc. assessment is made using a checklist by medical faculty as well as by the students.

Record of their participation is to be kept in Log Book. Training of postgraduate students in Educational Science and Technology is recommended.

7. **Continuing Medical Education Programmes (CME):** Recommended that at least 1 state level CME programmes should be attended by each student during the course.

8. **Conferences:** Attending conference is compulsory. Post-graduate student should attend one national and one state level conference during the course.

9. **Research Activities:**The Post-graduate students to be encouraged to carry out research activities in the department other than dissertation work.

B) Clinical / Practical Training:

- **Clinical Biochemistry Laboratory Postings.**

Every Postgraduate student in Biochemistry shall be posted to clinical Biochemistry Laboratory of the department where clinical investigations of the attached hospital are done. Student should be trained in collection of samples, carrying out investigations, interpretation, reporting of the results and maintenance of records of investigations.

Period: 6 months / Year.

- **Clinical microbiology and pathology Laboratory Postings.**

Period: 1 month each

- **Super-speciality clinic posting**

Cardiology

Nephrology

Gastroenterology

Endocrinology

Period: 15 days each

- **Practical Record.**

Student should maintain Practical Record for General & Clinical Biochemistry separately of all practicals done during the course and submit at the time of University Examination after duly certified by the Head of the Department.

V. OTHER CRITERIA TO BE FULFILLED FOR THE DEGREE COURSE:

1. Internal evaluation:

During the course of three years, the department will conduct three tests. Two of them will be annual, one at the end of first year and other at the end of second year. The third test will a preliminary examination which may be held three months before the final examination. The test may include the written papers, practicals / clinicals and viva-voce. Records and marks obtained in such tests will be maintained by the head of the department and will be sent to the University when called for.

Results of all evaluations should be entered into P.G's diary and departmental file for documentation purposes. Main purpose of periodic examination and accountability is to ensure clinical expertise of students with practical and communication skills and balance broader concept of diagnostic and therapeutic challenges.

2. Maintenance of Log Book:

Every candidate shall maintain a Log book/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. All the procedures performed by the post graduate students should be entered in the Log book. All the daily activities including the ward rounds and the routine procedures preformed on day to day basis should be entered in the Log book and it should be verified and signed by the faculty member. The Log book shall be scrutinized and certified by the Head of the Department and Head of the Institution, and presented in the University practical/clinical examination.

3. Dissertation:

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

For details regarding DISSERTATION Refer 9.1 to 9.11 of Chapter-I.

VI. SCHEME OF EXAMINATION:

Candidates will be allowed to appear for examination only if attendance (Minimum 80%) and internal assessment are satisfactory and dissertation is accepted.

A. Theory : 400 Marks

There shall be four papers, each of three hours duration. Total marks of each paper will be 100. Questions on recent advances may be asked in any or all the papers. The format of each paper will be same as shown below.

Type of Questions	No. of Questions	Marks for each question	Total Marks
Long essay	**02**	**20**	**40**
Short essay	**06**	**10**	**60**
Grand Total			**100**

Paper - I Physical, Organic aspects of Biochemistry and Biochemical techniques and Biostatistics

Paper - II Cell physiology,Tissue Biochemistry, Immunochemistry and Immunology, Molecular Biology and Human genetics.

Paper - III Enzymes, Vitamins and minerals,Digestion and absorption of food and other nutrients,Intermediary metabolism,Biological oxidation and Electron transport chain , Inborn errors of metabolism.

Paper - IV Human nutrition;fluid, electrolyte and acid base metabolism and related disorders,Endocrinology Good laboratory practices, Clinical biochemistry along with investigative aspects

Questions on recent advances may be asked in any or all papers.

Note: The distribution of chapters / topics shown on the papers are suggestive only and may overlap or change.

B. Clinical / Practical Examination: 300 Marks

Practical - I

Major Experiment.

A blood sample from a patient to be given with clinical history.Student has to give probable diagnosis and estimate relevant parameter and interpret the result. Suitable standardization with standard graph should be done.

Minor Experiment.

Qualitative analysis of any biological fluid (Urine, CSF, Pleural fluid etc) and interpretation.

Practical - II

Major Experiment.

- Experiment involving chromatography or electrophoresis to be given, Separation and identification of aminoacids or carbohydrates by chromatography or Separation and interpretation of serum proteins, Lipoproteins, Isoenzymes (LDH or CPK) by electrophoresis to be given

or

* Kit validation

Minor Experiment.

Screening tests for inborn errors in metabolism - such as porphyrias, PKU, Galactosemia, Alkaptonuria etc.

C. Viva -Voce Examination 100 Marks

1) Viva – Voce Examination - [80 marks]

2) Pedagogy Exercise(10 marks) and Log Book:- (10 Marks)

Students will be examined by all the examiners together about student's comprehension, analytical approach, expression and interpretation of facts. Student shall also be given case reports, charts for interpretation. It includes discussion on dissertation. A topic will be given to each candidate on the first day.

Student is asked to make a presentation for 8 – 10 minutes on the next day morning

D. Maximum Marks:

Maximum Marks for M. D. Biochemistry	**Theory**	**Practical**	**Viva**	**Grand Total.**
	400	300	100	800

VII. RECOMMENDED BOOKS (LATEST EDITIONS):

Sl.No	Name of the Textbook	Authors	Publishers
1.	Harrison's principles of internal medicine	Fauci, braunwald,kaper, haurer, longo, jameson,lascalgo	Mc Graw hill Companies
2.	Oxford Textbook of medicine	David A Warrell, Timothy Cox, John Firth	Oxford university press
3.	Harper's Review of Biochemistry	Murray.K.	Appleton & Lange
4.	Lehniger'sPrinciples's of Biochemistry.	David L Nelson	CBS
5.	Biochemistry	LubertStryer	WH Freeman
6.	Text Book of Biochemistry with clinical correlations	Devlin TM	Wiley Liss
7.	Biochemistry	Voet D &Voet J	John Wiley & Sons
8.	Biochemistry A Functional approach	McGilvery RW	WB Saunders
9.	Medical Biochemistry	N V Bhagawan	Jones & Bartlett
10.	Biochemistry A case oriented Approach	Montgomery	C V Mosby
11.	Duncan's Diseases of Metabolism	Bondy	Academic press
12.	Molecular cell Biology	Harvey Lodish	W.H.Freeman& Company
13.	Clinical Biochemistry.	Latner	WB Saunders
14.	Practical Clinical Biochemistry	Varley	Heinemann Medical Books
15.	Teitz Text Book of Clinical Biochemistry	Burtis	WB Saunders
16.	Clinical Chemistry, Theory, Analysis & Correlation.	Kaplan	Academic Press
17.	Clinical Chemistry	Marshall	Churchill Livingstone
18.	Molecular Biology of THE CELL.	Bruce Alberts	Garland Science,New York
19.	Text Book of Biochemistry	West & Todd	Oxford & IBH
20.	Metabolic basis of inherited diseases..	Stab Bury	Churchill Livingstone
21.	Biochemistry.	APPS	WB Saunders
22.	Principles of Biochemistry.	Abrham White	Mac Graw Hill Inc.
23.	Clinical Chemistry	Henry	Churchill Livingstone
24.	Krauses Food, Nutrition & Diet Therapy.	L.Kathleen Mahan	WB Saunders
25.	Clinical Physiology of acid-base and electrolyte disorders.	Rose BD	MeGraw Hill
26.	Clinical chemistry.Principles,Procedures& Correlations	M.L.Bishop	Lippincott
27.	The Principles & Practice of Diagnostic Enzymology	Henry Wilkinson	Arnold Publishers Ltd
28.	Text Book of Immunology. An Intoduction to immunochemistry &immunobiology.	James T. Barrett	C.V.Mosby.Company

VIII. RECOMMENDED JOURNALS:

Sl.No	Name of the Journal
1	Annual Review of Biochemistry.
2	Clinical Chemistry (J).
3	Trends in Biochemical Sciences.
4	Clinical Chemistry Reviews.
5	Medical Biochemistry (J).
6	Recent Advances in Endocrinology and Metabolism.
7	Recent Advances in Clinical Chemistry.
8	Essays in Biochemistry, Biochemical Society, UK.
9	Indian Journal of Clinical Biochemistry (J).
10	Indian Journal of Medical Research (J).

POST GRADUATE DEGREE COURSE

M.D. IN PATHOLOGY

I. GOALS:

The goal of postgraduate medical education shall be to produce a competent pathologist, research fellow and / or a medical teacher.

II. OBJECTIVES:

The following objectives are laid out to achieve the goals of the course. These objectives are to be achieved by the time the candidate completes the course. The objectives may be considered under the subheadings.

1. Knowledge :

At the end of the course a candidate must be able to

a) Understand and explain about the factors in causation of diseases.

b) Understand processes involved in the gross and microscopic changes of organs and tissues and explain these changes.

c) Understand and explain the basis of evolution of clinical signs and symptoms.

2. Skills :

a) Should be able to perform procedures designed for Laboratory detection of diseases and overall well being of the patient.

b) Should be able to recognize and report morphological changes in cells, tissues and organs.

c) Should be able to identify, plan, perform and report specific laboratory based research projects.

d) Should be able to perform clinical autopsy and present a CPC (clinico pathological correlation).

e) Should be able to plan and teach pathology for Laboratory Technology, Nursing, Dental and Medical students.

3. Human values, Ethical practice and Communication abilities

- Adopt ethical principles in all aspects of his/her practice; professional honesty and integrity are to be fostered. Care is to be delivered irrespective of the social status, caste, creed or religion of the patient.
- Develop communication skills, in particular the skill to explain various options available in management and to obtain a true informed consent from the patient.
- Provide leadership and get the best out of his her team in a congenial working atmosphere.
- Apply high moral and ethical standard while carrying out human or animal research.
- Be humble and accept the limitations in his her knowledge and skill and to ask for help from colleagues when needed,
- Respect patient's rights and privileges including patient's right to information and right to seek a second opinion.

III. COURSE CONTENTS:

BASIC SCIENCES

1) Anatomy - Histology of all structures in the human body/organ

2) Physiology – Biochemistry – basic aspects of various metabolisms & functioning of endocrines

3) Genetics - Fundamental/Applied aspects Biostatistics

4) Bio-medical ethics – Ethical issues related to medical practice and research involving human subjects and animals.

PATHOLOGY:

Historical aspects

General pathology including immunopathology

Systemic pathology

Haematopathology

Blood banking including transfusion medicine

Cytopathology

Genetic disorders: molecular pathology

Recent advances in all fields

Organization of laboratory including quality control

Internet, Telemedicine, Basic computer applications and Basic Photography techniques.

DETAILS OF COURSE CONTENT AS PER MCI GUIDELINES

The study of Pathologic Anatomy includes all aspects of Pathology as encompassed in the branches of General and Systemic Pathology. Only the broad outlines are provided.

A) General Pathology:

Normal cell and tissue structure and function. The changes in cellular structure and function in disease. Causes of disease and its pathogenesis. Reaction of cells, tissues, organ systems and the body as a whole to various sublethal and lethal injuries.

B) Systemic Pathology:

The study of normal structure and function of various organ systems and the aetiopathogenesis, gross and microscopic alterations of structure of these organ systems in disease & functional correlation with clinical features.

C) Hematology

1. The study of Hematology includes all aspects of the diseases of the blood and bone marrow. This would involve the study of the normal, and the causes of diseases and the changes thereof.
2. Laboratory Medicine (Clinical Biochemistry/Clinical Pathology including Parasitology).
3. Transfusion Medicine (Blood-Banking).
4. In the following fields the student is expected to acquire a general acquaintance of techniques and principles and to interpret data

a. Immunopathology

b. Electron microscopy

c. Histochemistry

d. Immunohistochemistry

e. Cytogenetics

f. Molecular Biology

g. Maintainence of records

h. Information retrieval, Computer, Internet in medicine.

It is difficult to give a precise outline of the course content for postgraduate training. A postgraduate is supposed to acquire not only professional competence of a well-trained specialist but also academic maturity, a capacity to reason and critically evaluate scientific data as well as to keep himself abreast of the latest developments in the field of the pathology and related sciences. A brief outline of what is expected to be learnt during the MD Course is given under each head.

Surgical Pathology

Knowledge.

- The student should· be able to demonstrate an understanding of the histogenetic and patho-physiologic processes associated with various lesions.
- Should be able to identify problems in the laboratory and offer viable solutions.

Skills

- Given the clinical and operative data, the student should be able to identify, and systematically and accurately describe the chief gross anatomic alterations in the surgically removed specimens and be able to correctly diagnose at least 80 percent of the lesions received on an average day from the surgical service of an average teaching hospital.
- A student should be able to demonstrate ability to perform a systematic gross examination of the tissues including the taking of appropriate tissue sections and in special cases as in intestinal mucosal biopsies, muscle biopsies and nerve biopsies, demonstrate the orientation of tissues in paraffin blocks.

- The student should be able to identify and systematically and accurately describe the chief histomorphological alterations in the tissue received in the surgical pathology service. He/she should also correctly interpret & correlate with the clinical data to diagnose at least 90% of the routine surgical material received on an average day. He/she should be able to diagnose at least 75% of the classical lesions being commonly encountered in the surgical pathology service without the aid of the clinical data.
- Be conversant with the automatic tissue processing machine and the principles of its running.
- Process a tissue, make a paraffin block and cut sections of good quality on a rotary microtome.
- Stain paraffin sections with at least the following:

  Haematoxylin and eosin

  Stains for collagen, elastic fibers and reticulin

  Iron stain

  PAS stain

  Acid fast stains

  Any other stains needed for diagnosis
- Demonstrate understanding of the principles of:

  (i) Fixation of tissues

  (ii) Processing of tissues for section cutting

  (iii) Section cutting and maintenance of related equipment

  (iv) Differential (Special) stains and their utility
- Cut a frozen section using freezing microtome / cryostat, stain and interpret the slide in correlation with the clinical data provided, and correctly diagnose at least 75 per cent of the lesions within 15 minutes.
- Perform fat stain on frozen section.

- Demonstrate the understanding of the utility of various immunohistochemical stains especially in the diagnosis of tumour subtypes.

Autopsy Pathology

Knowledge

- Should be aware of the techniques of autopsy.
- Should have sufficient understanding of various disease processes so that a meaningful clinico-pathological correlation can be made.
- Demonstrate ability to perform a complete autopsy independently with some physical assistance, correctly following the prescribed instructions. Correctly identify all major lesions which have caused, or contributed to, the patient's death on macroscopic examination alone and microscopy also in at least 90% of the autopsies in an average teaching hospital.
- In places where non-medicolegal autopsies are not available each student/candidate should be made to dissect organs from atleast five medico-legal autopsies.
- Write correctly and systematically Provisional and Final Anatomic diagnosis reports.

Cytopathology

Knowledge

- Should possess the background necessary for the evaluation and reporting of Cytopathology specimens.
- Demonstrate familiarity with the following, keeping in mind the indication for the test.

  a. Choice of site from which smears may be taken

     (as in the case of vaginal smears)

  b. Type of samples.

  c. Method of obtaining various specimens (Urine sample, Gastric smear, colonic lavage etc.)

  d. Be conversant with the principles and preparation of solutions of stains.

Skills

- Independently prepare and stain good quality smears for cytopathologic examination.
- Be conversant with the techniques for concentration of specimens: i.e. various filters, centrifuge and cytocentrifuge.
- Independently be able to perform fine needle aspiration of palpable superficial lumps in patients; make good quality smears, and be able to decide on the type of staining in a given case.
- Given the relevant clinical data, he/she should be able to independently and correctly:
  (i) Evaluate hormonal status in all cases as may be required.

  (ii) Diagnose the status of malignancy or otherwise in at least 75% of the cases received in a routine laboratory and categorize them into negative, inconclusive and positive.

  (iii) Demonstrate ability in the technique of screening and dotting the slides for suspicious cells.

  (iv) Indicate correctly the type of tumour, if present, in at least 75% cases.

  (v) Identify with reasonable accuracy the presence of organisms, fungi and Parasites in at least 75% of cases.

Hematology

Knowledge

- Should demonstrate the capability of utilizing the principles of the practice of Hematology for the planning of tests, interpretation and diagnosis of diseases of the blood and bone marrow.
- Should be conversant with various equipments used in the Hematology laboratory.
- Should have knowledge of automation and quality assurance in Hematology.
- Correctly plan a strategy of investigating at least 90% of the cases referred for special investigations in the Hematology Clinic and give ample justification for each step in consideration of the relevant clinical data provided.

Skills

- Correctly and independently perform the following special tests, in addition to doing the routine blood counts:
- Haemogram including Reticulocyte and Platelet counts.
    a. Bone marrow staining including stain for iron
    b. Blood smear staining
    c. Cytochemical characterization of leukemia with special stains like Peroxidase, Leukocyte Alkaline Phosphatase (LAP), PAS, Sudan Black, etc.
    d. Hemolytic anemia profile including HbF, Hb Electrophoresis etc.
    e. Coagulation profile including PT, APTT.FDP.
    f. BM aspiration and BM Biopsy
- Demonstrate familiarity with the principle and interpretation of results and utility in diagnosis of the following:
- Platelet function tests including platelet aggregation and adhesion and PF3 release
- Thrombophilia profile: Lupus anticoagulant (LAC),
- Anticardiolipin Antibody (ACA), Activated Protein C Resistance (APCR), Protein C (Pr C), Protein S (Pr S) and Antithrombin III (AT III) Immunophenotyping of leukaemias.
- Cytogenetics

    • Describe accurately the morphologic findings in the peripheral and bone marrow smears, identifying and quantitating the morphologic abnormalities in disease states and arriving at a correct diagnosis in at least 90% of the cases referred to the Haematology clinic, given the relevant clinical data.

Laboratory Medicine

Knowledge

- Possess knowledge of the normal range of values of the chemical content of body fluids, significance of the altered values and its interpretation.
- Possess knowledge of the principles of following specialized organ function tests

and the relative utility and limitations of each and significance of the altered values.

(i) Renal function test

(ii) Liver function test

(iii) Gastric and Pancreatic function

(iv) Endocrine function test

(v) Tests for malabsorption

- Know the principles, advantages, disadvantages, scope and limitation of Automation in laboratory.
- Know the principles and methodology of quality control in laboratory.

