

M.D. FORENSIC MEDICINE AND TOXICOLOGY

SYLLABUS

THEORY

Basic medical sciences namely Anatomy, Physiology, Pharmacology, Pathology and Microbiology as applied to Forensic Medicine.

- Surface Land marks & regional Anatomy of medico legal significance.
 - Comparative anatomical study of Male & Female skeleton.
 - Anatomy of neck with special reference to violent Asphyxial deaths.
 - Anatomy of reproductive organs
 - Gross anatomy of heart and coronaries.
 - Outline of embryonic / foetal development.
 - Microscopic anatomy (histology of different organs & tissues, such as brain, heart, lungs, liver, kidneys, spleen, thyroid, adrenals, bone, skin)
 - Body water & fluid balance.
 - Blood grouping & RH incompatibility.
 - Physiology of menses & pregnancy.
 - Physiology of thermo-regulation.
 - Patho-physiology of shock.
 - Blood sugar regulation & diabetic coma, hypoglycaemic coma.
 - Outline of the functions of circulation, respiration, and haemopoitic, and nervous, digestive, endocrine, excretory, reproductive and musculo-skeletal system. Patho-physiology of sexual functions and histopathology.
 - General pathology: Pathology of cell / tissues – Degenerative changes & secondary changes(atrophy, hypotrophy, aplasia, Hyperplasia, ischemia, necrosis, infarction, cloudy swelling, amyloidosis and embolism, asphyxia deaths, electricity, gun-shot wounds, poisoning, thrombo-embolism, fat embolism, aspirations, wound healing, histological determination of time of death.
 - Body's local and systemic response to trauma.
 - Healing and fibrosis (Pathology of scar)
 - Common general and systemic diseases and caused by physical/chemical agents.
 - Disorders of infancy and old age changes relevant to forensic medicine.
 - Pathology gross and microscopic in myocardial infarction, congenital heart diseases, tuberculosis, cirrhosis, malnutrition, starvation.
 - Histology with important Staining Procedures
 - Microbiology and serology of venereal diseases infections.
 - Microbiology of Cadavers.
 - Relevant General Pharmacology, Pharmacology of Important Antidotes & Drugs of
 - Addiction, Anti-sera, Hormones & Anaesthetic Drugs.
- Forensic Medicine including other clinical subjects as applied to it.**
- Identification of the living and dead, determination of race and religion, sex, age, external peculiarities such as moles, birth marks, occupational marks, anthropometry, finger prints, and foot prints handwriting etc. and their medico legal aspects. Evaluation of evidence from the skeleton. Problems of reconstruction, superimposition technique.

- Medico legal aspects of allergy and anaphylaxis.
- Evidence from trace elements like hair and biological stains of blood, semen, sweat, saliva, milk, sputum etc.
- Laboratory investigations as required in medico legal situations like unconsciousness, sudden death from unknown causes, therapeutic misadventures, industrial exposures and the like.
- Outlines of analytical and Histopathological techniques as applied to forensic medicine.
- Injuries and Thermal death from cold coma, heat coma, electricity coma, lightning and radiation.
- Death from starvation.
- Mechanical injuries & their medico legal aspects in relation to nature of injuries, accidental, suicidal, homicidal distinction between injuries caused during life and after death. Medico legal examination of injured person. Regional and Transportation injuries.
- Examination of weapon in relation to inflicted injuries.
- Firearm and Thermal injuries.
- Causes of death from wounds.
- Forensic radiology in identification, pathology, dentistry, child abuse, trauma, medico legal implications of radiological procedures.

FORENSIC PSYCHIATRY:

