

FORENSIC MEDICINE AND MEDICAL JURISPRUDENCE **INCLUDING TOXICOLOGY**

1. GOAL

The broad goal of teaching undergraduate students Forensic Medicine is to produce a physician who is well informed about Medico-legal responsibility during his/her practice of Medicine. He/She will also be capable of making observations and inferring conclusions by logical deductions to set enquiries on the right track in criminal matters and associated medico-legal problems. He/She acquires knowledge of law in relation to Medical practice, Medical negligence and respect for codes of Medical ethics.

2. EDUCATIONAL OBJECTIVES

KNOWLEDGE

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

- identify the basic Medico-legal aspects of hospital and general practice
- define the Medico-legal responsibilities of a general physician while rendering community service either in a rural primary health centre or an urban health centre
- appreciate the physician's responsibilities in criminal matters and respect for the codes of Medical ethics
- diagnose, manage and identify also legal aspect of common acute and chronic poisonings
- describe the Medico-legal aspects and findings of post-mortem examination in cases of death due to common unnatural conditions and poisonings
- detect occupational and environmental poisoning, prevention and epidemiology of common poisoning and their legal aspects particularly pertaining to Workmen's Compensation Act
- describe the general principles of analytical toxicology
- understand Clinical Forensic Medicine
- understand issues in organ transplantation

SKILLS

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

- 2.2.1 make observations and logical inferences in order to initiate enquiries in criminal matters and Medico-legal problems
 - a. to be able to carry on proper Medico-legal examination and documentation/ Reporting of Injury and Age
 - b. to be able to conduct examination for sexual offences and intoxication

- c. to be able to preserve relevant ancillary materials for medico - legal examination
- d. to be able to identify important post-mortem findings in common unnatural deaths and be able to distinguish between Natural and Un-natural deaths.
- e. to diagnose and treat common emergencies in acute and chronic poisoning
- f. to observe the principles of medical ethics in the practice of his profession

INTEGRATION

Department shall provide an integrated approach towards allied disciplines like Pathology, Radiology, Forensic Sciences, Hospital Administration etc. to impart training regarding Medico-legal responsibilities of physicians at all levels of health care. Integration with relevant disciplines will provide scientific basis of clinical toxicology e.g. Medicine, Pharmacology etc.

3. DURATION OF TEACHING

Semesters	-	3
Teaching Days	-	360
Teaching hours	-	100

4. SYLLABUS

a) LEARNING METHODS

Lectures, tutorials, practical demonstrations, group discussions and seminars

Distribution of teaching hours

Didactic lectures should not exceed one third of the time schedule, two third schedules should include Practicals, Demonstrations, Group discussions, Seminars and Tutorials.

Learning process should include living experiences and other case studies to initiate enquiries in criminal matters and Medico-legal problems.

A) Theory : Lectures	.....	40 hours
(including Tutorials, Seminars & Allied)	.....	20 hours
Total	.....	60 hours
B) Practicals	.....	25 hours
(including demonstrations)	.....	15 hours
Total	.....	40 hours

This period of training is minimum suggested. Adjustments, whenever required, depending on availability of time, may be made.

CONTENTS & DIVISION

1. PART – 1 FORENSIC MEDICINE:

A) INTRODUCTION

- i. Definition, Scope Relevant To Subject
- ii. History of Forensic Medicine
- iii. Need, Scope, Importance and probative value of Medical evidence in Crime Investigation

B) FORENSIC IDENTITY:

- i. Introduction, definition, types, corpus delicti
- ii. Data useful for Identification of Living and Dead
- iii. Age estimation and its medico-legal Importance
- iv. Sex determination and it's medico-legal importance
- v. Other methods of establishing identity: Dactylography, Tattoo marks, Deformities, Scars
- vi. Identification of decomposed, Mutilated bodies and skeletal remains
- vii. Medico legal aspect of DNA fingerprinting - a brief introduction
- viii. Value for evidence in crime
- ix. Medico-legal aspect of blood and blood stains.

Note: Collection, Preservation and Dispatch of Specimen for Blood and other ancillary material for identification and Medico-legal examination.