Skills

- Plan a strategy of laboratory investigation of a given case, given the relevant clinical history and physical findings in a logical sequence, with a rational explanation of each step; Be able to correctly interpret the laboratory data of such studies, and discuss their significance with a view to arrive at a diagnosis .
- Demonstrate familiarity with and successfully perform

1. Routine urine analysis including physical, Chemical and Microscopic examination of the sediment.
2. Macroscopic and microscopic examination of faeces and identify the ova and cysts of common parasites.
3. A complete examination of
    - C.S.F. , Pleural and Peritoneal fluid- physical, chemical & examination, cell content & type
    - Semen analysis.
    - Examination of Peripheral Blood for the commonly occurring parasites .
    - Independently and correctly perform at least the following Quantitative Estimations by Manual Techniques and/or Automated Techniques.

(i) Blood urea

(ii) Blood sugar

(iii) Serum Proteins total & fractional

(iv) Serum Bilirubin total & fractional

(vii) Serum amylase

- Demonstrate familiarity with the following Quantitative Estimations of blood serum by Automated Techniques. Serum cholesterol, Uric acid, Serum Transaminases (AL T and AST/SGOT and SGPT), etc.
- Prepare standard solutions and reagents relevant to the above tests, including the preparation of normal molar solution and Buffers.
- Explain the principle of Instrumentation, use and application of the instruments commonly used in the labs eg.. Photoelectric colorimeter, Spectrophotometer, pH meter, Centrifuge, Electrophoresis apparatus, ELISA Reader, flow cytometer

Transfusion Medicine (Blood Banking)

Knowledge

Students should possess knowledge of the following aspects of Transfusion Medicine.

- Basic immunology
- ABO and Rh groups
- Clinical significance of other blood groups
- Transfusion therapy including the use of whole blood and RBC concentrates.
- Blood component therapy.
- Rationale of pre-transfusion testing.
- Infections transmitted in blood.
- Adverse reactions to transfusion of blood and components
- Quality control in blood bank

Skills

Student should be able to correctly and independently perform the following.

- Selection and bleeding of donors
- Preparation of blood components i.e. Cryoprecipitates, Platelet concentrate, Fresh Frozen Plasma, Single Donor Plasma, Red Blood Cell concentrates.
- ABO and Rh grouping.
- Demonstrate familiarity with Antenatal and Neonatal work
- Direct antiglobulin test
- Antibody screening and titre
- Selection of blood for exchange transfusion
- Demonstrate familiarity with principle and procedures involved in :
- Resolving ABO grouping problems
- Identification of RBC antibody
- Investigation of transfusion reaction.
- Testing of blood for presence of
- HBV (Hepatitis B Virus Markers).
- HCV (Hepatitis C Virus Markers)
- HIV (Human Immunodeficiency Virus Testing)
- VDRL

Basic Sciences (in relation to Pathology)

a) Immunopathology

Knowledge

(i) Demonstrate familiarity with the current concepts of structure and function of the immune system, its aberrations and mechanisms thereof. (ii)Demonstrate familiarity with the scope, principles, limitations and interpretations of the results

of the following procedures employed in clinical and experimental studies relating to immunology.

(a) ELISA techniques

(b) Radioimmuno assay

(c) HLA typing

(iii) Interpret simple immunological test used in diagnosis of diseases and in research procedures

- Immunoelectrophoresis
- Immunofluorescence techniques especially on kidney and skin biopsies
- Antinuclear factor (ANF)
- Antineutrophil cytoplasmic antibody (ANCA)

b) Electron Microscopy

Knowledge

- Demonstrate familiarity with Principles and techniques of electron microscopy and the working of an electron microscope (including Transmission and Scanning Electron microscope (TEM and SEM)
- Recognise the appearance of the normal sub cellular organelles and their common abnormalities (when provided with appropriate photographs).

c) Enzyme Histochemistry

Knowledge

Should be familiar with the principles, use and interpretation of common enzyme histochemical procedures (Alkaline Phosphatase, Acid Phosphatase, Glucose-6-Phosphate Dehydrogenase, Chloroacetate Esterase.

d) Immunohistochemistry

Knowledge

Demonstrate familiarity with the principles and exact procedures of various immunohistochemical stains using both PAP (Peroxidase- Antiperoxidase) and AP-

AAP (Alk. Phosphatase-anti Alk. Phosphatase) ABC (Avidin-Biotin Conjugate) Systems; employing monoclonal and polyclonal antibodies. Be aware of the limitations of Immunohistochemistry.

Skills (desirable)

Be able to perform immunohistochemical staining using paraffin section with at least one of the commonly used antibodies (Cytokeratin or LCA) using PAP method.

e) Molecular Biology

Knowledge

Should understand the principles of Molecular biology especially related to the understanding of disease processes and its use in various diagnostic tests.

Should be conversant with the principle & steps and interpretations of a Polymerase Chain Reaction (PCR), Western Blot, Southern Blot, Northern Blot and Hybridization procedures.

f) Cytogenetics

Knowledge

Demonstrate familiarity with methods of Karyotyping and Fluorescent in -situ Hybridisation (FISH).

g) Tissue Culture

Knowledge

Demonstrate familiarity with methods of tissue culture.

h) Principles of Medical Statistics

Knowledge

Demonstrate familiarity with importance of statistical methods in assessing data from patient material and experimental studies.

IV. TEACHING AND LEARNING ACTIVITIES:

A. Theoretical Teaching:

1. Lectures: Lectures are to be kept to a minimum. Certain selected topics can be

taken as lectures. Lectures may be didactic or integrated.

2. **Journal Club:** Recommended to be held once a week. All the PG students are expected to attend and actively participate in discussion and enter in the Log Book the relevant details. The presentations would be evaluated using check lists and would carry weightage for internal assessment. A time table with names of the students and the moderator should be announced in advance.

3. **Subject Seminar:** Recommended to be held once a week. All the PG students are expected to attend and actively participate in discussion and enter in the Log Book relevant details. The presentations would be evaluated using check lists and would carry weightage for internal assessment. A timetable for the subject with names of the students and the moderator should be announced in advance.

4. **Autopsy/Case Discussion:** Recommended to be held once a week. All the PG students are expected to attend and actively participate in discussion and enter in the Log Book relevant details. The presentations would be evaluated using check lists and would carry weightage for internal assessment. A timetable for the case presentation with names of the students should be announced in advance.

5. **Clinico-Pathological Conference:** Recommended once a month for all post graduate students. Presentation to be done by rotation. Presentations will be assessed using checklist. If cases are not available due to lack of clinical postmortems, it could be supplemented by published CPCs.

6. **Inter Departmental Meetings:** Strongly recommended at least once a month. These meetings should be attended by post-graduate students and relevant entries must be made in the Log Book. Interesting cases shall be chosen and presented by the post-graduate students and discussed by them as well as the senior staff of Pathology department. The staff of Pathology department would then show the slides and present final diagnosis. In these sessions the advanced immuno-histo-chemical techniques, the burgeoning markers, other recent developments can be discussed.

7. **Teaching Skills:** Post-graduate students must teach under graduate students (eg. Medical, Nursing) by taking demonstrations, bedside clinics, tutorials, lectures etc. Assessment is made using a checklist by medical faculty as well as by the students. Record of their participation is to be kept in Log Book. Training of postgraduate students in Educational Science and Technology is recommended.

8. **Continuing Medical Education Programmes (CME):** Recommended that at least 1 state level CME programmes should be attended by each student during the course.

9. **Conferences:** Attending conference is compulsory. Post-graduate student should attend one national and one state level conference during the course.

10. **Research Activities:** The Post-graduate students to be encouraged to carry out research activities in the department other than dissertation work.

B) Clinical / Practical Training :

I. Rotational Postings in other Departments :

Biochemistry	-	2 months
Microbiology	-	2 months
Blood Bank	-	5 months

2. Details of training in the subject :

Histopathology	-	6 months
Haematology	-	6 months
Cytology	-	5 months
Chemical	-	4 months
Museum/Autopsy	-	6 months

V. OTHER CRITERIA TO BE FULFILLED FOR THE DEGREE COURSE:

1. Internal evaluation:

During the course of three years, the department will conduct three tests. Two of them will be annual, one at the end of first year and the other will be at the end of second year. The third test will be a preliminary examination which may be held three months before the final examination. The test may include the written papers, practicals and viva-voce. Records and marks obtained in such tests will be maintained by the head of the department and will be sent to the University when called for.

Results of all evaluations should be entered into P.G's diary and departmental file for documentation purposes. Main purpose of periodic examination and accountability is to ensure clinical expertise of students with practical and communication skills and balance broader concept of diagnostic and therapeutic challenges.

2. Maintenance of Log Book:

Every candidate shall maintain a Log book/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. All the procedures performed by the post graduate students should be entered in the Log book. All the daily activities including the ward rounds and the routine procedures performed on day to day basis should be entered in the Log book and it should be verified and signed by the faculty member. The Log book shall be scrutinized and certified by the Head of the Department and Head of the Institution, and presented in the University practical/ clinical examination.

3. Dissertation:

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

For details regarding DISSERTATION Refer 9.1 to 9.11 of Chapter-I.

VI. SCHEME OF EXAMINATION:

Candidates will be allowed to appear for examination only if attendance (Minimum 80%) and internal assessment are satisfactory and dissertation is accepted.

A. Theory : 400 Marks

There shall be four papers, each of three hours duration. Total marks of each paper will be 100. Questions on recent advances may be asked in any or all the papers. The format of each paper will be same as shown below.

Type of Questions	No. of Questions	Marks for each question	Total Marks
Long essay	02	20	40
Short essay	06	10	60
		Grand Total	**100**

Paper I - General Pathology including environmental pathology / Pathophysiology / Immunopathology with recent advances and applied pathology - 100 Marks

Paper II - Haematology/Clinical Pathology/Cytology/Transfusion medicine
Recent advances and applied pathology - 100 Marks

Paper III - Systemic Pathology - 100 Marks

Cardio vascular system, Respiratory system, Gastro intestinal System including liver & Biliary tract, Pancreas, Renal system Male and female Genital system and Breast. Recent advances and applied pathology

Paper IV - Systemic Pathology - 100 Marks

Central and Peripheral nervous system, endocrine system, Musculo-skeletal system, Reticulo-Endothelial System (Lymph nodes, Spleen and Thymus), Dermatopathology and Ophthalmic pathology, Bone, Joints and soft tissues. Recent advances and applied pathology

Note : The distribution of chapters/topics shown against the papers are suggestive only and may overlap or change.

B. Practical Examination: 300 Marks

Duration - 3 days

DAY 1:

a. Autopsy/Reconstructed autopsy (organ systems) - 30 Marks

b. Gross/morbid Anatomy - 10 specimens - 30 Marks

c. Haematology & Cytology slides – 10 + 10 slides - 60 Marks

d. Histopathological Techniques: - 40 Marks

1. Frozen section,
2. Block cutting and staining - H & E
3. Special stain (minimum of 4 special stains)

4. Cytology stain (minimum of 2 special stains)

e) Lecture topic allotment

DAY 2: a. Haematology and clinical pathology

(i) Clinical case/History/clinical data discussion - 30 Marks

(ii) Haematology exercise including Blood Banking - 30 Marks

b. Histopathology slides - 20 slides - 60 Marks

DAY 3: Autopsy Final Report - 20 Marks

All practical exercises are to be evaluated jointly by all the examiners. an oral question answer session should be conducted at the end of each exercise.

C. Viva- Voce Examination: 100 Marks

Aims : To elicit candidate's knowledge and investigative/therapeutic skills.

1) Viva-voce examination - [80 Marks]

All examiners will conduct viva-voce conjointly on candidate's comprehension, analytical approach, expression and interpretation of data. It includes all components of course contents. In addition candidates may be given case reports, spriometry, ABG, gross specimens, histo-pathology slides, X-rays, ultrasound, CT scan images, PFT report, ventilation-perfusion scan images, etc., for interpretation and questions on these as well as use of instruments will be asked. Student's knowledge on use of instruments and drugs pertaining to the respiratory system will also be evaluated during viva-voce examination. It includes discussion on dissertation also.

2) Pedgogy Exercise and Log Book - [20 Marks]

(i) Candidate is asked to make a presentation for 8-10 minutes on a topic given in the beginning of clinical examination. 10 Marks

(ii) Candidate is asked to make a presentation for 8-10 minutes on the dissertation topic and the review of Log Book. 10 Marks

D. Maximum Marks:

	Theory	Practical	Viva	Grand Total
Maximum marks for M.D. Pathology	**400**	**300**	**100**	**800**

VII. RECOMMENDED BOOKS (LATEST EDITIONS):

Sl. No.	Name of the Textbook	Authors	Publisher
1	Robbins and Cotrans Pathologic Basis of Disease	Kumar V, Abbas AK, Fausto N	Elsevier
2	Anderson's Pathology,	Damjanov I, Linder J	C.V.Mosby Company St.Louis.
3	Oxford Text Book Of Pathology Vol. 1, 2a, 2b	Mc Gee, Isaacson and Wright Edited	Oxford University Press
4	General Pathology	J.B.Walter, M.S.Israel	Churchill Livingstone
5	Systemic Pathology 16 Volumes,	Emeritus Editor: W.st. Symmers	Churchill Livingstone
6	Ackerman's Surgical Pathology	Jaun Rosai, M.D.	C.V. Mosby company.
7	Surgical Pathology	Walter F Coalson	Lippincott
8	Soft Tissue Tumours	Enzinger and Weiss	B.I.Publications (India) C.V.Mosby company
9	Histopathology Of The Skin	Wf Lever - GS Lever	J.B. Lippin Cott Company
10	EVAN'S Histological Appearances Of Tumours	David J.B.Ashley	Churchill Livingstone
11	Gynecologic And Obstetric Pathology	Novak & Woodruff Edited, Novak's	Kiaku Shoin/ Saunders
12	Diagnostic Cytology And Its Histopathologic Basis	Leopold G Koss	J.G.Lippincott Company
13	Comprehensive Cytopathology	Marluce Bibbo	W.B. Saunders and Company
14	Diagnostic Cytopathology	Winnifred Grey	Churchill Livingstone

15	Fine Needle Aspiration Cytology (Manual & Atlas)	Orell, Sterrett, Walters & Whittaker	Churchill Livingstone
16	Neoplastic Haematopathology	Daniel M Knowles	Williams & Wilkins
18	De Gruchy's Clinical Haematology In Medical Practice	Firkin, Chesterman, Penington, & Rush,	Blackwell Publishing
19	Ophthalmic Pathology	Prema V Iyer & Robert Rowland	Churchill Livingstone
20	Clinical Diagnosis And Management By Laboratory Method	Todd, Sanford, Davidson	W.B.Saunders and Company
21	Surgical Pathology And Laboratory Techniques	Dr. Shameem Sharif	Prism publications
22	Diagnostic Histopathology Of Tumours Vol. 1 & 2,	ChristopherD.M.Fletcher	Churchill Livingstone
23	Laboratory Techniques in Surgical Pathology	Shameem Shariff	1.4.1999, Bangalore, Prism Pvt. Ltd.
24	Dacie and Lewis. Practical Hematolgy	Lewis SM, Bain BJ, Bates	Churchill Livingstone. London.
25	Haematology Basic Principles and Practice.	Hoffman R, Berz EJ, Shattil S	Churchil Livingstone
26	Principles and Practice of Surgical Pathology and Cytopathology	Silverberg	Churchil Livingstone.
27	Pathology Practical and Quick Review	Ganga S. Pilli	CBS Publishers & distributors Pvt. Ltd.

VIII. RECOMMENDED JOURNALS:

Sl. No.	Name of the Journal
1	British Journal of Haematology
2	CANCER, International journal of the American cancer society
3	American journal of Clinical Pathology.
4	Hematology /Oncology Clinics of North America
5	Histopathology, Journal of the British Division of the international Academy of pathology
6	The American journal of Surgical Pathology,
7	ACTA Cytologica, The journal of clinical cytology and cytopathology
8	Archives of pathology and Laboratory medicine
9	The Indian Journal of Pathology & Microbiology
10	The Indian Journal of Cancer
11	Human Pathology,
12	Journal of cytology
13	National & International Journals of other Clinical/paraclinical subjects-Eg-OBG & Gyn, Orthopaedics, Ophthalmology etc.

POST GRADUATE DEGREE COURSE
M.D IN MICROBIOLOGY

I. GOALS :

The main aim 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 assignments in medical colleges/institutions.

II. OBJECTIVES :

A candidate upon successfully qualifying in the MD (Microbiology) examinations, should be able to **:**

a. Be a competent Microbiologist.

b. Conduct such clinical/experimental research as would have significant bearing on human health and patient care.

c. Interact with the allied departments by rendering services in advanced laboratory investigations.

d. Conduct collaborative research in the field of Microbiology & allied sciences.

e. Demonstrate to the students how the knowledge of Microbiology can be used in a variety of clinical settings to solve diagnostic and therapeutic problems.

f. Undertake teaching assignment of microbiology in a medical college.

The following specific objective are laid out to achieve the goals of the course. These objectives are to be achieved by the time the candidate completes the course. The objectives may be considered under the following subheadings.

1. Knowledge
2. Skills
3. Human values, ethical practice and communication abilities.

1. Knowledge :

General Bacteriology :

1. Understand the contributions of various pioneers in microbiology.
2. Describe the types, working principles and applications of Compound microscope, Phase contrast microscope, Dark ground, Fluorescent Polorised microscope & Electron Microscope.
3. Identify various morphological forms of bacteria and other micro-organisms.
4. Understand nomenclature and classification of microbes.
5. Describe the physiology of growth, metabolism and nutrition of bacteria.
6. Understand various sterilization methods and their applications.
7. Describe various mechanisms of virulence in bacteria and understand their clinical applications.
8. Understand the principles and applications of bacterial genetics and gene cloning.
9. Understand and apply various antibacterial substance used in the treatment of infection and drug resistance in bacteria.
10. Learn normal flora of human body, ecology of hospital environment, air, water, food & milk.
11. Discuss / Describe host parasite relationship.