Various Acts in relation to Forensic psychiatry,

- Classification of mental disorders and abnormal human behaviours. Medico legal aspects of INSANITY and abnormal human behaviour as regards to civil & criminal responsibilities and rules regarding admission, treatment and discharge of mentally ill person in the Menta Hospitals, Feigned insanity, Juvenile delinquency in the juvenile court. Restraint of mentally ill person.
- Biology of behaviour, emotion, stress, attitudes, normal & abnormal personalities.
- Psychological assessment & testing personality and its disorders, abnormal psychology, health psychology, assessment strategies in medical education.
- Study of suicide, production of personality and circumstances. Post mortem analysis of suicide notes and circumstances
- Counselling in normal sexual behavior and sex related disorders.
- Medico legal aspects of emergency & resuscitation intensive care, medical negligence death.
- Trauma, Work Stress & Disease.
- Torture medicine: Medico legal aspects & duties of physician in cases of torture. Type of personalities.
- Mass disasters.
- Bombs and other explosives. Biological and chemical warfare and barotrauma.
- Impotence, Sterility, Artificial insemination, sterilization. Test tube babies & their medico legal aspects.
- HIV and AIDS.
- Virginity, Pregnancy, Delivery in relation to suit of nullity of marriage, divorce, and legitimacy affiliation cases etc.
- Abortion – Criminal & Justifiable, Laws in relation to criminal abortion. Duties of medical persons when called to treat a case of criminal abortion. MTP Act 1971.

- Sexual Offences – Rape, Incest, unnatural sexual offences such as sodomy,
- Tribadism, Bestiality & Buccal Coitus, Sexual perversions.
- Infanticide.

Forensic Toxicology & Medical Jurisprudence

- General & Forensic Toxicology including Classification, Mechanism of Action , Clinical Features, Diagnosis , Management , Autopsy appearances & Medico-legal Importance of Poisons.
- Addiction, de-addictions and drug abuse.
- Important Toxicological Analytical Techniques.
- Forensic Science: Recent Advances & Modern Trends.
- Introduction & working of various Wings of Forensic Science Laboratory.. Immunology, Examination of Biological Trace material Evidence. Ballistics, Identification. Crime Laboratory, Forensic Photography.
- Definition of Medical Jurisprudence.
- Introductory remarks, Criminal Courts & their powers, inquests and legal procedures, procedure in court, medical evidence, various medical certificates, medico legal reports, dying declaration & dying deposition, witness, conducts and duties of the doctor in the witness box, professional secrecy.
- Regulation of medical profession, various governing bodies, their constitution & functions. Laws in relation to medical man.
- Rights, duties & privileges of a registered medical practitioner.
- Informed consent in medical practice. Infamous conduct. Medical malpraxis.
- Physician duties under various public health & medical Acts.
- Problems of privileges and confidentiality etc. Physician in the Witness Box.
- Liabilities of Hospitals, nursing home and public dispensaries to patients.
- Medical practice in relation to Insurance.
- Relevant parts of Indian Penal Code of criminal procedure, Indian Evidence Act, Suppression on Immoral Trafficking Act. Workman's Compensation Act and other Laws related to medical practice.
- Law & Procedures related to Organ Transplantation.
- Legal & Ethical aspects of Family planning procedures.
- Therapeutic trial & human experimentation etc.
- Medico legal aspects of Organ & Tissue transplantation.
- Euthanasia.
- Supreme Court and High Court Landmark judgments related to Forensic Medicine and Medical Jurisprudence.
- Relevant Laws, Legal Procedures & Psych General Medical Jurisprudence including MCI, MMC, Ethics & Bio Med Research, Consent, Negligence, Relevant Sections , Courts & their powers , Evidence & Recording of Evidence ,
- Relevant Sections of IPC, Cr Pc, IEA, Acts Like CPA , MTP , PCPNDT , NDPS , OT , NHRC
- Medical certification of cause of death and relevant vital statistics..
- Day-to-day MLC problems in hospitals.
- Recent Laws applicable to medical man.
- Value of medical opinion in the court of law.

Forensic Pathology including Forensic immunology & recent advances.

- Medico legal autopsy of dead body, decomposed and mutilated body or its fragments / skeleton, bones, exhumation & rules regarding it.
- Death, manner of death, modes of death, cause of death, sudden death, signs of death and changes following death. Estimation of post mortem interval, Forensic Entomology, Post mortem chemistry of body fluid like blood, CSF and vitreous humour, presumption of death and presumption of survivorship. Violent asphyxial deaths: Hanging, Strangulation, Suffocation and Drowning.
- Death from sudden violent, suspicious, unknown and unnatural cause, disease following trauma.
- Basic concepts of immunology and serology.
- Principles of various immune-serological tests, precipitin test, pregnancy test, sperm antibody test.
- Role of immunological techniques in crime investigation and exclusion of parentage.
- Incompatibility and adverse reaction of drugs commonly used in therapy etc.
- Anaphylaxis and hypersensitivity reactions.
- Different types of teaching aids, methods of teaching & question paper formation of different types (MCQs, Structures, Traditional, Short, and Essay Types).
- DNA & Finger Print System, Lie Detector & Polygraph, Norco-analysis.
- National Health policies.
- Life saving maneuvers and pre-hospital first aid.
- Routine and advanced Imaging Techniques and equipments.
- Medico-legal record keeping.
- Basics of medical education technology and research methodology.
- Computer and its use and its applicability in the specialty.
- Medical auditing.