C) THANATOLOGY:

- i. Definition and concept of death, Brainstem Death in relation to Organ Transplantation
- ii. Causes of sudden Natural deaths
- iii. Changes after death, Cooling, Hypostasis, Changes in eye, Muscle changes, Putrefaction, Adipocere, Mummification, Estimation of time since death
- iv. Presumption of death and survivorship, disposal and preservation of dead bodies

D) MEDICO-LEGAL AUTOPSY

- i. Autopsy: Objectives, Facilities, Rules and Basic techniques, Proforma for reporting medico-legal autopsy
- ii. Exhumation, examination of mutilated remains, Obscure autopsy and post-mortem artifacts

E) TRAUMA

- i. Definition and classification of injuries:
- ii. Blunt force Trauma : Abrasions, Contusions and Lacerations
- iii. Sharp force Trauma : Incised, Stab and Chop wounds
- iv. Physical methods of Torture and their identification
- v. Firearm injuries and Explosive injuries and Basics of Firearms
 - a) PM examination of Firearm injury deaths.
 - b) Removal and collection of Bullets, Pellets etc.
- vi. Complications and causes of death due to injury.
- vii. Medico-legal aspect of injury/hurt, simple and grievous hurts, murder, Ante-mortem & Postmortem Wounds, Age of the injury, cause of death and relevant sections of I.P.C., Cr.P.C.
- viii. Causative Weapon and appearance of Suicidal, Accidental and Homicidal injuries.
- ix. Regional injuries: Head injury, mechanism, Injury to Scalp, Skull, Brain and Spinal Injuries
- x. Intracranial Haemorrhage, changes in Brain

- xi. Road Traffic Accidents
- xii. Thermal injuries: Injuries due to heat and cold, Frostbite, Burns, Scalds and Bride burning
- xiii. Injuries due to Electricity, Lightening
- xiv. Non-Accidental Domestic Violence
- xv. Starvation deaths

Note: Collection, Preservation and Dispatch of Specimen for Blood and other ancillary material for Medico-legal examination.

F) MEDICO-LEGAL ASPECTS OF SEX, MARRIAGE AND INFANT DEATH

- i. Explanation and ML Importance of Terminologies: Impotence, Sterility, Virginity, Pregnancy, Delivery, Paternity, Legitimacy, Assisted Reproductive Technique Medico Legal Aspects and PNDT Act,
- ii. Sexual Offences and perversions: Natural (Rape, Adultery and Incest), Unnatural (Sodomy, Bestiality and Buccal coitus) Lesbianism, perversions and relevant sections of I.P.C. and Cr.P.C.
- iii. Examination of Rape and Sodomy cases.
- iv. Abortions, Medical Termination of pregnancy, Criminal abortions and relevant IPC sections.
- v. Infant death:
 - a) Explanation of Terminologies Viability Live Births, Deadborn, Stillborn
 - b) Determination of age of Foetus and Infant with special reference to 3, 5, 7 & 9 months of I.U.Age
 - c) Infanticides: Autopsy to confirm Livebirth, period of survival, causes of deaths
 - d) Battered Baby Syndrome and Sudden Infant Death Syndrome.

Note: Collection, Preservation and Dispatch of Specimen: Hair, seminal fluid/stains and other ancillary material for medico-legal examination, examination of seminal stains and vaginal swabs.

G) ASPHYXIAL DEATHS:

- i. Introduction, Pathophysiology, General Signs-Symptoms Asphyxia
- ii. Hanging: Definition, Types and Causes of death, PM Finding, MLI
- iii. Strangulation, Suffocation and Traumatic Asphyxia: Definition, Types and causes of death, PM Finding, MLI
- iv. Drowning – Definition, Types, Mechanisms and Causes of death, MLI, PM Finding, Diatom Test.

H) FORENSIC PSYCHIATRY

- i. Basic concepts of Forensic Psychiatry in respect of Civil and Criminal responsibility
- ii. Examination, Certification, restraint and admission to Mental Hospital
- iii. Mental Health Act 1987: Principles and Objectives

2. PART – 2 TOXICOLOGY:

A) GENERAL PRINCIPLES :

- i. Introduction to Toxicology
- ii. Epidemiology of poisoning
- iii. General consideration and Laws in relation to poisons / Narcotic drugs and Psychotropic substances Act, Duties and Responsibilities of attending Physician.
- iv. Basics of Environmental and Industrial Toxicology in relation to Health & Ecology;
- v. Common poisons and their classification, Identification of common poisons, Routes of Administration, Actions of poisons and factors modifying them, Diagnosis of poisoning (Clinical and Confirmatory), Treatment / Management of cases of acute and chronic poisoning.
- vi. Analytical Toxicology (Principles: Bedside & Common Lab. Tests), Collection, Preservation and Dispatch of Viscera to FSL
- vii. Regulatory Toxicology for prevention of Hazards to Health and Ecology.