Immunology :

1. Describe the anatomy and physiology of innate immunity.
2. Differentiate between innate and acquired immunity.
3. Discuss structure and function of antigen and antibodies.
4. Understand the function of complement in health and disease.
5. Describe various antigen and antibody reactions with their applications in the diagnosis of various diseases.

6. Understand the mechanisms of cellular and humoral immunity.
7. Classify various types of hypersensitivity reactions and describe their role in various diseases.
8. Recognize various immunodeficiency disorders & autoimmune diseases.
9. Describe the mechanisms of immunotolerance and surveillance.
10. Describe various types of transplants and mechanisms in graft versus host reactions.
11. Understand the role of immunity in tumours and describe various tumour antigens / markers.
12. Understand and apply the role of immunoprophylaxis and immunotherapy in various diseases / disorders.
13. Discuss the scope of qualitative / quantitative estimation of various antigen & antibodies in health & disease.

Systemic Bacteriology :

Describe the morphology, cultural characteristics, biochemical reactions, antigenic structure, virulence factors, pathogenicity, laboratory diagnosis epidemiology of the disease caused, preventive and control measures and recent advances in detail of all the pathogenic bacteria.

Virology

1. General virology

Describe the morphology, classification, replication, cultivation, pathogenesis, host response, antiviral agents and viral genetics.

Describe the structure and functions of Bacteriophages.

II. Systemic virology

Describe in detail the morphology, general properties, classification, pathogenesis, laboratory diagnosis, epidemiology, prevention & control

measures of all the pathogenic DNA & RNA viruses including their recent advances in the field of medical virology.

Parasitology

Describe the geographical distribution, habitat, morphology, life cycle, immunology, pathogenicity, clinical features, complications, laboratory diagnosis, treatment and prophylaxis of all the Protozoan and Helminthic parasites of medical importance including the recent advances in the field of parasitology.

Mycology

Describe the structure, classification, morphology, reproduction, pathogenesis, clinical features, laboratory diagnosis and epidemiology of all the fungi of medical importance including the recent advances in the field of mycology.

Applied microbiology

1. Discuss the epidemiology of various infectious diseases.
2. Describe hospital acquired infections and discus the role of microbiologist in the control of hospital acquired infections and hospital waste management.
3. Describe the principles and applications of various molecular techniques in diagnostic microbiology.
4. Describe the principles, methods of preparation, storage, routes of administration, indications, contraindications, complications of vaccines. Discuss Universal Immunization Programme.

2. SKILLS

General Bacteriology :

1. Washing and sterilization of glassware and other articles.
2. Disposal of contaminated materials.
3. Operation and maintenance of autoclave, hot air oven, distillation plant, filters like Seitz, Membrane and sterility tests.
4. Testing of disinfectants – Phenol coefficient test and its use.

5. Preparation and Quality control of media, stains, reagents etc.
6. Aseptic practices in Laboratory and safety precautions.
7. Care and operation of microscopes viz., compound, Dark ground, Phase Contrast and Fluorescent microscope, (Electron microscope).
8. Care and breeding of laboratory animals viz. Mice, Rats, Guinea pigs Rabbits, and also experiments on various laboratory animals.

Systemic Bacteriology

1. Preparation of stains viz, Grams, Alberts, , Ziehl Neelsens, Capsular and spore staining etc., and performation of staining techniques
2. Preparation and pouring of media – Nutrient agar, Blood agar, Mac Conkey agar, Sugars, Kligler iron agar, Robertsons cooked meat, Lowenstein Jensens, Sabouraud's Dextrose agar etc..
3. Preparation of reagents – Oxidase, Kovac, MR, VP, Nitrate broth etc.
4. Preparation of antibiotic discs ; performance of Kirby Bauer, Stokes etc., Estimation of Minimal inhibitory/Bactericidal concentrations by tube/ agar dilution methods.
5. Tests for Beta lactamases.
6. Techniques of anaerobiosis.
7. Collection of specimens for Microbiological investigations.
8. Identification of Bacteria of Medical Importance upto species level
9. Skin tests - Mantoux, Lepromin, Casoni's test etc.
10. Conjugation experiments.
11. Serum antibiotic assay.
12. Phage typing of bacteria.
13. Toxigenecity tests.
14. Sero grouping of streptococci.
15. Antibiotic susceptibility test for Mycobacteria.

Immunology:

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

Mycology :

1. Collection and processing of clinical specimens for fungal infections.
2. Perform special techniques like Woods lamp examination, hair baiting techniques, slide cultures.
3. Maintenance of stock culture.
4. Perform animal pathogenicity tests for Cryptococcus and Candida.

Parasitology :

1. Examination of stool for ova and cysts : Direct and Concentration methods.
2. Carryout egg counting techniques.
3. Examination of peripheral blood, urine, CSF, and other body fluids for parasites.
4. Examination and identification of histopathology slides for parasitic infection.
5. Perform serological tests for parasitic diseases.
6. Preservation of parasites.
7. Permanent staining techniques for parasites.
8. Perform In-vitro culture for parasites, viz., Malarial parasites, Entamoeba and Ancylostoma. Etc.

Virology:

1. Cultivation of viruses and identification of CPE in various tissue cultures.
2. Perform serological tests for viral infections.
3. Handling of experimental animals and collection of various samples for evidence of viral infection in animals.
4. Carryout laboratory diagnosis of all important viral infection.
5. Execute laboratory safety measures.

3. Human values, Ethical practice and Communication abilities:

- Adopt ethical principles in all aspects of his/her practice; professional honesty and integrity are to be fostered. Care is to be delivered irrespective of the social status, caste, creed or religion of the patient.
- Develop communication skills, in particular the skill to explain various options available in management and to obtain a true informed consent from the patient.
- Provide leadership and get the best out of his team in a congenial working atmosphere.
- Apply high moral and ethical standard while carrying out human or animal research.
- Be humble and accept the limitations in his knowledge and skill and to ask for help from colleagues when needed.
- Respect patient's rights and privileges including patient's right to information and right to seek a second opinion.

III. 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. Culture Media & techniques
7. Bacterial metabolism.

8. Sterilization and disinfection.
9. Bacterial toxins.
10. Bacterial antagonism : Bacteriocin.
11. Bacterial genetics.
12. Gene cloning.
13. Antibacterial substances used in the treatment of infections and drug resistance in bacteria.
14. Bacterial ecology-Normal flora of human body, Hospital environment, Air, Water food and Milk.
15. Host parasite relationship.

Immunology :

1. Normal immune system.
2. Innate immunity.
3. Antigens.
4. Immunoglobulins.
5. Complement.
6. Antigen-Antibody reactions.
7. Cell mediated immunity.
8. Humoral immunity.
9. Hypersensitivity.
10. Immunodeficiency diseases..
11. Auto-immunity.
12. Immunotolerance.
13. Immunology of transplantation.
14. Tumour immunology.
15. Prophylaxis and immunotherapy.
16. Measurement of immunity.
17. Immunohaematology.

SYSTEMATIC BACTERIOLOGY

1. Isolation, description and identification of bacteria.
2. Staphylococcus and Micrococcus.
3. Streptococcus and Lactobacillus.
4. Neisseriae, Branhamella & Moraxella.
5. Corynebacterium and other coryniform organisms.

6. Bacillus.
7. Clostridia.
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. Spirochaetes.
17. Chlamydiae.
18. Rickettsiae.
19. Non sporing Anaerobes.
20. Mycoplasmatales : Mycoplsama, Ureaplasma, Acholeplasma.
21. Erysipelothrix and Listeria.
22. Chromobacterium, Flavobacterium, Acinetobacter and Alkaligens.
23. Miscellaneous bacteria.

Virology

General Virology

1. Classification of Viruses.
2. Morphology of Viruses.
3. Replication of Viruses.
4. Cultivation & Assay of Viruses.
5. Genetics of Viruses.
6. Viral Pathogenesis & Host Response.
7. Immunity in Viral infections.
8. Vaccines and antiviral agents.
9. Bacteriophage.

Systemic Virology
DNA Viruses

1. Herpetoviridae.
2. Poxviridae.

3. Adenoviridae.
4. Papovaviridae.
5. Parvoviridae.

RNA Viruses

1. Picornaviridae.
2. Myxoviridae
3. Arboviridae
4. Retroviridae.
5. Hepatitis Viruses.
6. Oncogenic Viruses.
7. Slow Viruses.
8. Teratogenic Viruses.
9. Miscellaneous Viruses.

Parasitology

1. Protozoan parasites of medical importance : Entamoeba, Free living Amoeba, Giardia, Trichomonas, Leishmania, Trypanosoma, Plasmodia, Toxoplasma, Sarcocystis, Cryptosporidia, Cylospora,Isospora, Babesia, Balantidium etc.

2. Helminthology : Medically important helminths belonging to Cestodes, Trematode and Nematode.

Cestode	:	Diphyllobothrium, Taenia, Echinococus, Hymeonolepis, Dipylidium, Multiceps etc.
Trematode	:	Schistosoma, Fasciola, Gastrodiscoides, Paragonimus, Clonarchis, Opisthorchis, etc.
Nematodes	:	Trichuris, Trichinella, Strongyloides, Ancylostoma, Ascaris, Enterobius, Filarial worms, Dracunculus, etc.
Ectoparasites	:	Common arthropods and other vectors.

Mycology

1. Classification of fungi .
2. The morphology and reproduction in fungi
3. Contaminant and opportunistic fungi.
4. Superficial mycotic infections.

5. Subcutaneous mycotic infections.
6. Systemic mycotic infections.
7. Antifungal agents

Applied Microbiology

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.

IV. TEACHING AND LEARNING ACTIVITIES:

A. Theoretical Teaching:

1. Lectures :

Lectures are to be kept to a minimum. Certain selected topics can be taken as lectures. Lectures may be didactic or integrated.

2. Journal Club :

Journal clubs are held once a week. All the PG students are expected to attend and actively participate in the discussion and enter in the log book relevant details. The presentations are evaluated using check list and would carry weightage for internal assessment. A timetable for the subject with names of the students and the moderator is announced well in advance.

3. Subject Seminar :

Seminars shall be conducted once a week on the theory question topic. All the PG students are expected to attend and actively participate in the discussion and enter in the log book relevant details. The presentations are evaluated using check list and would carry weightage for internal assessment. A timetable for the subject with names of the students and the moderator is announced well in advance.

4. Teaching Skills :

Post Graduate students teach undergraduate students (eg. Medical, BDS, Nursing, BPT, Allied Courses) by taking demonstrations and lectures. Assessment is made using checklist by medical faculty as well as by the students. Record of their participation is to be kept in log book. Training of Post Graduate students in educational science and technology is recommended.

5. **Symposia :**
   Symposia are conducted once in every semester.

6. **Continuing Medical Education Programmes (CME) :**
   All Post Graduate students should attend atleast 1 state CME programmes.

7. **Conferences :**
   Attending conference is compulsory. Post-graduate student should attend one national and one state level conference during the course.

8. **Research Activities :**
   The Post-graduate students are encouraged to carry out research activities in the department other than dissertation work.

B. Practical Training:

1. **Rotational Postings in different sections :**
   Each candidate is posted to different sections on rotation.

Scheme of Training:

I Term	Each student shall undergo orientation in various sections of microbiology during the first 3 months so as to get familiarized 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 bacteria 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

2. Culture seminars and discussions :

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 :

Clinical sample seminars are held once a month by processing the clinical samples for isolation and identification of the microbes causing that condition.

4. Animal Experiment :

Experiments are conducted periodically.

Posting to 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.

V. OTHER CRITERIA TO BE FULFILLED FOR THE DEGREE COURSE :

1. Internal evaluation :

During the course of three years, the department will conduct three tests. Two of them will be annual, one at the end of first year and other at the end of second year. The third test will a preliminary examination which may be held three months before the final examination. The test may include the written papers, practicals / clinicals and viva-voce. Records and marks obtained in such tests will be maintained by the head of the department and will be sent to the University when called for.

Results of all evaluations should be entered into P.G's diary and departmental file for documentation purposes. Main purpose of periodic examination and

accountability is to ensure clinical expertise of students with practical and communication skills and balance broader concept of diagnostic and therapeutic challenges.

2. Maintenance of Log Book :

Every candidate shall maintain a Log Book/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 candidates as well as details of clinical or laboratory procedures, if any, conducted by the candidate. All the procedures performed by the post graduate students should be entered in the Log Book. All the daily activities including the ward rounds and the routine procedures performed on day to day basis should be entered in the Log Book and it should be verified and signed by the faculty members. The Log Book shall be scrutinized and certified by the Head of the Department and Head of the Institution, and presented in the University practical/clinical examination.

3. Dissertation :

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

For details regarding DISSERTATION Refer 9.1 to9.11 of Chapter –I.

VI. SCHEME OF EXAMINATION :

Candidate will be allowed to appear for examination only if attendance (minimum 80%) and internal assessment are satisfactory and dissertation is accepted.

A. Theory : **400Marks**

There shall be four question papers, each of three hours duration. Total marks of each paper will be 100. Questions on recent advances may be asked in any or all the papers. The format of each paper will be same as shown below.

Type of Questions	No. of Questions	Marks for each question	Total marks
Long essay	02	20	40
Short essay	06	10	60
Grand total			100

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

PAPER I General Microbiology & Immunology.

PAPER II Systematic Bacteriology.

PAPER III Mycology & Virology

PAPER IV Parasitology.

Note : The distribution of chapters/topics shown against the papers are suggestive only and may overlap or change.

B. Practical Examination : 300Marks

To elicit competence in practical skills and to discuss differential diagnostic therapeutic aspects.

S.No.	Exercise	Marks
1	Bacteriology exercise I & II	90
2	Serology exercise	35
3	Mycology exercise	35
4	Virology exercise	30
5	Animal experiment	20
6	Applied Microbiology & special techniques.	20
7	Parasitology	25
8	Reporting on slides	45
	Total	**300**

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)

All examiners will conduct viva-voce conjointly on candidate's 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 and Log Book : (20 Marks)

i. Candidate is asked to make a presentation for 8 – 10 minutes on a topic given in the beginning of practical examination.

ii. Candidate is asked to make a presentation for 8-10 minutes on the dissertation topic and the review of Log Book.

D. Maximum Marks:

Maximum marks for M.D. Microbiology	Theory	Practical	Viva	Grand Total
	400	300	100	800

VII. RECOMMENDED BOOKS (LATEST EDITIONS) :

Sl.No.	Name of the Textbook	Authors	Publishers
1	Medical Microbiology,	Samuel Baron	Churchill Livingstone Inc.
2	Laboratory Diagnosis of Viral Infections, ,	Edmin H Lennette	Newyork Marcel Dekker, Inc.
3	Manson's Tropical Diseases,	Gordon Cook	London, ELBS.
4	Bergey's Manual of Determinative Bacteriology,	John G Holt et al	Maryland, Williams & Wilkins.
5	Manual of Clinical Microbiology, 1	Albert Balows	Washington D.C, American Society for Microbiology.
6	Bailey & Scott's Diagnostic Microbiology,	Ellen Jo Baron et al	Missouri, Mosby.
7	Clinical Virology,	Douglas D. Richman	Newyork, Churchill Livingstone.
8	Burrows Textbook of Microbiology,	Bob A Freeman	W.B. Saunders.
9	Anaerobes in Human Disease,	Brian I Duerden & B. S. Drasar	Great Britain, Edward Arnold.
10	Introduction to Diagnostic Microbiology, Colour Atlas and Textbook of Diagnostic Microbiology. 2006.	Elmer W Koneman Etal	Philadelphia, J.B. Lippincott Company.
11	Field Virology, Vol. 1,	Bernard N Fields et al	Philadelphia, Lippincott-Ramen.
12	Medical Microbiology, A guide to Microbial Infections, Pathogenesis, Immunity, Laboratory Diagnosis and Control,	Danial Greenwood et al	London, Churchill Livingstone.
13	Mackie & McCartney Practical Medical Microbiology,	J.G. Collee et al	London, Churchill Livingstone.
14	Hospital Infections,	John V Bennett & Philip S Brachman	Little Brown.
15	Manual of Clinical Laboratory Immunology,	Noel R Rose et al	Washington D.C, Americal Society for Microbiology.
16	Fundamental Immunology,	William E Paul	Newyork, Raven Press.
17	Medical Immunology,	Stites D. P. Terr AI, Parslow T.G.	Appleton & Lange, USA

18	Cellular and Molecular Immunology,	Abbas A.K., Lichtman Att	Saunders.
19	Manual of Clinical Laboratory Immunology,	Rose N.R., Macario EC	American Society for Microbiology.
20	Essential Immunology,	Roitt IM, Delves PJ, Roitts	Blackwell Scientific Publisher.
21	Microbiology and Microbial infections,	Topley & Wilson's	Arnold.

VIII RECOMMENDED JOURNALS:

Sl.No.	Name of the Journal
1	Journal of Medical Microbiology. Lippincott-Raven Publishers, Pathological Society of Great Britain & Ireland,
2	Clinical Infectious Diseases. Pub : The University of Chicago Press, Chicago Illinois 60637,
3	Clinical Microbiology Reviews. Pub : The American Society for Microbiology.
4	Microbiology & Molecular Biology Reviews. (mmbr). Pub : American Society for Microbiology,
5	Journal of Clinical Microbiology (JCM). Pub : American Society for Microbiology,
6	The Journal of Infectious Diseases. Pub : The University of Chicago Press,
7	Journal of Communicable Diseases. Pub : The Indian Society for Malaria and other communicable disease.
8	Infectious Disease Clinics of North America. Pub : W.B. Saunde Company, A Division of Harcourt Brace & Company,
9	Indian Journal of Medical Microbiology, Pub : Indian Associates of Medical Microbiologists,
10	The Indian Journal of Medical Research. 2008. Pub : Indian Council of Medical Research, New Delhi.
11	Annual Review of Microbiology, 2008. Pub : Annual Reviews Inc. Palo Alto. California, USA.