Note: The project syllabus is minimal and may require further improvement time to time as per requirements of MCI and the advances in the specialty of forensic medicine & toxicology.

PRACTICAL

1. Medico-legal autopsies.
2. Age estimation
3. Medico-legal Injury report preparation.
4. Medico-legal examination of an Alcoholic and other drugs;
5. Medico-legal examination in cases of Sexual offences
6. Medico-legal examination of Poisoning cases
7. Psychiatric assessment of patient.
8. Medico-legal examination of bones, weapons, clothing, wet specimens, poisons.
9. Detection of common poisons in Toxicology Laboratory.
10. Medico-legal examination of Photographs.
11. Medico-legal examination of X-rays.
12. Laboratory examination of Biological trace material evidence.
13. Court evidence / attendance.
14. Awareness of various intensive care setups & Operation Theatre setups.

15. Awareness of medico legal & crime Laboratory instruments & Equipments.

16. Attending CME/Workshops/Conference; involvement in UG Teaching.

Teaching Program

General Principles

Acquisition of practical competencies being the keystone medical education, postgraduate is skills oriented. Learning in postgraduate program is essentially self-directed and primarily emanating from academic and experimental work. The formal sessions are merely meant to supplement this core effort.

Teaching sessions

In addition to undergraduate teaching by postgraduate students, there are daily sessions of formal teaching. Each MD student has to present Seminars, Journal clubs, perform medicolegal autopsies, prepare medico legal reports. They are also allotted time for doing work related to thesis. Candidates must actively participate in Postmortem Examination, Clinical Medico legal cases, Laboratory work, Clinico-pathological Conferences, Seminars, Journal Clubs, Group Discussions, Visit to Scene of crime, Court Evidence & Research work. The facilities offered by other Clinical & Basic Science Departments are made available to them. The postgraduate Student shall be required to actively participate in the Teaching / Training programmes of undergraduates, nursing students, interns. The candidates are also expected to be aware of basics of medical education teaching technology principles and use of audiovisual aids in the same. The postgraduate Student should maintain a Log Book of the work assigned to him. This log book will be assessed by the postgraduate Guide of the Student and will be jointly evaluated by the Guide & Head of the Department.

Teaching Schedule

The suggested departmental teaching schedule is as follows:

Monday: Thesis work reporting to guide and to the department
Tuesday: Journal club
Wednesday: Autopsy report presentation
Thursday: Presentation of clinical forensic medicine cases
Friday: Seminar
Saturday: Statistics

End of each month: Theory test

6 monthly: Grand viva

Note:

- All sessions are to be attended by the faculty members. All PGs are supposed to attend the sessions.
- All the teaching sessions are assessed by the consultants at the end of session and marks are given out of 10 (for participant) & 100 (for presenter) and kept in the office for internal assessment
- Attendance of the residents at various sessions has to be at least 75%.

Posting:

The postgraduate student shall rotate through the following department and acquire the relevant knowledge as follows:

a. **Anatomy:** Dissection techniques, Gross & Histological appearances of Vital Organs & Endocrines. Forensic Osteology, Anthropometry, Embalming & Relevant Embryology.

b. **Physiology & Biochemistry:** Functional aspects of Vital Organs & endocrines, Physiology & Biochemistry of Blood, Semen, Saliva, Sweat, CSV, P.M. Biochemistry of Body Fluids.

c. **Pathology & Microbiology:** Injury, Inflammation, Repair, Thrombus-Embolism, Shock, Gross & Microscopic Appearances of Vital Organs and histopathology in cases of sudden death e.g. Myocardial infarctions and other related diseases e. g, which can cause sudden death by complications e.g. tuberculosis, renal failure etc.& Endocrines Imp. Staining techniques, Museum Procedures, Infection, Immunology, HIV, Anaphylaxis, Insulin, Penicillin, Observation- Collection-Preservation & Forwarding Of Pathological & Microbial Evidence.