ADDITIONAL READING :

Sl.No.	Name of the Textbook	Authors	Publishers
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	The elements of Research, writing and editing 1994	Santosh Kumar.	Dept. of Urology, JIPMER, Pondicherry.
4	Medical Education Principles and Practice, 1995.	Srinivasa D K etal.	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 f India, Kotla Road, New Delhi.
7	Francis C M, Medical Ethics, 1993.		J P Publications, Bangalore.
8	Indian National Science Academy, Guidelines for care and use of animals in Scientific Research, 1994.		New Delhi,
9	Internal National Committee of Medical Journal Editors, Uniform requirements for manuscripts submitted to biomedical journals, N Engl J Med 1991; 424-8		
10	Essentials of Medical Statistics , 1st Ed., 1988.	Kirkwood B R.	Oxford : Blackwell Scientific Publications
11	Methods in Bio statistics for medical students. 6th Ed. 1989.	Mahanjan B.K.	New Delhi, Jaypee Brothers Medical Publishers.
12	A Practical approach to PG dissertation.	Raveendran B. Gitanjali	New Delhi, J P Publications, 1998.

POST GRADUATE DEGREE COURSE

M.D. IN PHARMACOLOGY

I. GOALS:

The purpose of postgraduate programme (M.D.) isto standardize parmacology teaching at postgraduate level in accordance with MCI regulations, so as to achieve the course objectives.

II. OBJECTIVES:

The following objectives are laid out to achieve the goals of the course. These objectives are to be achieved by the time the candidate completes the course. the objectives may be considered under subheadings

1) Knowledge
2) Skills
3) Human values, ethical practice and communication skills
4) Basic Medical Research
5) Clinical research
6) Teaching in a Medical Institution
7) Assigned responsibility in pharmaceutical industry

1) Knowledge:

A candidate upon successfully qualifying in the M.D (Pharmacology) examination should be able to

1) Demonstrate sound knowledge of general pharmacology and systemic pharmacology, rational use of drugs and essential drug concept.

   (Through the knowledge mastered by:

   - Attending undergraduate lecture classes
   - Presenting and attending seminars on selected topics of general and systemic pharmacology.

- Attending integrated teaching
- Clinical problem solving exercises and critical evaluation of prescriptions.)

2) Update with recent advances in related fields and concepts such as Pharmacogenomics, Pharmcogenetics, Pharmaco-epidemology, Pharmacoeconomics, Pharmacovigilance, Chronopharmacology, Echopharmacology, Molecular- biology etc.

(By attending the seminars, group discussions, guest lectures, CME's, workshops, conferences etc).

3) Demonstrate knowledge of National Health Policy, drug rules and regulations in India and ethical issues concerned with animal/human research.

(By reviewing relevant literature & participation in group discussions).

2) Skills:

1) Teach pharmacology and therapeutics to medical and allied disciplines.

(Through the techniques learnt by attending and participating in lesson planning & teaching learning sessions under the guidance of faculty).

2) Plan and carry out basic and clinical research:

(Through guidelines & techniques learnt during training in experimental pharmacology, dissertation project, protocol writing and group discussion on pharmaco-epidemology).

3) Plan and conduct toxicity studies:

(Through the practical training involving experimental animals /isolated tissues).

4) Monitor therapeutic effects, adverse drug events and suspect drug toxicity through skills & knowledge to measure/ detect drugs in biological fluids and interpret the same in therapeutic/toxicological context.

(Through clinical posting and training in chemical/experimental pharmacology)

3) Human values, Ethical practice and Communication abilities.

- Adopt ethical principles in all aspects of his/ her research; professional

honesty and integrity are to be fostered.

- Develop communication skills;

  (Through paper presentation in conferences, research finding communication to medical journals and through critical review and comments on published papers).

- Provide leadership and get the best out of his team in a congenial working

  Atmosphere

- Apply high morale and ethical standard while carrying out animal research
- Be humble and accept the limitations in his knowledge and skill and to ask for

  help from colleagues when needed

- Respect patient's rights and privileges including patient's right to information and right to seek a second opinion.

III. COURSE CONTENTS :

THEORY

1. Basic and General Pharmacology:

Basic Principles of Pharmacodynamics and Kinetics, Molecular Pharmacology, Historical aspects of drug discovery, Evaluation of new drugs in animals and man, Gene based therapy and drug abuse, Pharmacoepidemiology.

2. Clinical Pharmacology :

Principles of Clinical Pharmacokinetics and their application in drug treatment, Clinical trials –conduct of clinical trials, ethical issues in clinical trials, informed consent and SOP-Standard operating procedures of clinical trials. Therapeutic drug monitoring, Adverse drug event monitoring and reporting, Principles of rational drug use, Essential drug concept, Adverse drug interactions, Drug information.

3. Chemical Pharmacology:

Basic Principles and using techniques of Colorimeter, Spectrophotometer, Chromatograph, & their use in research.

4. **Systemic Pharmacology and Therapeutics:**

   - Pharmacology of drugs acting on various organ systems, Chemotherapeutic agents and Immunomodulators.
   - Drug treatment of disease conditions.
   - Screening procedures for various drug categories in humans and animals.

5. **Toxicology :**

   - Drug poisoning and Principles of management.
   - Environmental, Occupational and Industrial Toxicology.

6. **Biostatistics:**

   Basic principles and their application in drug research.

7. **Recent advances in Pharmacology.**

8. **Special problems related to drug use in Different age groups, Pregnancy, lactation and Disease conditions.**

9. **Research Methodology :**

(The candidate shall get acquainted with various aspects of biomedical research including protocol writing so as to confidently undertake/ supervise research projects).

a. Basic Principles and related aspects.

b. Ethical issues related to research on human subjects and animals.

c. Ethical guidelines of ICMR, INSA for Breeding and conducting Experiments on Animals (Control and Supervision) Rules 1998.

PRACTICAL TRAINING

Objective: A candidate after passing M.D. Pharmacology examination should possess enough skills in testing the effects of drugs on the various isolated tissues and experimental animals specified below. He should also be well versed in analyzing and interpreting the observations and data obtained from the studies.

A. Experiments on Laboratory Animals:

1. Isolated tissue experiments:

a) Rat – uterus, phrenic nerve diaphragm, fundus, vas deferens, colon,etc.

b) Guinea Pig – ileum, vas deferens, heart (Langendorff's preparation), tracheal chain, duodenum etc.

c) Rabbit – heart (Langendorff's preparation), jejunum, duodenum, aortic strip etc.

2. Whole animal experiments:

i. In rat – screening of the drugs for the following activities:

- Anti-anxiety
- Anti depressant
- Anti – convulsant
- CNS stimulant
- Sedative and hypnotic
- Anti-inflammatory
- Analgesic
- Anti ulcer
- Anti-diabetic
- Anti-fertility

ii. In rabbit & guinea pig to screen the drugs for their :

- Local anesthetic activity
- Mydriatic and miotic activity

iii. In cat / dog (Computer Aided) to identify the nature of the drug by observing its effect on:

- Blood pressure

- Respiration
- Nictitating membrane
- Intestinal movements

3. Technique demonstration:

I. Blood withdrawal :

1. Rat– Tail vein, retro-orbital sinus puncture, cardiac puncture.
2. Rabbit – Marginal ear vein.

II. Intravenous/intraperitoneal/subcutaneous/oraldrug administration in rat, rabbit and mouse.

III. Measuring pedal volume

IV. Rat vaginal smear preparation & interpretation

B. Chemical Experiments:

1. Simple tests for detecting the chemical nature of drugs (alkaloids, glycosides, steroids, lead, fluoride etc).
2. Monitoring of drug level in body fluids using colorimeter, chromatograph and spectrophotometer.

COURSE DURATION: 3 Years (6 Terms of 6 months each)

WORK SCHEDULE

I TERM

- Search and identify dissertation topic in consultation with guide and collect the relevant literature. Preparation of synopsis and submission of the same to the University for registration.
- Participation in undergraduate teaching programmes.
- Journal review meetings.
- Seminars.
- Experimental pharmacology practical.

II TERM

- Journal review meetings.
- Seminars.
- Participation in undergraduate teaching programmes.
- Experimental pharmacology practicals
- Preparation for dissertation experiment.
- Test on General pharmacology, ANS and CVS.

III TERM

- Journal review meetings.
- Seminars.
- Participation in undergraduate teaching programme.
- Dissertation experiments.
- Experimental pharmacology practicals

IV TERM

- Journal review meetings
- Seminars.
- Participation in undergraduate teaching programme.
- Clinical posting.
- Dissertation experiments.
- Dissertation writing.
- Test on CNS and Chemotherapy.

V TERM

- Dissertation writing and submission to university.
- Journal review meetings.

- Seminars on selected topics.(Recent advances)
- Participation in undergraduate teaching programme.
- Experimental pharmacology practicals.
- Visit to pharmaceutical industry
- Visit to clinical trial centre
- Test on Endocrinology, Blood and Autacoids.

VI TERM

- Journal review meetings.
- Seminars on selected topics. (Recent advances)
- Experimental pharmacology practicals.

Preliminary examination (Theory and practical) similar to the university pattern.

IV TEACHING AND LEARNING ACTIVITIES:

A. Theoretical Teaching:

1. Lectures:

Lectures are to be kept to a minimum. Certain selected topics can be taken as lectures.Lectures may be didactic or integrated

2. Journal Club

Recommended to be held once a week. All the PG students are expected to attend and actively participate in discussion and enter in the log book the relevant details. The presentations would be evaluated using check lists and would carry weightage for internal assessment. A time table for the subject with names of the students and the moderator should be announced in advance.

3. Subject Seminar

Recommended to be held once a week. All the PG students are expected to attend and actively participate in discussion and enter in the log book the relevant details. The presentations would be evaluated using check lists and would carry weightage for internal assessment. A time table for the subject with names of the students and the moderator should be announced in advance

4. Continuing Medical Education Programmes (CME): Recommended that at least 1 state level CME programmes should be attended by each student during the course.

5. Interdepartmental Meetings:

Strongly recommended particularly with department of medicine at least once a month these meetings should be attended by post graduate students and relevant entries must be made in the log book

6. Conferences: Attending conference is compulsory. Post-graduate student should attend one national and one state level conference during the course.

7. Research Activities: The Post-graduate students to be encouraged to carry out research activities in the department other than dissertation work.

8. Teaching Skills: Post graduate students must teach undergraduate students by taking demonstrations ,tutorials ,lectures etc

B. Clinical / Practical Training:

1. Rotational Postings in other Departments:

A candidate of the M.D Degree Course in Pharmacology needs to be well versed in the applied aspects of pharmacology and therapeutics by attending rounds during clinical postings and learn about the recent drugs used presently in clinical practice, also discuss the rationality of the prescription with the staff. Postings in the wards of the Clinical departments will help the candidate get acquainted with the patterns of drug use, adverse drug reactions and interactions etc. Such postings will also help them to improve their communicating skills.

The following clinical postings are recommended:

Department	**Period of Posting**
General Medicine	02 Months
Pediatrics	01 Month
Anaesthesia and ICU	02 Weeks
Dermatology	02 Weeks
Psychiatry	02 Weeks
O.B.G.	02 Weeks
Total Duration	**5 Months**

In addition, a candidate will be posted for Pharmacovigilance posting in the hospital to get acquainted to procedures involved in reporting of adverse drug reactions for a minimum of 2 months.

Desirable activity :

A candidate desirous to attend industrial posting will be posted for a period of 2 months at renowned pharmaceutical industries to get hands on experience of the working culture and skills of the industries.

(Monitoring of clinical postings, would be through weekly discussions about interesting cases with critical appraisal of prescriptions).

2. Departmental Clinical Meetings

1. Criticism/ analysis of prescriptions
2. Newer drugs (drug of the week).

V OTHER CRITERIA TO BE FULFILLED FOR THE DEGREE COURSE:

1. Internal evaluation

During the course of three years, the department will conduct three tests. Two of them will be annual, one at the end of first year and other at the end of second year. The third test will be a preliminary examination which may be held three months before the final examination. The test may include the written papers, practicals and viva-voce. Records and marks obtained in such tests will be maintained by the head of the department and will be sent to the University when called for.

Results of all evaluations should be entered into P.G's diary and departmental file for documentation purposes. Main purpose of periodic examination and accountability is to ensure expertise of students with practical and communication skills

2. Maintenance of Log Book:

Every candidate shall maintain a Log book/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 procedures, if any, conducted by the candidate. All the procedures performed by the post graduate students should be entered in the Log

book. All the daily activities performed on day to day basis should be entered in the Log book and it should be verified and signed by the faculty member. The Log book shall be scrutinized and certified by the Head of the Department and Head of the Institution, and presented in the University practical/clinical examination.

3. Dissertation

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

For details regarding DISSERTATION Refer 9.1 to 9.11 of Chapter-I.

4. They should carry out practicals regularly in morning hours at least once a week (3-6 Hrs).

5. Actively participate in the departmental journal review meetings held every week.

6. Actively participate in the departmental seminars held every week.

7. They should participate in UG teaching programme like tutorials, Practical, Demonstrations and Integrated teaching etc.

8. They should regularly attend clinical meetings, guest lectures organized in the institution. .

VI) SCHEME OF EXAMINATION

Candidates will be allowed to appear for examination only if attendance (Minimum 80%) and internal assessment are satisfactory and dissertation is accepted

A. Theory : 400 Marks

There shall be four papers, each of three hours duration. Total marks of each paper will be 100. Questions on recent advances may be asked in any or all the papers. The format of each paper will be same as shown below.

Type of Questions	Number of questions	Marks for each question	Total Marks
Long Essay questions	02	20	40
Short Essay questions	06	10	60
GRAND TOTAL			**100**

DISTRIBUTION OF TOPICS FOR 4 THEORY PAPERS:

Paper I Basic and General Pharmacology including Bio-statistics, Toxicology.

Paper II Systemic Pharmacology – I:

Autonomic and Central Nervous system; Cardio vascular systems, Respiratory and Gastrointestinal systems including Diuretics and Blood.

Paper III Systemic Pharmacology - II:
Endocrines, Chemotherapy and Immunopharmacology.

Part IV Recent advances, Therapeutics and Experimental pharmacology.

Note : The distribution of chapters/topics shown against the papers are suggestive only and may overlap or change.

B) Practical Examination – 300 marks

To elicit candidates practical knowledge or logical approach, investigative and therapeutic skill.

(Practicals are to be held on 2 days, along with Viva-Voce at the end of second day).

	Experiments	Marks
1	Major Experiment : Bio Assay using Isolated Tissue)	80
2	Minor Experiment : Intact Animal / Chemical Test	60
3	Technique Demonstration	30
4	Clinical pharmacology: a) Research Protocol Writing b) Case Discussion	 25 25
5	Interpretation of Graph	20

6	Computer Animal Simulator	30
7	Journal Critiquing	10
8	Pedagogy*	20
TOTAL		**300**

C) Viva – Voce Examination: 100 Marks

Grand viva	80
Dissertation viva**	20
TOTAL MARKS	**100**

Viva-Voce Examination

All examiners will conduct viva-voice conjointly on candidates comprehension, analytical approach ,expression and interpretation of data. It includes all components of course contents and discussion on dissertation also.

Pedgogy Exercise and Log Book – [20 Marks]

* Candidate is asked to make a presentation for 8 – 10 minutes on a topic given in the beginning of clinical examination.

** Candidate is asked to make a presentation for 8 - 10 minutes on the dissertation topic and the review of Log Book.

D) MAXIMUM MARKS

	Theory	Practical	Viva	Grand Total
Maximum marks for M.D. Pharmacology	**400**	**300**	**100**	**800**

VII. RECHOMMENDED BOOKS (LATEST EDITIONS):

Sl.No	Name of the textbook	Authors	Publishers
1	The Pharmacological Basis of Therapeutics	Goodman & Gilman's	Mc Graw Hill
2	Pharmacology	Rang H P & Dale M M	Churchill Livingstone
3	Clinical Pharmacology	Laurence D R, Bennett P N & Brown M J	Churchill Livingstone
4	Basic and Clinical pharmacology	Katzung B G	Mc Graw Hill
5	Lewis's Pharmacology	Crossland J	Churchill Livingstone
6	Fundamentals of Experimental Pharmacology	Ghosh M N	Hilton and company
7	Screening methods in Pharmacology	Turner R A	Academic Press Inc Ltd
8	Evaluation of Drug Activities: Pharmacometrics" Volume - 1 & 2	Laurence D R & Bacharach A L	Academic Press Inc Ltd

VIII. RECOMMENDED JOURNALS:

Sl. No.	Name of the Journal
1	Annual Review of Pharmacology and Toxicology
2	Journal of Pharmacology and Experimental Therapeutics (Monthly).
3	Indian Journal of Pharmacology (Bimonthly).
4	Clinical Pharmacology and Therapeutics (Monthly)
5	Journal of Pharmacy and Pharmacology (Monthly).
6	Indian Journal of Experimental Biology (Monthly)
7	Other relevant periodicals available in the library or internet.

Sl. No.	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, Ministry of Health and Family Welfare, Govt. of India, Nirman Bhawan, New Delhi.
2	National Health Policy, Ministry of Health & Family Welfare, Nirman Bhawan, New Delhi.
3	Indian Council of Medical Research, "Policy Statement of Ethical considerations involved in Research on Human Subjects, 1982, I.C.M.R, New Delhi.
4	Code of Medical Ethics framed under section 33 of the Indian Medical Council Act, 1956. Medical Council of India, Kotla Road, New Delhi.
5	Francis C M, Medical Ethics, J P Publications.
6	Indian National Science Academy, Guidelines for care and use of animals in Scientific Research, New Delhi.
7	Mahajan B K, Methods in Bio statistics for medical students, 5th Ed.

JOURNAL REVIEW SHEET

Title :_____

Name of the Journal:_____

Authors :_____

Volume: _____ Page No: _____

Date: _____

Assement						
Sl. No.	Details of Teaching	Excellent 5	Very Good 4	Good 3	Average 2	Poor 1
1.	Name of the P.G.					
2	Journal Club / Case Presentation					
3.	Guide					
4.	Comment :					

Name & Signature of the Faculty .....

SEMINAR EVALUATION SHEET

Topic :_____

Reference Book:_____

Authors :_____

Edition: _____Chapter No:_____Page No: _____

Date: _____

Assement						
Sl. No.	Details of Teaching	Excellent 5	Very Good 4	Good 3	Average 2	Poor 1
1.	Name of the P.G.					
2	Seminar / Case Presentation					
3.	Guide					
4.	Comment :					

Name & Signature of the Faculty .....

POST GRADUATE DEGREE COURSE

M.D. IN FORENSIC MEDICINE AND TOXICOLOGY

I. GOALS:

A Post Graduate student by the end of the course should

1. Be a competent teacher, trainer, researcher and leader in the field.
2. Practice the speciality ethically and uphold the dignity of medical profession, codes of medical ethics consistent with national health policy and law of the land (India)
3. Undertake medico-legal responsibilities and discharge Medico-legal duties, which arise in day-to-day general practice as well as in hospital practices.
4. Identify and define existing as well as future Medico-legal problems as they emerge in the community and work to resolve such problems by planning, implementing, evaluating and modulating Medico-legal services.
5. Be a competent expert to guide Doctor, Medical Officers handling Medico-Legal cases both in living and dead.
6. Be a expert with reference to law in relation to practice of medicine, medical negligence and investigation of crime against human beings.

II OBJECTIVES:

1. Knowledge:

1. One should acquire basic skills in teaching, training, researching.
2. Keep themselves abreast with fundamental knowledge of all branches of medical disciplines related to their medico-legal applications and all recent developments and emerging trends in Forensic Medicine, Clinical Forensic Medicine. Medical Ethics and the Law.
3. Detect, describe, interpret the observations and conclude the procedure in a technically competent manner.
4. Deal with routine medico legal problems related to clinical cases in the hospital casualty, emergency, custodial and poison wards.

5. It is expected that they must be able to refer and understand relevant application of like botany, zoology chemistry, and physics.
6. Evaluate his professional activities, educational needs and select appropriate learning resources periodically.
7. Impart education in Forensic Medicine and Toxicology to under-graduate and post- graduate students with the help of modern teaching aids.
8. Assess the students' understanding of the subject of Forensic Medicine and toxicology.
9. Plan and modify the undergraduate curriculum.
10. Must be competent enough to teach subject to undergraduates.
11. Must be able to offer technically competent consultancy services to the health, home and law departments in connection with medicolegal work, crime investigation process and courts.
12. Must acquire the knowledge of basic computer.

2. Skill:

1. One should be well equipped with theoretical and practical knowledge.
2. Perform medico-legal autopsy independently with required physical assistance, prepare report and derive inferences.
3. Interpret histo-pathological, microbiological, radiological, chemical analysis, DNA profile and other investigative reports for medico-legal purposes.
4. Depose as an expert witness in a Court of Law on medico-legal matters.
5. Describe relevant legal/court procedures applicable to medico-legal/ medical practice.
6. Identify, examine, initiate management and prepare reports on medico-legal cases in emergency set up.
7. Identify and discharge all legal responsibilities in medico-legal cases.
8. Plan, organise and supervise medico-legal work in general/teaching /district hospitals and in any health care set up.

9. Interpret, analyse & review medico-legal reports prepared by other medical officers.

10. Collect, preserve and dispatch various trace evidences to the concerned authorities.

11. Identify and articulate the correct medical ethical position in relation to the patient, profession, society, state and humanity at large.

12. Interpret for and advice authorities on matters related to medical ethics and medicolegal issues.

13. Discharge his duties in respect to forensic, clinical, emergency, environmental, medico-legal and occupational aspects of toxicology.

14. Plan, organise and manage toxicological laboratory services.

15. Have fundamental knowledge of laboratory investigations as required in medico-legal situations as well as tests for spot detection of common poisons in autopsy room and in casualty.

16. Be aware of proceedings to visit the scene of crime, scene of occurrence and site of exhumation.

17. Detect, describe, interpret the observations and conclude the procedure in a technically competent manner.

18. Provide information and consultation on all aspects of toxicology to professionals, industry, Government and the public at large.

19. Encourage interaction with the allied departments by rendering services in advanced laboratory investigations and relevant expert opinion.

20. Encourage the student to participate in various workshops/seminars/journal clubs/ demonstration in the allied departments, to acquire various skills for collaborative research and tuning the knowledge.

21. Uphold the prestige of the discipline amongst the fraternity of doctors.

3. Human values, Ethical practice and Communication abilities

- Adopt ethical principles in all aspects of his/her practice; professional honesty and integrity are to be fostered. Care is to be delivered irrespective of the

social status, caste, creed or religion of the patient.

- Develop communication skills, in particular the skill to explain various options available in management and to obtain a true informed consent from the patient.
- Provide leadership and get the best out of his team in a congenial working atmosphere.
- Apply high moral and ethical standard while carrying out human or animal research.
- Be humble and accept the limitations in his knowledge and skill and to ask for help from colleagues when needed,
- Respect patient's rights and privileges including patient's right to information and right to seek a second opinion.

III. COURSE CONTENTS:

a. Theory

(A) BASIC SCIENCES IN RELATION TO THE FORENSIC MEDICINE
Anatomy:- Applied aspects in relation to Forensic Medicine. Surface land marks & regional anatomy of medico-legal significance.Brain and Cerebral Circulation. Heart and Coronary Circulation. Foetal circulation. Surface Landmark. Comparative Anatomical study of Male and Female Skeleton. Forensic Dentistry. Microscopic anatomy.
Physiology:- Applied aspects in relation to Forensic Medicine. Physiology of Thermoregulation. Physiology of Shock. Blood grouping and Rh. Incompatibility.
Biochemistry:- Applied aspects in relation to Forensic Medicine. Postmortem Chemistry of Blood and other body fluids and their Forensic aspects.
Pathology:- Applied aspects in relation to Forensic Medicine. General Pathology:- Ischemia, Infarction, Thrombosis, Embolism, Wound healing. Pathology of Scar. Gross and Microscopy in Myocardial Infarction and about common diseases in other organs. Patho-physiology of sexual functions. Important staining procedures and histopathology

Microbiology:- Applied aspects in relation to Forensic MedicineBasic concepts of immunology and serology.Principles of immunoserological test. Precipitin test. Pregnancy test. Anaphylaxis and Hypersensitivity. Wound infection. Entomology of Cadaver. Microbiology of Cadavers.

Pharmacology:-Applied aspects in relation to Forensic Medicine.

Pharmacology of addictive drugs and their effects. Drugs used to procure abortion. Drugs causing impotency. **Anaesthetic drugs** and their forensic aspects.

(B) FORENSIC MEDICINE

PART I- BASICS OF FORENSIC MEDICINE

1. INTRODUCTION WITH HISTORY:

Definitions of Forensic Medicine, medical jurisprudence etc. History of Forensic Medicine

2. LEGAL PROCEDURE

Relevant Sections of Cr.PC, IPC, IEA, Acts - CPA, MTP, PNDT, NDPS, OT, NHRC, juvenile courts Act etc. Immoral Trafficking Act, Workman's Compensation Act and other Laws related to Medical practice.Investigation of Death in Suspicious Circumstances, Inquest, Different types of Inquests, Types of Courts, Prosecutors, Trial of a Criminal Case, Witness and types, Summons, Procedure in court, Record of evidence. Evidences, types of evidence, Guidelines to a doctor in witness box, Examination of dead body at the scene of crime/death. Value of medical opinion in the court of law.

3. AUTOPSY, ARTEFACTS AND EXHUMATION

Autopsy –definition, types, Purpose, Rules and procedure. Autopsy room and facility for autopsy, and Biosafety.

External Examination, Examination of Clothing. Internal Examination. Viscera preservation -Procedure, preservative used. Examination of mutilated and charred bodies, skeletal remains. Obscure autopsy, negative autopsy, postmortem artifacts. Time since death, Preservation of dead bodies and organs . Embalming, Plastination. Exhumation, Virtual autopsy. removal of organ , body donation. Framing the cause of death in medicolegal autopsy

4. IDENTIFICATION IN DETAIL

Definition, Types, Data, Race, Sex in detail, Age, Teeth Morphology, eruption, bite marks, Gustafson's technique, etc. Bones-ossification and other changes, Developmental features in different ages, Medico legal importance of Age. Stature, Scars, Tattoo marks, Anthropometry. Dactylography, Foot print, Other prints, Hair and other fibers, Occupational Marks, Other identification features. Problems of reconstruction, Recent techniques in identification. Study of DNA profiling.

5. IDENTIFICATION FROM TRACE SUBSTANCES AND THEIR OTHER EVIDENTIAL VALUES

Locard's principle, Blood-Physical, Microscopic, Spectroscopic, Chemical, Micro chemical, Sero-immunological (group) tests, Disputed Paternity, abnormal Haemoglobin; Seminal fluid, Saliva, Vaginal fluid, Faecal and Urinary stain, Examination of Skin, Tooth pulp, Nail. Collection and preservation of trace elements, like hair and biological stains of blood, semen, sweat, saliva, milk, sputum etc.

6. FORENSIC SCIENCE LABORATORY(F.S.L.):

Introduction & working of various Wings of Forensic Science Laboratory - Physical, Biological, Immunology, Chemical and Ballistics, Crime Laboratory,

Examination of biological trace material evidence, Forensic Photography.Important Toxicological Analytical Techniques: Chromatography-Types, Electrophoresis, Spectroscopy, Spectrophotometry-Types, Uses of -Neutron Activation Analysis, Comparative microscope, Fluorescent microscope, Polarizing microscope, Electron scanning microscope, Polygraph, Narcoanalysis etc.

7. LABORATORY INVESTIGATION IN MEDICO LEGAL PRACTICE

Different types of specimen and tissues to be collected both in the living and dead. -Body fluids - blood, urine, semen, vaginal smear, saliva, Viscera, skull, specimen for DNA, PCR, specimen for histopathological examination, blood grouping and DNA finger printing in disputed paternity and maternity

- Methods of sample collection, preservation, labelling, dispatch, and interpretation of reports

8. EMERGING TECHNOLOGIES IN FORENSIC MEDICINE

Outline the principle and medico legal importance of :

DNA profiling, Polygraph (Lie Detector), Narco analysis, Brain Mapping, Digital autopsy, Virtual Autopsy, Imaging technologies, Nano technology

9. THANATOLOGY (Forensic Thanatology)

Definition of death, Types, Suspended animation, Moment of Death, Biomedical determination of death, Modes of death, Coma, Asphyxia, Syncope. Natural and sudden deaths- and their types, causes of death, Euthanasia, Medico-legal aspects of emergency, resuscitation in intensive care, Causes of death in wounds, Diagnosis of Locked in Syndrome /Coma Vigilante, PVS, Uniform Declaration of Death Act (UDDA) Presumption of death and Survivorship etc Natural Death and Sudden Death, Certification of cause of death.

Postmortem changes- Immediate, early and late changes, Sudden death .brain death, brainstem death. Organ transplantation and related Acts, Estimation of time of death, cold storage effect, Warm ischemia etc. Mortuary- Preservation of dead bodies and cold storage; and documentation in mortuary. Disposal of dead body

10. SUDDEN AND UNEXPECTED DEATHS: approaching the cause of death, post mortem demonstration of myocardial infarction, and other diseases.

11. THERMAL DEATHS

Definition and Classification, Hypothermia, Frostbite, Trench foot, Immersion foot, Heat hyperpyrexia (heatstroke, sunstroke), Heat Exhaustion (prostration), Heat cramps (miner's cramps) Burns, Scalds. Chemical burns

12. DEATH DUE TO ELECTRICITY, LIGHTNING AND RADIATIONS

Electrocution, wound of entry, wound of exit, electric burns, causes of death. Lightning-wound of entry, wound of exit, causes of death. Radiation injuries.

13. VIOLENT ASPHYXIAL DEATHS

Definitions, Classification, Hanging, Lynching, Strangulations by ligature, other materials, throttling, garroting, mugging Suffocations –smothering, Choking, café coronary, traumatic asphyxia, bansdola, gagging, overlying, burking; Masochistic asphyxial deaths, etc. submersion, Drowning-types, mechanism, laboratory tests and PM findings in detail

14. NEGLECT, STARVATION AND ABUSE OF HUMAN RIGHTS

Types of starvation, malnutrition and circumstances. hunger strikes and laws.

Features of physical abuse torture, Medico-legal aspects & duties of physician in cases of torture, human rights commission.

Custody related torture, crime and cruelty at home: Battered child, Battered wife, husband, elderly subjects, other members Dowry death , laws related to women.

15. DEATH ASSOCIATED WITH SURGERY AND ANAESTHESIA

PART II - FORENSIC TRAUMATOLOGY

16. INJURIES-LEGAL CONSIDERATIONS AND TYPES

Definitions, Different sections of I.P.C. related to offences against human body, Different classifications of bodily injuries. Hurt (Sec. 319 IPC), Grievous hurt (Sec.320 IPC), assault (Sec. 351IPC), Rash and negligent act (304 (A)) etc., Culpable homicide (Sec.299,300-302 IPC) - amounting to / not amounting to murder, Manslaughter.

17. MECHANICAL INJURIES

Biological and physical factors influence on mechanical injury;Mechanism and consequences of Abrasions, Bruise / contusion, Lacerations, Incised wounds, Chop wounds, Punctured wounds etc.

18. COMMUNICATION AND TRANSPORTATION INJURIES

Road Traffic Accidents. Injuries to pedestrian, two wheeler riders & occupant of vehicle.Railway Accidents, Aviation Accidents, Shipwrecks. Other vehicular / transportation accidents

19. REGIONAL INJURIES

Head injury. Head-Scalp and face injury, Fracture of Skull, Coup and Contre coup injury, Intracranial hemorrhages, Injuries to brain substance, Injuries on Neck, Chest, Abdomen, Limbs, Genital organs, Spinal cord.

20. MEDICO LEGAL ASPECTS OF INJURIES

Examination and reporting on wound in living and dead Factors influencing in dating of wound. Infliction of Injuries and Healing, Technique for dating of wound, Body's local and systemic response to trauma.

Answers to different legal questions. Causes of death in injury.

21. FIREARM INJURIES IN DETAIL AND BOMB EXPLOSION INJURIES

Definitions, types and parts of weapon,
Cartridge, parts of cartridge. Entry & Exit wound in rifled and smooth bored weapons. (Wound Ballistics).

22. MEDICO LEGAL MANAGEMENT OF MASS DISASTER INCLUDING BIOTERRORISM

PART III-CLINICAL FORENSIC MEDICINE

23. MANAGEMENT OF ML CASES IN CASUALTY:

Registration Isolation, Information, Maintenance of Record, Custody, Life saving maneuvers and pre-hospital first aid.

24. MEDICAL JURISPRUDENCE :LEGAL AND ETHICAL ASPECTS OF PRACTICE OF MEDICINE

Oath of Hippocrates, Declaration of Geneva-1948, International and National Code of medical Ethics, Etiquette, etc. Acts related to Medical Practice e.g.–Indian Medical Council and State Medical Council Acts, Bio-Medical Research.

Rights, Privileges and duties of a Registered Medical Practitioner, Professional secrecy, Privileged communication, Infamous conduct, Codes laid down by M.C.I. Malpractice or Negligence-Civil and Criminal, Medical Maloccurrence, Therapeutic Misadventure, Corporate Negligence, Common knowledge, Novus Actus Interveniens, Product liability, Duties of a Patient, Contributory negligence, vicarious responsibility, Doctrine of Res Ipsa Loquitur, etc., Precautions against charge of Negligence, C.P.A. or COPRA. Recent laws applicable to medical man.

25. CONSENT to and refusal of examination/ treatment.

26. EUTHANASIA, HUMAN ORGAN TRANSPLANTATION ACT Maintenance of Medical Records,

27. BLOOD TRANSFUSION & AIDS

Hazards of Blood Transfusion Social, Medical, Legal and Ethical Problems with AIDS, Autopsy in AIDS Cases

28. IMPOTENCE, FRIGIDITY STERILITY, VIRGINITY AND DEFLORATION

Definitions, Medico legal aspects, Causes of Sterilization, Certification, Artificial insemination. Definitions, Types of hymen, True virgin, False virgin. Impotence in female

29. LEGITIMACY AND MEDICOLEGAL ASPECTS OF MARRIAGE ANNULMENT

Legitimate and illegitimate child Disputed paternity and maternity. **Co-habitation and live in relation.**

30. PREGNANCY AND DELIVERY

Signs of pregnancy, Duration of pregnancy, Spalding's sign, Pseudocyesis , Fictious child, Post humus child, etc and Medico legal aspects.

Precipitated labour, Signs of recent and remote delivery in living and dead, Parous & Nulliparous uterus. Superfoetation, Superfecundation, Surrogate mother, Concealment of birth.

31. ABORTION

Types, Causes of natural abortion, Criminal abortion and I.P.C. Methods of abortion, MTP Act and Rule in detail. Causes of death, P.M. diagnosis, Diagnosis in living.

32. INFANTICIDE AND FOETICIDE:

Definitions, English law provision, Medico legal questions.

Still birth, Dead birth, Live birth, Signs of live birth. Signs of viability.

Natural causes of infant death, Modes of infanticide, acts of omission, acts of commission, Concealment of birth, Abandonment of child, Precipitated labour, Crib death, Battered child syndrome.

33. SEXUAL OFFENCES AND PERVERSIONS

Definitions, Types, Natural, Unnatural offences, Perversions. Relevant IPC sections. Method of examination of victim and accused. Preservation of material for microscopic and serological study

34. FORENSIC PSYCHIATRY

Role of Forensic Psychiatrist, Causes of Mental illness (insanity), Types, Some definitions- Psychopathic disorders, Schizophrenia, Epileptic insanity, Maniac-depressive psychosis, Mental retardation, Dementia. Impulse, Mental sub normality. Diagnosis of mental illness.

Mental Health Act 1987, True and feigned Mental illness. Restraint procedures.

Admission of Mentally ill person in a Hospital or Nursing Home-different methods, Discharge from Hospital, Civil and Criminal responsibilities of Mentally ill, Different criminal rules, Diminished responsibility.