d. **Medicine+Paediatrics +Psychiatry+Pharmac** +Medical Record Section: Awareness of Diagnosis, Evaluation of ECG in cases of Myocardial Infarctions Medicolegal Aspects & Management of Critical Care, Poisoning & Psychiatry cases, Visit to MICU Set Up, important Paediatric procedures + NICU Set Up, Pharmacology & Detection Of Drugs of Dependence, Casualty: First Aid , Examination, Diagnosis & Medical + Medico Legal Management of Clinical Medico-legal cases, Dying Declaration and Dying deposition, Gastric Lavage, Parental Injections, Emergency Tray, Casualty Administration in Mass Disasters.

e. **Surgery + Orthopaedics +Dentistry + Radiology + Anaesthesiology:** Awareness regarding Examination, Diagnosis & Medical + Medico Legal Management of cases Of Imp. Regional Injuries (Poly trauma & Burns), Injury certification & Disability Evaluation, X-ray findings in Bony Trauma Age determination cases Intracranial hemorrhages with the help of MRI and CT Scans Visit to Surgical ICU & Operation Theatre, Awareness of imp Anaesthetic Procedures and complications, Important OT Instruments & Equipments.

f. **Obstetrics & Gynaecology:** Abortion, Sterilization Techniques, Introduction to Major Obs. & Gyn. Procedures, Prenatal Diagnostic Techniques. Study of fetuses and placenta
g. Forensic Science Laboratory: Introduction to various sections of the FSL Setup & Instrumentation, Introduction to & relevant awareness of imp Qualitative & Quantitative Detection & Analytical Techniques. Introduction to & relevant awareness of Identification, Biology, Chemistry, Toxicology & Ballistics Divisions.

Note:-The Casualty Posting should be split in to two periods. The initial posting during First Year is introductory type. The Second Casualty posting is during Second year. This posting is major one & it is expected that students must be exposed to maximum quantity & variety of cases. Their ability to manage the casualty in major casualties can be observed during this period.

Thesis

Every candidate shall carry out work on an assigned research project under the guidance of a recognized Postgraduate Teacher; the project shall be written and submitted in the form of a thesis.

The students will identify a relevant research question; (ii) conduct a critical review of literature; (iii) formulate a hypothesis; (iv) determine the most suitable study design; (v) state the objectives of the study; (vi) prepare a study protocol; (vii) undertake a study according to the protocol; (viii) analyze and interpret research data, and draw conclusions; (ix) write a research paper.

Assessment.

All the PG residents are assessed daily for their academic activities and also periodically.

General principles

- The assessment is valid, objective, and reliable
- It covers cognitive, psychomotor and affective domains
- Formative, continuing and summative (final) assessment is also conducted in theory as well as practicals/clinical. In addition, thesis is also assessed separately

Formative

The formative assessment is continuous as well as end-of-term. The former is based on the feedback from the senior residents and the consultants concerned. End-of-term assessment is held at the end of each semester (up to the 5th semester). Formative assessment will not count towards pass/fail at the end of the program, but will provide feedback to the candidate.

Internal Assessment

Items Marks

1.	Personal attributes*	20 marks
2.	Clinical skills and performance	20 marks
3.	Academics activities(Journal club, seminars, drug review)	20 marks
4.	End of term theory examination(1st year, 2nd year, 2 years and 9 months)	20 marks
5.	End of term practical examination / Oral	20 marks

The record of internal assessment will be presented to the board of examiners for consideration at the time of final examination.

*Personal attributes

Availability: Punctual, available continuously on duty, responds promptly to calls and takes proper permission for leave.

Sincerity and motivation: Dependable, honest, admits mistakes, does not falsify information, exhibits good moral values, loyal to institution, has initiative, takes on responsibilities, goes beyond routine work, exhibits keen desire to learn.

Diligence and performance: Dedicated, hardworking, does not shirk duties, leaves no work pending, does not sit idle, competent in clinical case work up and management (Where applicable), skilled in procedures, proficient in record keeping and file work.