(C) FORENSIC TOXICOLOGY

35. GENERAL ASPECTS

Definitions of Toxicology, Poisons, Drugs; Different Acts, Sources, Nature of use, Route of use, Actions, Factors influencing, Duties of Doctor, Diagnosis in living, in dead- by examination, Viscera preservation; Treatment, Classifications, analytical and clinical toxicology, Ideal Suicidal and Homicidal poisons.

36. CORROSIVE AGENTS

H_2SO_4, HNO_3, HCl, Carbolic acid, Oxalic acid, Corrosive alkalis etc

37. ORGANIC & INORGANIC CHEMICAL IRRITANTS

Mechanical: - Glass powder, Diamond Powder, Others.
Non-metallic inorganic Chemical irritants:-Chemical-Phosphorus, Chlorine, Iodine, etc.
Metallic inorganic Chemical irritants:- Arsenic, Mercury, Lead, Copper, Iron, etc.
Organic Chemical irritants :-Agricultural poisons – Classification, Organophosphorus, carbamate, endrine, Zinc phosphide, Aluminium phosphide, etc.

38. VEGETABLE IRRITANTS

Abrus, Castor, Croton, Semicarpus, Calotropis, Capsicum etc.

39. ANIMAL IRRITANTS

Snakes, Scorpions, Cantharides, bees & wasps.

40. CEREBRAL POISONS

Somniferous-Opium and Opiates, Morphine, Heroin, Pethidine, Codeine,
Inebriants- Ethyl alcohol, Methyl alcohol, Isopropyl alcohol, Chloroform,
Hypnotics-Barbiturates, Chloral hydrate.
Cerebral stimulants- Amphetamine, Caffeine, tranquillisers, etc.
Deliriants- Datura, (hyoscine, hyoscyamine, atropine, belladonna) Cocaine, Cannabis, etc.
Hallucinogen- L.S.D., Mescaline, Nutmeg, Hallucinogenic Dimethyl triptamine, Phencyclidine etc.
Miscellaneous—Kerosene, Formaldehyde, etc.

41. SPINAL & PERIPHERAL NERVE POISONS

Strychnine, Other than cholinesterase inhibitors, Curare, Botulin

42. CARDIAC POISONS Hydrocyanic acid and its salts, Aconite, Nicotine, Digitalis, Cerbera Thevetia, Nerium odorum, Quinine, etc.

43. ASPHYXIANTSCO, CO_2, H_2S. $COCl_2$ (Phosgene), SO_2, Phosphine, war gases, HCN, etc.

44. FOOD POISONS Botulin Toxin, Poisonous Mushrooms – (Amanita Muscaria, Phalloides, Destroying Angel) Lathyrus Sativa, Ergot, argemone mexicana, Ptomaines, Food Allergy, etc.

45. DRUG DEPENDENCE AND ABUSE General principle, Types of Abusers and Abused drugs, Factors mattering, Assessment and dealing of the problem.

(D) TEACHING AND EVALUATING

46. BASICS OF TEACHING: Teaching aids and types, teaching methods,

47. BASICS OF EVALUATION: Framing of question paper, framing of different types of questions -MCQs, Structured, Short, and Essay types OSCE and OSPE etc. Method of valuation and documentation and reproduction.

48. Medico-legal record keeping. Medical auditing.

49. Use and applicability of Computer in medicolegal work.

Note: The specified syllabus is minimal and may require time to time improvement as per advancement in the medical science and technical field.

b. Practical:

A. Reporting and certification in Medico legal cases

1. Autopsy: medicolegal autopsy of adult and foetal cases
2. Examination of injury cases
3. Examination for Age by physical, dental and radiological examination
4. Examination of X-ray films
5. Examination of Alcoholic/ other drugs intoxication cases
6. Examination of Sexual offence cases- accuse and victim
7. Examination of Psychiatry (any mental illness) cases for Psychiatric assessment of a patient.

8. Examination of Skeletal Remains
9. Examination of Photographs
10. Examination of Toxicology specimen and Detection of common poisons in Toxicology Laboratory (PDC).
11. Examination of Weapons
12. Expert opinion on medical and medicolegal reports, video graph, Photographs etc
13. Visiting scene of crime/ occurrence
14. Autopsy on Exhumed cases
15. Autopsy and giving evidence in the court of law to be done independently in third year

B. Other practical exercises

16. Procedures to preserve body, viscera, trace evidence etc
17. Preparation and study of histopathology slides.
18. Spot diagnosis of common poisons and its treatment / antidote
19. Awareness of various intensive care setups & operation theatre setups.
20. Court evidence / attendance
21. Attending CME/Workshops/Conference
22. Involvement in UG Teaching.
23. Specimen mounting with discretion

IV. TEACHING AND LEARNING ACTIVITIES:

A) Theoretical Teaching:

1. Lectures: Lectures are to be kept to a minimum. Certain selected topics can be taken as lectures. Lectures may be didactic or integrated.

2. Journal Club: Recommended to be held once a week. All the PG students are expected to attend and actively participate in discussion and enter in the Log Book the relevant details. The presentations would be evaluated using check lists and would carry weightage for internal assessment. A time table with names of the students and the moderator should be announced in advance.

3. **Subject Seminar:** Recommended to be held once a week. All the PG students are expected to attend and actively participate in discussion and enter in the Log Book relevant details. The presentations would be evaluated using check lists and would carry weightage for internal assessment. A timetable for the subject with names of the students and the moderator should be announced in advance.

4. **Case Discussion:** Recommended to be held once a week. Interesting cases may be chosen from ward or casualty or autopsy cases and presented by the post graduate students and discussed by them as well as the senior staff of the department and with the doctors involved in the cases. All the PG students are expected to attend and actively participate in discussion and enter in the Log Book relevant details. The presentations would be evaluated using check lists and would carry weightage for internal assessment. A timetable for the case presentation with names of the students should be announced in advance.

5. **Clinico-Pathological Conference:** Recommended once a month for all post graduate students. Presentation to be done by rotation. Presentations will be assessed using checklist. If cases are not available due to lack of clinical postmortems, it could be supplemented by published CPCs.

6. **Inter Departmental Meetings:** Strongly recommended particularly with departments of Pathology and Radio-Diagnosis at least once a month. These meetings should be attended by post-graduate students and relevant entries must be made in the Log Book.

   Pathology: Interesting cases shall be chosen and presented by the post-graduate students and discussed by them as well as the senior staff of Pathology department. The staff of Pathology department would then show the slides and present final diagnosis. In these sessions the advanced immuno-histo-chemical techniques, the burgeoning markers, other recent developments can be discussed.

   Radio-diagnosis: Interesting cases and the imaging modalities should be discussed. Emphasis should be given for the radiological differential diagnosis.

7. **Mortality Meeting (Post – Mortem Review):** The mortality meeting should be conducted in the department every month. The post graduate student should prepare the details regarding the cause of death after going through the case records in detail, and should present during the mortality meeting. The death records will be discussed in detail during this meeting.

8. **Teaching Skills:** Post-graduate students must teach under graduate students (eg. Medical, Nursing) by taking demonstrations, bedside clinics, tutorials, lectures etc. of medico legal cases, Autopsy etc. Assessment is made using a checklist by medical faculty as well as by the students. Record of their participation is to be kept in Log Book. Training of postgraduate students in Educational Science and Technology is recommended.

9. **Continuing Medical Education Programmes (CME):** Recommended that at least 1 state level CME programmes should be attended by each student during the course.

10. **Conferences:** Attending conference is compulsory. Post-graduate student should attend one national and one state level conference during the course.

11. **Research Activities:** The Post-graduate students to be encouraged to carry out research activities in the department other than dissertation work.

B) Clinical / Practical Training

1. **Rotation postings in other departments:**

Anatomy——2 weeks
Pathology——1month
Microbiology——2weeks
Dental –oral medicine and radiology——2weeks
Psychiatry——2weeks
Radiology——2weeks
FSL——3 weeks
Medical education dept. ——1week

2. **Details of training in the subject:**

Casualty———1week/1month during entire course

Autopsy———1week/1month during entire course

Exposure to courts along with seniors on rotation

Visit to Scene of crime — for all cases

Specimen mounting—system wise 1-2 organs in each term (6 months)

V. OTHER CRITERIA TO BE FULFILLED FOR THE DEGREE COURSE:

1. Internal evaluation:

During the course of three years, the department will conduct three tests. Two of them will be annual, one at the end of first year and other at the end of second year. The third test will be a preliminary examination which may be held three months before the final examination. The test may include the written papers, practicals / clinicals and viva-voce. Records and marks obtained in such tests will be maintained by the head of the department and will be sent to the University when called for.

Results of all evaluations should be entered into P.G's diary and departmental file for documentation purposes. Main purpose of periodic examination and accountability is to ensure clinical expertise of students with practical and communication skills and balance broader concept of diagnostic and therapeutic challenges.

2. Maintenance of Log Book:

Every candidate shall maintain a Log book/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. All the procedures performed by the post graduate students should be entered in the Log book. All the daily activities including the ward rounds and the routine procedures performed on day to day basis should be entered in the Log book and it should be verified and signed by the faculty member. The Log book shall be scrutinized and certified by the Head of the Department and Head of the Institution, and presented in the University practical/clinical examination.

3. Dissertation:

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

For details regarding DISSERTATION Refer 9.1 to 9.11 of Chapter-I.

VI. SCHEME OF EXAMINATION:

Candidates will be allowed to appear for examination only if attendance (Minimum 80%) and internal assessment are satisfactory and dissertation is accepted.

A. Theory : 400 Marks

There shall be four papers, each of three hours duration. Total marks of each paper will be 100. Questions on recent advances may be asked in any or all the papers. The format of each paper will be same as shown below.

Type of Questions	No. of Questions	Marks for each question	Total Marks
Long essay	02	20	40
Short essay	06	10	60
		Grand Total	**100**

Paper I:

Topics:-Applied Basic Sciences: - Anatomy, Physiology, Biochemistry, Pathology, Microbiology and Pharmacology in relation to Forensic Medicine; History of Forensic Medicine and Toxicology.

Paper II:

Topics:-Basics of Forensic medicine:- Legal Procedure; Medicolegal Autopsy, Exhumation, Artifacts; Identification, Trace evidences, F.S.L.; Thanatology-Death and its causes; Sudden and Unexpected deaths; Infanticide and Foeticide; Starvation deaths; mass disaster; Death associated with Surgery and Anaesthesia; Death associated with Torture, Crime and Cruelty at home and custody; Forensic traumatology including mechanical, firearm, Violent asphyxia, Thermal, Electricity, lightning and radiation injuries etc.

Paper III:

Topics:-Laws in relation to Medical profession; Related sections of Indian Penal Code, Criminal Procedure Code and Indian Evidence Act; Euthanasia, Human Organ Transplantation Act, PCPNDT Act; Consumer Protection Act etc. and Consent; Clinical Forensic Medicine including Sexual Offences and Perversions; Pregnancy, Abortion, and Delivery; Impotence, Sterility, Frigidity, Virginity and Defloration; Legitimacy and Medicolegal Aspects of Marriage Annulment; Blood Transfusion and AIDS.

Paper IV:

Topics:-Forensic Toxicology; Forensic Psychiatry; Forensic Radiology; Modern Trends/ Recent Advances and Basics of Teaching and Evaluation;

Note : The distribution of chapters/topics shown against the papers are suggestive only and may overlap or change.

Types of Cases	No. of Cases	Marks
Long Case	1	100
Short Cases	10 (10 marks each)	100
Total	**11**	**200**

B. Clinical / Practical Examination:.....300 Marks

To elicit candidate's practical knowledge, logical approach, investigative and therapeutic skill.

Sl. No.	Types of cases	Marks
	○ **Long case**	
1.	Medico Legal Autopsy	100
	○ **Short cases**	
2.	Examination of Injury case	20
3.	Examination for Age, by physical, dental and radiological examination	20
4.	Examination of Alcoholic case	20
5.	Examination of Sexual offence case	20
6.	Examination of Psychiatry case	20
7.	Examination of Skeletal Remains	20
8.	Examination of Photographs + Microscope slides	20
9.	Examination of Toxicology specimen +Weapons	20
10.	Examination of X-ray films	20
11.	Expert opinion	20
Total marks		300

C. Viva- Voce Examination: 100 Marks

Aims: To elicit candidate's knowledge, logical approach and investigative/ therapeutic skill.

1). Viva-Voce examination – [80 Marks]

All examiners will conduct viva-voce conjointly on candidate's comprehension, analytical approach, expression and interpretation of data. It includes all components of course contents. In addition candidates may be given case reports, gross specimens, histo-pathology slides, X-rays, ultrasound, CT scan images, , photographs, videos etc., for interpretation and questions on these as well as use of instruments will be asked. The knowledge pertaining to diagnosis and management of poisoning cases will also be evaluated during viva-voce examination. Viva-voce also includes discussion on dissertation.

2) Pedagogy Exercise and Log Book – [20 Marks]

(i) Candidate is asked to make a presentation for 8 – 10 minutes on a topic given in the beginning of practical examination..... 10 Marks

(i) Candidate is asked to make a presentation for 8 - 10 minutes on the dissertation topic and the review of Log Book..... 10 Marks

D. Maximum Marks:

Maximum marks for M.D. in Forensic Medicine & Toxicology	Theory	Practical	Viva	Grand Total
	400	300	100	800

VII. RECOMMENDED BOOKS (LATEST EDITIONS):

A. Core Books

Sl. No.	Name of the Textbook	Authors	Publisher
1.	Modi's: Medical Jurisprudence and Toxicology	Mathiharm .K. & Patnaik	Butterworth & Co.
2.	Taylor's Principle and Practice of Medical Jurisprudence	Keith Mant	Churchil Livingstone
3.	Text book of Forensic Medicine and Toxicology	Krishan Vij	ELSEVIER INDIA Pvt. Ltd.
4.	The Essentials of Forensic Medicine and Toxicology	Reddy KSN	Suguna devi K., Hyderabad
5.	Text book of Medical Jurisprudence and Toxicology	Parikh C.K.	CBS Publication, Delhi
6.	Post Mortem Procedures	Grasham & Turner	Wolfe Medical Publications
7.	Medical Jurisprudence and Toxicology	Knight B.	Arnold Publication
8.	Forensic Pathology	Di Maio Vincent, Dimaio Demnik	CRC Press
9.	Legal Medicine Manual	Dr. S.S. Agarwal, Dr. Lavlesh Kumar, Dr. K.Chavli	Jay Pee Brothers.
10.	Forensic Medicine, Toxicology and Medical Jurisprudence,	Subramanyam B.V.	Modern Publishers, New Delhi.
11.	Textbook of Forensic Medicine and Toxicology	P.C.Dikshit	Pee Pee Publishers and Distrbutors(p) LTD
12.	Text of book Forensic Medicine	Ajay Kumar	Avichal publishing company
13.	Review of Forensic Medicine and Toxicology	Gautam Biswas	Jaypee brothers
14.	Modern Text book of Forensic Medicine & Toxicology	Putul Mahanta	Jaypee brothers

B. Reference Books

Sl. No.	Name of the Textbook	Authors	Publisher
1.	Knight's: Forensic Pathology	Knight B. Soukko P.	Arnold Publication
2.	Gunshot Wounds	Vincent J.M., Di Maio	CRC Press
3.	Gradwohl's Legal Medicine	Gradwohl	Camp.F.E
4.	Forensic Radiology	Govindaiah D	Paras Medical Book
5.	Text book of Forensic Medicine (Vol. 1,2,3)	Tedeschi, Eckert Tedeschi	W.B.SAUNDERS COMPANY
6.	Forensic Medicine	Gorden, Shapiro	Churchil Livingstone
7.	Pediatric Forensic Medicine and Toxicology	Mason J.K.	Chapman & Hall Medical
8.	Forensic Medicine	Mason J.K.	Chapman & Hall Medical
9.	Current methods of autopsy practice.	Jurgen Ludwig:	W.B.SAUNDERS COMPANY
10.	Comprehensive Medical Toxicology	Pillay V.V	Paras Publication
11.	Encyclopedia of Forensic Sciences	Siegel JA, Saukko PJ	Academic Press, California
12.	Modern Trends in Forensic Medicine	Simpson K	Butterworth & Co.

VIII. RECOMMENDED JOURNALS:

Sl. No.	Name of the Journal
1.	Jnl. of KAMLS. – Published bi-annually – Karnataka medico-legal society
2.	Jnl. of IAFM.- Published quarterly –– By Bibliographic Informatics Division, National Infonnatics Centre, New Delhi.
3.	American Jnl. of Forensic Medicine and Toxicology- Published quarterly. It is official journal of National Association of Medical examiners. Editorial office- Juliechase j chase@1ww.com
4.	Jnl. of Forensic Medicine and Toxicology(JFMT) Published bi-annually from Dept. of Forensic Medicine and Toxicology, A.I.I.M.S., New Delhi.
5.	Medicine, Science and Law – Published quarterly. Chairman-A.W. Goode –By Barnsburg publications, London
6.	Forensic Science International- Published monthly. – Elsevier publications.
7.	Medico legal update An International Journal- AIIMS E-mail: medicolegalupdate@hotmail.com
8.	American Journal of Forensic Medicine & Pathology (1980-) [via Ovid Journals]
9.	Forensic Science International (1978-) [via Science Direct Journals]
10.	Forensic Science International Supplement Series (2009-) [via Science Direct Journals]
11.	Homicide Studies (1999-) [via Sage Publications]
12.	International Journal of Offender Therapy and Comparative Criminology (1999-) [via Sage Publications]
13.	Internet Journal of Forensic Science, The (2005-) [via Internet Scientific Publications]
14.	Journal of Biosocial Science (1997-) [via Cambridge Journals Online]
15.	Journal of Clinical Forensic Medicine (1995-2006; title changed to Journal of Clinical Forensic and Legal Medicine) [via Science Direct Journals]

16.	Journal of Forensic and Legal Medicine (2007-; prior title is Journal of Clinical Forensic Medicine) [via Science Direct Journals]
17.	Journal of Forensic Psychiatry & Psychology (2003-1 year ago; prior title is Journal of Forensic Psychiatry) [via Ebsco Host Database Journals]
18.	Journal of Forensic Sciences (2006-) [via Wiley Online Library]

POST GRADUATE DEGREE COURSE
M.D IN COMMUNITY MEDICINE

I. GOALS :

A candidate upon successfully qualifying in the M. D. Community Medicine Examination should be competent to be

1) Teacher and Trainer
2) Researcher
3) Public Health Specialist.
4) Epidemiologist.
5) Health Team Leader.

II. OBJECTIVES :

The following objectives are laid out to achieve the goals of the course. These objectives are to be achieved by the time the candidate completes the course. The Objectives may be considered under the subheadings.

1. Knowledge
2. Skills
3. Human values, ethical practice and communication abilities.

1. Knowledge:

At the end of MD course in Community Medicine candidate should have a sound knowledge regarding.

- Structure and functioning of the health system at local, state, centre and international level and its historical perspective.
- Role of government, private and voluntary sector in health care.
- Socio-cultural dimensions of health and disease, knowledge in the design and implementation of an integral health programme.
- Epidemiological tools for understanding disease conditions and determinants of health.
- Health problems of community and special age groups.

- Principles of nutrition, maternal and child health, family welfare, Biostatistics and Sociology.
- Health information system, public health laws and polices.
- Natural disasters / calamities / epidemics.
- Various national health programmes.
- Principles of communicable and non communicable diseases.
- Health education, teaching and learning technique.

2. Skills:

A candidate should acquire the skills in the following areas.

- To plan and conduct an educational session / programme.
- Assist in development of curriculum, teaching and learning activities and methods of evaluation.
- Assist in man power planning and development, should be able to participate in programmes for the selection, training and supervision of various cadres of health personnel.
- To plan and execute a research study including clinical trials, able to use / organize biostatistical analysis using computers and softwares and prepare reports / papers.
- Critically evaluate research activities.
- To make recommendation on policy and procedures.
- To define and manage the health problems of the community and special age groups.
- To implement various national health programmes and evaluate them.
- To conduct epidemiological investigations of communicable and non communicable diseases and suggest appropriate solutions.
- To interact, communicate, educate effectively persons from diverse back grounds and ages to promote healthy behaviour through community participation.
- To facilitate intersectoral coordination.

- To promote and establish partnerships.
- Apply the principles of environmental and occupational health in designing health programmes aimed at protecting and improving health status of industrial workers.

3. Human values, Ethical practice and Communication abilities

- Adopt ethical principles in all aspects of his/her practice; professional honesty and integrity are to be fostered. Care is to be delivered irrespective of the social status, caste, creed or religion of the patient.
- Develop communication skills, in particular the skill to explain various options available in management and to obtain a true informed consent from the patient.
- Provide leadership and get the best out of his team in a congenial working atmosphere.
- Apply high moral and ethical standard while carrying out human or animal research.
- Be humble and accept the limitations in his knowledge and skill and to ask for help from colleagues when needed,
- Respect patient's rights and privileges including patient's right to information and right to seek a second opinion.

III. COURSE CONTENTS

HEALTH SYSTEMS IN INDIA AND THE WORLD

– A HISTORICAL PERSPECTIVE

1. History of public health in the world

a) Influence of the various systems of Medicine i.e. Chinese, Mesopotamian, Greek , Roman, Egyptian, etc.

b) Concepts in public health

- Disease Control
- Health Promotion
- Social Engineering

- Health for All

- Millennium Development Goals

2. History of public health in India

a) History of health services in India

b) Indigenous system of medicine in India.

c) Bhore Committee & other Committee reports on Health services, health care and health professional education in India.

d) National Health Policy.

e) An update of achievements of the country vis-à-vis Health for All Indicators.

3. Primary Health Care

a) Concepts of primary health care

b) Principles of primary health care

c) Elements of primary health care

d) Modes / Models of delivery of primary health care

e) Current status of Primary health care in the world.

f) IPHS (Indian Public Health Standards)

4. The health care system in India, structure and function

a) Central level

b) State level

c) District level

d) Taluka level.

e) Primary health centre level.

f) Village level

g) Urban level

SOCIO - CULTURAL DIMENSION IN HEALTH

1. Principles of Sociology and the Behavioral Sciences:

a) Concepts of sociology and behavioral sciences.

b) Influence of social and cultural factors in health and disease.

c) Social structure and social organization.

d) Doctor - patient relationship and hospital sociology

2. Principles of social - psychology

a) Principles of psychology.

b) Principles of behavioral sciences.

c) Principles of social anthropology.

3. Application of sociology in health and development

a) Social problems in health and disease

b) Uses of Sociology in addressing problems in health and disease

c) Social Security

4. Study of Family and Health

PRINCIPLES OF EDUCATIONAL, SCIENCE AND TECHNOLOGY

a) Curriculum Planning, Educational objectives.

b) Principles of learning

c) Teaching / learning methods.

d) Preparation and use of teaching and learning aids, research materials.

e) Methods of evaluation.

PRINCIPLES AND PRACTICE OF INFORMATION, EDUCATION AND COMMUNICATION.

1) Principles of health education

- Objectives of health education
- Content of health education

2) Communication skills

- Principles of communication
- Communication barriers
- Non verbal communication.
- Counseling

3) The use of media for IEC

4) Practice (methods) of IEC and its application in community health.

5) Evaluation of impact

PRINCIPLES OF NUTRITION AND APPLIED NUTRITION

1. Nutrients, daily requirements, Balanced Diet, Primordial prevention of lifestyle related diseases.
   - Classification of food
   - Daily requirements of nutrients
   - Balanced Diet
   - Nutritional profile of food items
2. Nutritional Deficiencies
   - Nutritional requirements
   - Protein energy malnutrition
   - Vitamin deficiencies
   - Mineral deficiencies
   - Deficiencies of trace elements
3. Assessment of nutritional status in a community and to plan a programme
   - Assessment of Individual and family nutritional status
   - Assessment of community nutritional status
   - NRC (Nutritional Rehabilitation Centre)

4. Nutritional Programmes in India –critical review

- Nutritional problems in India
- Programmes to combat these problems
- Nutritional surveillance
- Social factors in nutrition

5. Other aspects of nutrition

- Food borne diseases
- Food hygiene
- Food adulteration including PFA act.

PRINCIPLES OF ENVIRONMENTAL HEALTH

1. Water

- Sources of water
- Water pollution
- Purification of water
- Water quality standards
- Epidemiology and control of water borne diseases
- Investigation of an out break and reporting (including water testing)
- Concepts of water conservation and Rain water harvesting

2. Air

- Indices of thermal comfort
- Air pollution including monitoring
- Effects of air pollution and prevention and control
- Ventilation
- Global warming

3. Housing standards: domestic and industrial.

4. Noise pollution

5. Radiation hazards

6. Meteorological environment including temperature, humidity and rainfall

7. Lighting

8. Disposal of waste and sanitation

- Sources and classification of wastes
- Disposal of solid waste
- Excreta disposal
- Sewage treatment
- Bio-medical waste management

9. Medical entomology

- Insecta: Mosquito, flies, lice, fleas and bugs
- Arachnida: ticks and mites.
- Crustacea: Cyclops
- Identification of the arthropods
- Diseases transmitted by arthropods
- Control of arthropods
- Insecticides and insecticide resistance
- Rodents and anti-rodent measures
- Integrated vector control

REPRODUCTIVE AND CHILD HEALTH AND FAMILY WELFARE

1. Common Maternal and child health problems at an individual level.
   - Antenatal care
   - Care of the preschool child
   - Intranatal care

- Postnatal care

- Child health problems

- Low birth weight – Kangaroo Mother Care

- Care of the infants

- Growth and development

- Childhood Infections

- Adolescent Health

- Gender Issues & Women empowerment

2. Structure of MCH and family welfare services in India

- Family planning

- Methods of family planning

- Indicators of MCH

- Delivery of Maternal and child health services

-Trends in the MCH services

- MCH related programmes in India eg. RCH, ICDS, NRHM, NUHM, IMNCI.

3. Demographic trends in India

- Demographic cycle

- Trends in the world

- Demography related indicators

- Demographic trends in India

4. School health services

- Objectives

- Components of school health services

- Planning for school health services

- Care of handicapped children

- Behavioral and learning problems in children
- Evaluation of School Health Services

5. Social pediatrics
   - Juvenile Delinquency
   - Child abuse
   - Child labour
   - Street children
   - Child guidance clinic
   - Child marriage
   - Child placement

PRINCIPLES AND APPLICATION OF EPIDEMIOLOGICAL METHODS IN HEALTH RESEARCH

1. Research Methodology
   - Quantitative
     - Descriptive
     - Analytical
     - Experimental
   - Qualitative
     - Focus group discussion
     - Participant observations
     - In depth interview

2. Good clinical practice

3. Medical Ethics :

Apply ethical principles to the collection, maintenance, use and dissemination of data and information.

4. Medical Audit

BIOSTATISTICS

Collection / Organization of data / Measurement scales

Presentation of data

Measures of central tendency

Measures of Variability

Sampling and planning of health survey

Probability, Normal distribution and inductive statistics

Estimating population values

Tests of significance (Parametric / Non- parametric including qualitative methods)

Analysis of variance

Association, correlation and regression

Vital statistics

Evaluation of health and measurement of morbidity / mortality

Life table and its uses

Use of computers – Epi info, SPSS

PRINCIPLES OF TROPICAL MEDICINE

1. Infectious Disease Epidemiology

- Respiratory diseases such as Small pox, Chicken pox, Measles, Mumps, Rubella, Diphtheria, Pertussis, Influenza, Tuberculosis, ARI SARS, Avian Influenza (Bird Flu, H1N1) etc.

- Intestinal infections such as poliomyelitis, Hepatitis, food poisoning, Acute Diarrhoeal diseases, Cholera, Enteric fever, Amoebiasis, Worm infestations etc.

- Arthropod borne infections such as Malaria, Filaria and Arboviral infections.

- Zoonotic diseases such as Brucellosis, Rickettsial diseases, Plague, Rabies Leptospirosis.

- Surface infections including AIDS, STDs, Leprosy, Tetanus, Trachoma

- Emerging and Re-emerging diseases

- Hospital / Nosocomial Infections, Prevention and control measures

2. Non infectious Disease Epidemiology

-Non- infectious diseases of public health importance

- Cardiovascular diseases, diabetes, blindness, accidents, cancers, obesity

NATIONAL HEALTH PROGRAMMES & NATIONAL HEALTH POLICIES

Objectives historical development, interventions, current state and critical evaluation of the different national health programmes (NHP):

-National family welfare programme (NFWP)

- Revised National Tuberculosis Control programme

- Modified Leprosy Elimination Campaign.

- National Anti Malaria programme

- National filariasis control programme

- National AIDS control programme

- National guinea worm eradication programme

- National Vector Borne disease control programme

- National Iodine deficiency disorders (IDD) control programme

- National programme for the control of blindness

- National Cancer control programme

- National Mental Health programme

- National Diabetes control programme

- Reproductive and Child Health (RCH) Programme

- Universal Immunization programme (UIP)
- National Water Supply and Sanitation programme
- Minimum needs programme
- National Health Policy
- National Population Policy
- National Policy on Urban Health
- IDSP

COMMUNITY MENTAL HEALTH

1. Principles of Mental Health
    - Types, causes and warning signals of mental illness
    - Preventive aspects of mental health
2. The approach to mental health problems in a community
    - Primary Health Care approach to mental health problems
    - Mental Health Services in the country
3. Alcoholism, drug dependence, tobacco related health hazards

OCCUPATIONAL HEALTH

1. Principles of occupational health
    - Occupational environment
    - Occupational Hazards
    - Sickness absenteeism
    - Problems of Industrialization
    - Health protection of workers
    - Prevention of Occupational diseases
    - Basics of Ergonomics
2. Legislation in Occupational Health
    - Factories Act

- Employees State Insurance Act
- Workmen's Compensation Act
- Mines Act
- Plantation Labour Act

HEALTH CARE OF THE AGED AND THE DISABLED

1. Community Geriatrics
   - Implications of demographic changes in Indian population
   - Health problems of the aged
   - Preventive Health Services for the aged
2. Disability and Rehabilitation
   - Problems of disabled in the country
   - Types of disabilities and their management
   - Rehabilitation of the disabled
   -Community based rehabilitation
   -Indicators of disability
3. Disaster Management
   - Principles of Disaster
   - Application of these principles in disaster management
   - Bioterrorism

HEALTH CARE OF TRIBAL PEOPLE

DESERT MEDICINE

PUBLIC HEALTH LEGISLATIONS

VOLUNTARY SECTOR IN HEALTH

Role of the Voluntary sector in health

- Activities undertaken by Voluntary Organizations in the health sector
- Activities of specific Voluntary Organizations in health
-Innovative approaches of Voluntary sector in health

HEALTH CARE ADMINISTRATION AND HEALTH MANAGEMENT

1. Principles of Health planning and evaluation
    - Plan Formulation
    - Execution
    - Evaluation
    - Planning cycle
2. Health Management
    - Methods and techniques of health management
    - Behavioral Sciences in Management
    - Quantitative Methods in Health Management
3. Basics of Health Systems Research
4. Basics of Health Economics :
    - Introduction to micro and macro economics
    - Demand and supply
    - Health Financing
    - Health Accounts
    - Insurance
    - Costing and Budgeting
    - Resource mobilization and utilization
5. Health Information System
6. **Essential Medicine and Counterfeit Medicines**
7. **Genetics and health**
    - Common genetic problems
    - Management of genetic problems
    - Preventive and social measures in genetics

RECENT ADVANCES AND TOPICS OF CURRENT INTEREST

1. Computers in Health
2. Agriculture Medicine and plantation health
3. Community Ophthalmology

COURSE CONTENTS FOR PRACTICALS

1. Microbiology as applied to public health (posting in Dept. of Microbiology)

a)Interpretation of the following slides

- Grams stain
- Alberts stain
- Ziehl–Neelsen's stain
- Peripheral blood examination of thick and thin smears and reporting

b) Microscopic examination of stool and interpretation

c) Interpretation of commonly used serological tests such as Widal / HIV/ Hepatitis B/ VDRL / Viral Antibody titers

2. Medical Entomology

- Identification of various vectors
- Entomological survey

3. Epidemiological exercise and case studies (including family studies) to illustrate principles and practice of community health

4. Statistical exercise to illustrate principles and their application in practice.

5. Investigation of an outbreak of a disease and measures to control

6. Exercise in public health administration

- Planning exercises
- VED analysis etc
- Beneficiary need analysis
- Preparation of annual plan

- Budgeting at the PHC level

- Supervision of a PHC / SC

- Requirement of vaccines, medicines, stationary at the PHC level

- Organization of a family welfare camp

- To conduct an Immunization camp

- Organization of cataract detection camp

- Implementation of National Health Programmes at Health Centres (Rural & Urban).

7. Diet and Nutritional survey of a community

8. Study of environment and its influence on health in

- Work places

- Household

-Community

- Meteorological factors and their effects on health

(study of air pollution, temperature, humidity and others)

9. Study of sanitation problems of the Community

10. Environmental sanitation

- Collection of water sample/ analysis / reporting

- Analysis of physical, chemical and microbiological quality of water

- Study of waste management methods

- Water supply and waste disposal methods in an industrial or plantation setting

11. Visits / Postings to the following institutions

- District health office

- District hospital

- Taluka hospital

- Field publicity office
- ICDS office
- Sewage treatment plant
- HUDCO
- Meteorology department
- NGO
- District Malaria Office /DTC
- National tuberculosis institute, Bangalore
- Polio surveillance office
- Visit to factory
- Home for the aged
- Blind school
- Deaf and dumb school
- Physically handicapped centre
- Slaughter house
- Hotel
- Milk dairy
- Cinema house
- Food and beverages processing units
- National Institute of Nutrition, Hyderabad
- Centre for Preventive Medicine, Hyderabad

IV. TEACHING AND LEARNING ACTIVITIES:

A. Theoretical Teaching:

1. **Lectures:** Lectures are to be kept to a minimum. Certain selected topics can be taken as lectures. Lectures may be didactic or integrated.
2. **Journal Club:** Recommended to be held once a week. All the PG students

are expected to attend and actively participate in discussion and enter in the Log Book the relevant details. The presentations would be evaluated using check lists. A time table with names of the students and the moderator should be announced in advance.

3. **Subject Seminar:** Recommended to be held once a week. All the PG students are expected to attend and actively participate in discussion and enter in the Log Book relevant details. The presentations would be evaluated using check lists. A timetable for the subject with names of the students and the moderator should be announced in advance.

4. **Clinico - Social Case Discussion:** Recommended to be held once in 2 months. All the PG students are expected to attend and actively participate in discussion and enter in the Log Book relevant details. The presentations would be evaluated using check lists. A timetable for the case presentation with names of the students should be announced in advance.

5. **Integrated Seminars:** arranged with departments of Paediatrics and Obstetrics and Gynaecology at least once in three months.

6. **Teaching Skills:** Post-graduate students must teach under graduate students by taking Practicals & lectures. Assessment is made using a checklist by medical faculty. Record of their participation is to be kept in Log Book.

7. **Continuing Medical Education Programmes (CME) & Conference:** Every student should attend one CME, one Conference (National/State/ Regional) every year.

During the 3 years of PG training every student shall present a scientific paper at state/national conference and may publish the article in scientific journal.

8. **Research Activities:** The Post-graduate students to be encouraged to carry out research activities in the department other than dissertation work.

B) Clinical / Practical Training:

1. **Rotational Postings in other Departments:**

TRAINING IN OBSTETRIC AND GYNAECOLOGY

1. Antenatal care

2. High risk pregnancy

3. Intranatal care – The management of normal labour

4. Postnatal care

5. Family welfare

6. Adolescent health

7. Reproductive tract infections

8. Cancer of the reproductive tract especially carcinoma cervix

TRAINING IN PAEDIATRICS

1. Pediatric Infectious diseases

2. Nutritional problems

3. Immunization

4. Neonatal problems

5. Growth monitoring and child development

TRAINING IN MEDICINE

1. Diagnosis and treatment of common Communicable & Non-Communicable Diseases of Public health importance.

TOTAL DURATION OF POSTINGS :

MICROBIOLOGY **:** 15 DAYS

HOSPITAL POSTING : 1 Month each in OBG, Pediatrics & Medicine Department

RMRC POSTING : 1 Week - Regional Medical Research Centre, Belagavi

RURAL POSTING **:** 1 ½ Years at PHC

TRAINING ACTIVITIES

The entire training and the facilitation of the learning process will be aided through the following methods of learning in the department.