Academic ability: Intelligent, shows sound knowledge and skills, participates adequately in academic activities, and performs well in oral presentation and departmental tests

Inter-personal skills: Has compassionate attitude towards patients, gets on well with colleagues and paramedical staff, respectful to seniors.

Job Responsibilities

The junior residents should:

1. Maintain log book on daily basis
2. Maintain daily record of post graduate activities including:
 - Practical exercises
 - Statistics exercises
 - PG teaching schedule
3. Prepare for undergraduate and postgraduate practical
4. Provide the basic medico-legal services in relation to practice of medicine.
5. Must be able to conduct, interpret and report common medico-legal autopsies.
6. Identify diagnose and manage common acute and chronic poisonings.
7. Be able to examine , interpret , report and if required give expert opinion in various clinical medico-legal matters like age estimation, alcoholics, sexual offences, injuries, abortion, sex determination, paternity, disability evaluation etc.
8. Teach the practical undergraduate medical students the subject of forensic medicine and also to actively participate in the training and re-orientation programmes of interns.

Suggested books

Core books-Name of book & author

1. Modi's Text book of medical Jurisprudence & Toxicology.
2. The essentials of forensic medicine & toxicology. K.S.N. Reddy.
3. The textbook of Forensic Medicine. J.B. Mukharjee, Vol. 1 & 2.
4. Principles of Forensic Medicine. A. Nandy.
5. A Textbook of Forensic Medicine & Toxicology, Principles & Practice. Krishan Vij
6. Textbook of Forensic Medicine & Toxicology V.V. Pillay.
7. Modern Medical Toxicology. V.V. Pillay
8. Forensic Pathology. Bernard Knight
9. Handbook of Forensic Pathology. Vincent J.M. Di Maio & Suzzanna E. Dana.

Reference Books

- 1) Bernard Knight et.all: Cox's Medical Jurisprudence & Toxicology.
- 2) Russel S. Fisher & Charles S. Petty: Forensic Pathology.
- 3) Keith Simpson's Forensic Medicine.
- 4) Jurgen Ludwig, Current methods of autopsy practice.
- 5) Camps F.E. Gradwohls- Legal Medicine, Bristol Wright.
- 6) Simpson's: A Doctors guide to Court.
- 7) Polson C.J.: The essentials of Forensic Medicine.
- 8) Adelson L.: The pathology of Homicide.
- 9) Atlas of Legal Medicine: Tomio Watanabe.
- 10) Spitz W.U., & Fisher R.S. , Medici Legal Investigation of Death.
- 11) A. Keith Mant, Taylor's principles & practice of Medical Jurisprudence.Churchil
Lvng.
- 12) Justice Hidayatullah & V.R.Manohar , Ratanlal & Dhirajlal : The Indian Penal Code.
- 13) Justice Hidayatullah & S.P.Sathe : Ratanlal & Dhirajlal ; The Code of
Crm.Procdr.
- 14) Justice Hidayatullah & V.R. Manohar , Ratanlal & Dhirajlal :The Law of Evidence.
- 15) H.S. Mehata: Medical Law & Ethics in India.
- 16) Code of Medical Ethics, Medical Council of India , approved by Central Govt.
U/S 33(m) of IMC Act 1956 (Oct. 1970).
- 17) Krogman W.M. : The Human Skeleton in Legal Medicine.
- 18) F.E. Camps, J.M. Cameren , David Lanham : Practical Forensic Medicine.
- 19) Dr.B.V. Subrahmanyam , Textbook of Forensic Medicine & Toxicology.
- 20) The Medical Profession & Law, Dr.R.D.Lele.(IMA , Mumbai Publication).

Journals

1. Journal of Forensic Sciences.
2. Journal of Legal Medicine (Of American College Medicine.).
3. Journal of Forensic Science Society.
4. Medico-legal Journal.
5. American Journal of Of Law & Medicine.
6. American Journal of Forensic Medicine.
7. Forensic Science International.
8. Journal of Clinical Forensic Medicine.
9. Medicine Science & Law.
10. Science & Justice.
11. Journal of Indian Academy of Forensic Medicine. Journal of Punjab Academy of
Forensic Medicine and Toxicology
12. Journal of Forensic Medicine & Toxicology, (Medico-legal Society.)
13. Medico-legal Update, An International Journal.
14. Journal of Clinical Forensic Medicine.
Journal of Forensic and Legal Medicine