1. Lecture discussions

2. Practical demonstrations

3. Field visits – family studies / clinico- social case studies / site visits

4. Institutional visits

5. Seminars

6. Journals clubs

7. Epidemiology exercises

8. Supervised training of undergraduate teaching including lesson planning

9. Involvement in specific departmental project works

10. Conduct of surveys

11. Micro Teaching Practice Sessions

METHODS OF MONITORING:

1. Self monitoring :

Through maintaining daily work diary and log book of PG teaching sessions.

2. Faculty evaluation :

Through scrutiny of work diary and log book by head of dept. and guide .

3. Technique of skills in Pedagogy:

Through lesson plans and supervised teaching activities for undergraduates

Through Feedback during Micro Teaching Practice Sessions

4. Skill evaluation :

Through demonstrations, practicals and field reports.

5. Knowledge and Communication Skill evaluation:

Through journal clubs, seminars, case presentations and tests.

a) Journal club : once a week (Min. two to three per month)

b) Seminar : once a week (Min. two to three per month)

c) Case discussion : once in 2 months

6. Every PG Student has to present 4 Seminars, 4 Journal Club articles per year (Total 12 each).

7. The P.G .Student will maintain the following records, which will be verified by the guide and Head of the Department .

a) Practical Records : Microbiology , Entomology and Water Chemistry

b) Record of Field Work

c) Record of Statistical Problems. etc.

8. At the end of every year each PG Student will give a written examination.

9. Preliminary examination will be conducted before the final examination (Four theory papers and practical).

V. OTHER CRITERIA TO BE FULFILLED FOR THE DEGREE COURSE:

1. Internal evaluation:

During the course of three years, the department will conduct three tests. Two of them will be annual, one at the end of first year and other at the end of second year. The third test will be preliminary examination which may be held six weeks before the final examination. The test shall include the written papers, practicals / clinicals and viva-voce. Records and marks obtained in such tests shall be maintained by the head of the department and shall be sent to the University when called for.

Results of all evaluations should be entered into P.G's diary and departmental file for documentation purposes. Main purpose of periodic examination and accountability is to ensure clinical expertise of students with practical and communication skills and balance broader concept of diagnostic and therapeutic challenges.

2. Maintenance of Log Book:

Every candidate shall maintain a Log book/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. All the procedures performed by the post graduate students shall be entered in the Log book. All the daily activities performed on day to day basis shall be entered in the Log book and it should be verified and signed

by the faculty member. The Log book shall be scrutinized by the guide and certified by the Head of the Department and Head of the Institution, and presented in the University practical/clinical examination.

3. Dissertation:

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

For details regarding DISSERTATION Refer 9.1 to 9.11 of Chapter-I.

VI. SCHEME OF EXAMINATION

Candidates are eligible to appear for university examination if the attendance is 80% and dissertation is accepted.

A. Theory : 400 Marks

There shall be four papers, each of three hours duration. Total marks of each paper will be 100. Questions on recent advances may be asked in any or all the papers. The format of each paper will be same as shown below.

Type of Questions	No. of Questions	Marks for each question	Total Marks
Long essay	02	20	40
Short essay	06	10	60
Grand Total			100

Paper I :

- History of public health and community medicine
- Behavioral sciences and health
- Information, Education, Communication and counseling
- Microbiology including parasitology and immunology
- Environmental health including entomology and ecology
- General epidemiology, biostatistics and research methodology

Paper II :

- Diet and nutrition in health and disease
- Epidemiology of communicable and non-communicable diseases
- Occupational health

Paper III :

- Reproductive and child health
- Demography and family welfare
- Care of special groups viz. school health, adolescent health, and geriatrics
- Care of disabled, community based rehabilitation, tribal health, desert medicine
- Public health emergencies and calamities

Paper IV :

- Health and hospital administration
- Health care delivery including national programmes
- Public health legislation
- Genetics and counseling
- Mental health
- International health
- Voluntary health organizations, NGOs.

Note : The distribution of chapters/topics shown against the papers are suggestive only and may overlap or change.

B. PRACTICALS : 300 Marks

1. Family study: (one) **(75 marks)**

One family will be allotted in rural /urban field practice area. Presentation and discussion will be on the health status of the family and of any individual case in the family and on factors that contribute towards maintenance of health and occurrence of disease ; management at individual, family and community levels.

2. Clinico-social case study (One case) **(75 Marks)**

One clinical case will be allotted in the Hospital. Basic clinical presentation and discussion on diagnosis, treatment and management, with emphasis on social and community aspects.

3. Public health Laboratory (Two) **(40 Marks)**

a) Interpretation of smears, interpretation of common serological diagnostic tests

b) Water analysis or interpretation of given results.

4. Problems on epidemiology and biostatistics (four) **(50 Marks)**

Based on situation analysis from communicable or non-communicable diseases, MCH and FP including demography, Environmental health including entomology.

Four problems will be given carrying marks as follows

1. Statistical Problems (two) -each 13 marks

2. Epidemiology Problems (two) -each 12 marks

5. Spotters (Five) **(30 marks)**

Identification and description of relevant public health aspects of the spotters / Specimen by the student. Spotters shall be from nutrition, Environmental health including entomology and occupational health, MCH and FP; Microbiology including parasites and vaccines.

6. Pedagogy: Demonstration of teaching skills/techniques - [30 Marks]

A topic will be given to each candidate on the first day. Student is asked to make a presentation on the topic on the second day for 20 minutes.

C.VIVA-VOCE : 100 marks

Aims: To elicit candidate's knowledge and investigative / therapeutic skills.

1. **Viva-voce examination - [80 marks]**

a) Students will be examined by all the examiners together about students' comprehension, analytical approach, expression and interpretation of data and understanding of the subject.

b) Discussion on dissertation work : (20 Marks)

D.

Max. Marks in M.D. Community Medicine	Theory	Practical	Viva-voce	Total
	400	300	100	800

***Note :** 1) A Candidate shall secure an aggregate of 50% in all the four theory papers considered together.

2) A Candidate shall secure not less than **50%** marks in practical / clinical including viva-voce examination.

3) A candidate shall secure a minimum of **50%** marks in each of two components separately i.e., theory and practical (clinical examination and viva – voce) in the same examination to be declared as pass.

VII. RECOMMENDED BOOKS (LATEST EDITIONS):

Sl. No.	Name of the Textbook	Authors	Publisher
1.	Maxcy-Rosenau Public Health and Preventive Medicine	Maxcy Rosenau John. M. Last	Appleton-Century-Crofts,
2.	The Theory and Practice of Public Health	Hobson W	Oxford Med. Publication
3.	Epidemiology in Medical Practice	Barker D.J.P	Churchill Livingstone.
4.	Text Book of P & S M	Park. J. E. & K . Park.	M/s. Banarasidas Bhanot
5.	Text Book of P & S M	Mahajan. B. K and M.C. Gupta	Jaypee Publications.
6.	Principles of Medical Statistics	Bradford Hill	The Lancet Ltd.
7.	Public Health Administration and Practice	John J. Hanlon	Mosby.
8.	Epidemiology	MacMahon & Pugh	Little Brown & Co.
9.	Modern Nutrition in Health	Robert S. Goodheart, Mulice E.Shills	K M Varghese & Co.
10.	Epidemiology : An Introductory Text	Mawner & Kramer	W B Saunders Co.
11.	Hunter's Diseases of Occupations	P.A.B. Raffle, P.H. Adams, P.J. Baxter and W.R. Lee	Edward Arnold Publishers, Great Britain.
12.	National Health Programmes of India	J. Kishore	Century Publication New Delhi
13.	Text Book of Community Medicine	Sunderlal, Adarsh, Pankaj,	CBS Publishers, Darya Ganj, New Delhi : 110 002.

14.	Medical Ethics	Francis C.M	J.P. Publications, Bangalore
15.	Essentials of Medical Statistics	Kirkwood B.R	Oxford; Blackwell Scientific Publications.
16.	Methods in Bio statistics for medical students	Mahajan B.K	Jaypee Brothers Medical Publishers New Delhi,
17.	Occupational Medicine	Carl Zenz	Mosby, USA.
18.	Epidemiology and Management for Health Care for all	Sathe P. V. Sathe A. P.	Popular Prakashan Pvt. Ltd. Mumbai
19.	Principles of Community Medicine	Sridhar Rao. B.	AITBS publishers and Distributors New Delhi
20.	Community Medicine with Recent advances	Suryakantha	Jaypee Brothers

VIII. RECOMMENDED JOURNALS:

Sl. No.	Name of the Journal
1.	Indian Journal of Community Medicine
2.	Indian Journal of Public Health
3.	Indian Journal of Community Health
4.	Journal of Communicable Diseases,
5.	Indian Journal of Maternal & Child Health.
6.	Indian Journal of Occupational Health & Environmental Medicine.
7.	Indian Journal of Medical Research.
8.	Indian Journal of Malariology.
9.	Indian Journal of Environmental Health.
10.	Indian Journal of Medical Education
11.	Journal of Indian Medical Association
12.	Journals of Medicine, Pediatrics, OBG, Skin & STD, Leprosy, Tuberculosis & Chest Diseases (for reference)
13	Indian Journal of Social Work
14.	Journal of Environmental Science and Engineering
International Journals	
1.	WHO Publications
2.	Journal of Epidemiology & Community Health.
3.	Tropical Diseases Bulletin.
4.	Vaccine.
5.	American Journal of Public Health.
6.	Lancet
7.	New England Journal of Medicine.
8.	American Journal of Epidemiology.
9.	Health Promotion and Education in South East Asia
10.	W.H.O. Technical Report Series.
11.	Pan American Journal of Public Health

E – Journals	
1.	American Journal of Public Health
2.	Applied Health Economics & Health Policy
3.	Epidemiology
4.	International Journal of Epidemiology
5.	Journal of Acquired Immune Deficiency Syndromes & Human Retrovirology
6.	Journal of Epidemiology & Community Health
7.	Journal of Medical Ethics
8.	Journal of Occupational & Environmental Medicine
9.	Health Care Management Review
10.	Quality in Health Care

COMMITTEE REPORTS AND POLICY DOCUMENTS – MEDICAL EDUCATION AND HEALTH POLICY.

1**. Bhore Committee Report (1946)** Health Survey and Development Committee, Govt. of India, Delhi.

2. **Mudaliar Committee Report (1961)** Health Survey and Planning Committee, Govt of India. Delhi.

3. **Shrivastav Report (1974),** Health Services and Medical Education – A Programme for immediate action, Group on Medical Education and Support Manpower, Ministry of Health and Family Welfare, Govt. of India. New Delhi.

4. ICSSR/ICMR (1981), **Health for All – An alternative strategy – Report of a Joint study group of ICSSR/ICMR,** Indian Institute of Education, Pune.

5. **National Health Policy,** (2001) Ministry of Health and Family Welfare, Government of India, New Delhi.

6. Compendium of Recommendations of various committees on Health and Development (1943 – 1975), Central Bureau of Health Intelligence (1985) Directorate General of Health services, Ministry Family Planning, New Delhi.

7. Bajaj, J.S. etal. (1990) Draft **National Education Policy for Health Sciences**, I.J.M.E. Vol. 1 & 2 (Jan – August 1990)

8. National Health Policy, Min. of Health & Family Welfare, Nirman Bhawan, New Delhi

9. Indian Council of Medical Research, "Policy Statement of Ethical considerations involved in Research on Human Subjects", I.C.M.R, New Delhi.

10. Code of Medical Ethics framed under section 33 of the Indian Medical Council Act, Medical Council of India, Kotla Road, New Delhi.

11. Indian National Science Academy, Guidelines for care and use of animals in Scientific Research, New Delhi.

12. Internal National Committee of Medical Journal Editors, Uniform requirements for manuscripts submitted biomedical Journals, New England J. Med

ADDITIONAL READING (LATEST EDITION) :

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, Ministry of Health and Family Welfare, Govt. of India, Nirman Bhavan, New Delhi. P – 335.
2. National Health Policy, Min. of Health & Family Welfare, Nirman Bhawan, New Delhi.
3. Santosh Kumar, The elements of Research, writing and editing Dept. of Urology, JIPMER, Pondicherry.
4. Srinivasa D.K et al, Medical Education Principles and Practice, National Teacher Training Centre, JIPMER, Pondicherry.
5. Indian Council of Medical Research, "Policy Statement of Ethical considerations involved in Research on Human Subjects", 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.
8. Indian National Science Academy, Guidelines for care and use of animals in Scientific Research, New Delhi.
9. Internal National Committee of Medical Journal Editors, Uniform requirements for manuscripts submitted biomedical Journals, New England J. Med 1991: 424-8
10. Kirkwood B.R, Essentials of Medical Statistics, Oxford; Blackwell Scientific Publications.
11. Mahajan B.K, Methods in Bio statistics for medical students, New Delhi, Jaypee Brothers Medical Publishers.

12. Raveendran B Gitanjali, A Practical approach to PG dissertation, New Delhi, J.P.Publications.

OCCUPATIONAL HEALTH (LATEST EDITION)

1. Hunter's Diseases of Occupations, Edited by P.A.B Raffle, P.H.Adams, P.J.Baxter and W.R.Lee Edward Arnold Publishers , Great Britain

2. Schilling , Occupational Health Practice, Butterworth & Company, Great Britain.

3. Carl Zenz , Occupational Medicine, Mosby, USA.

1. WHO Geneva, Early detection of Occupational Diseases

2. ILO Publications Geneva, Encyclopedia of Occupational Health & Safety, Vol. 122.

3. Plunkett (E.R), Occupational Diseases, Barret Book Company, Stanford.

4. Johnstone (R.T), Occupational Diseases and Industrial Medicine, Saunders, Philadelphia.

OTHER TEXT BOOKS (LATEST EDITIONS)

1. Weinsieir. R.L. Fundamentals of Clinical Nutrition.

2. Detels.R.Holland.W.W. Oxford Textbook of Public Health. Vol. I , II , III

3. Sathe.P.V. Sathe.A.P. Epidemiology and Management for Health Care for all.

4. Williams.S.R. Essentials of Nutrition and Diet Therapy.

5. Kishore.J. National Health Programmes of India.

6. WHO, Health Research Methodology.

7. Mandell.G.L. Bennett.J.E., Principles and Practice of Infectious Diseases. Vol. I.

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 also helps teachers to evaluate students, but also students to evaluate themselves. The monitoring is 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: (i) Personal attitudes, (ii) Acquisition of knowledge, (iii) Clinical and operative skills, and (iv) Teaching skills.

i) Personal attitudes. The essential items are:

- Caring attitudes
- Initiative
- Organisational ability
- Potential to cope with stressful situations and undertake responsibility
- Trust worthiness and reliability
- To understand and communicate intelligibly with patients and others
- To behave in a manner which establishes professional relationships with patients and colleagues
- Ability to work in team
- 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.

ii) Acquisition of knowledge:

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.

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)

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)

Clinico-pathological conferences: This should be a multidisciplinary case 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.

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

iii) Clinical skills

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).

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).

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).

iv) 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).

v) Periodic tests:

In case of degree courses of three years duration. The departments 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, practicals / clinicals and viva voce.

vi) 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.

vii) 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.

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 counselled 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 at the examination, if she/he fails to fulfill the requirements in spite of being given adequate chances to set himself 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 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.	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 Unit Head: Date:

Sl. No.	Items for observation during presentation	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.	Bedside manners					
8.	Rapport with patients					
9.	Counselling patient's relatives for blood donation or postmortem and case follow up.					
10.	Over all 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 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					
	Grand Total					

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 A-V 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	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					

LOGBOOK

Table 1: Academic activities attended

Name:

Admission Year:

College:

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

LOGBOOK

Table 2: Academic presentations made by the student

Name:

Admission Year:

College:

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

LOGBOOK

Table 3: Diagnostic and Operative procedures performed

Name:

Admission Year:

College:

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

* Key:

0 - Washed up and observed

A - Assisted a more senior surgeon

P A - Performed procedure under the direct supervision of a senior surgeon

PI - Performed independently

Model Overall Assessment Sheet

Name of the College:

Academic Year:

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										

Note: Use separate sheet for each year.

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 patient, 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 (i), General Objective (ii) stated in Chapter II, and develop human values it is urged that **ethical sensitisation** be achieved by lectures or discussion on ethical issues, clinical case 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 (AIR) Artificial Insemination by Donor (AID),

   Surrogate motherhood, Semen Intrafallopian Transfer (SIFT),

Gamete, Intrafallopian Transfer (GIFT), Zygote Intrafallopian 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 cares

   Malpractice and Negligence

8. Research Ethics

   Animal and experimental research / humanness 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: (Latest edition)

Francis C.M., Medical Ethics, Jaypee Brothers, New Delhi.

ADDITIONAL READING: (LATEST EDITIONS)

1. Indian Council of Medical Research, "Ethical Guidelines for Biomedical Research on Human Subjects", I.C.M.R, New Delhi, 2000.
2. Code of Medical Ethics framed under section 33 of the Indian Medical Council Act, 1956. Medical Council of India, Kotla Road, New Delhi.
3. Francis C M,Medical Ethics, J P Publications, Bangalore, 1993.
4. Indian National Science Academy, Guidelines for care and use of animals in Scientific Research, New Delhi, 1994.
5. Inter national Committee of Medical Journal Editors, Uniform requirements for manuscripts submitted to biomedical journals, N Engl J Med 1991; 424-8 -
6. Kirkwood B R, Essentials of Medical Statistics, 1 sl Ed., Oxford: Blackwell Scientific Publications 1988.
7. Mahajan B K, Methods in Bio - statistics for medical students, 51h Ed.. New Delhi, Jaypee Brothers Medical Publishers, 1989.
8. 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.
9. National Health Policy, Min. of Health & Family Welfare, Nirman Bhawan, New Delhi, 1983.
10. Srinivas D K etal, Medical Education Principles and Practice, 1995. National Teacher Training Centre, JIPMER, Pondicherry.