B) CORROSIVE & IRRITANT POISONS:

- i. Inorganic Corrosives- Sulphuric, Nitric & Hydrochloric Acid
- ii. Organic Corrosives- Phenol, Oxalic Acid
- iii. Inorganic Non-Metallic Irritants- Phosphorus, Halogens
- iv. Inorganic Metallic Irritants- Arsenic, Lead, Mercury, Copper
- v. Organic Vegetable Irritants- Abrus, Castor, Croton, Calotropis, Semicarpus, Ergot.
- vi. Organic Animal Irritants – Snake Bite, Scorpion & other common insect bites diagnosis and Management; Medicolegal Aspects
- vii. Mechanical Irritants- diagnosis and treatment & Medicolegal Aspects

C) NEUROTOXIC :

- i. Inebriates- Ethyl Alcohol, Methyl Alcohol
- ii. Somniferous and Sedative Hypnotics – Opium and Derivatives, Barbiturates
- iii. Deliriant- Dhathura, Cannabis, Cocaine .
- iv. Insecticides/ Pesticides/ Agrochemical- Organo-phosphorus Compounds. Organo-chlorides, Carbamates , Pyrethroids, Aluminium phosphide.
- v. Spinal Poisons- Strychnine
- vi. Peripheral Poisons- Curare

D) ASPHYXIANTS (GASES)-

Carbon monoxide, Carbon Dioxide, Cyanogens and Cyanides

E) CARDIAC POISONS-

Oleanders, Aconite, Tobacco

F) OTHER POISONS:

- i. Domestic/ Household Poisons- Kerosene, Detergents, Disinfectants, Cosmetics, Rodenticide mothballs etc.
- ii. Therapeutic Drug Toxicity/ poisoning by Medicines- Salicylates, Paracetamol, Newer derivatives of sedatives
- iii. Food Poisoning- Bacterial, Viral, Mushrooms, Chemical etc.
- iv. Drugs of dependence and Drug Abuse

3. PART – 3 MEDICAL JURISPRUDENCE:

A) LEGAL AND ETHICAL ASPECTS OF PRACTICE OF MEDICINE

- i. The Indian Medical Council and State Medical Council: Formation, Functions
- ii. Rights, Privileges and Duties of Registered Medical Practitioners
- iii. Infamous conduct, Professional secrecy and privileged communications
- iv. Medical Ethics and prohibition of Torture & care of Torture Victims
- v. Consent – Its relevance in Medical Practice & medical record maintainance.
- vi. Medical Negligence and contributory negligence, Precautionary measures and defences for Medical Practitioners against legal actions, Medical/Doctors indemnity insurance, Consumer Protection Act relevant to medical practice
- vii. Euthanasia – Current views and dilemmas, Different codes of Medical Ethics and Ethics in Research
- viii. Common medico-legal problems in Hospital practice
- ix. Medico-legal, ethical & social problems in relation to AIDS

Note: Workmen's compensation Act, * Mental Health Act, Medical Practitioner Act, Protection of human rights Act, 1993, * National Human Rights Commission, * Human Organ Transplantation Act and other relevant sections of I.P.C., Cr.P.C. and I.E. Act. Maharashtra civil medical code, Hospital administration manual.

4. PART – 4 LEGAL PROCEDURES IN MEDICO-LEGAL CASES:

- i. Medico-Legal Investigations of death in suspicious circumstances, different Inquest, type of offences
- ii. Types of Criminal courts and their powers, punishments prescribed by law, kinds of witnesses, Evidence, Documentary Medical evidence, Dying declaration and Dying deposition
- iii. The Trial of criminal cases, Rules and Conventions to be followed by Medical Witness at Medical evidence, subpoena, conduct money
- iv. Relevant Sections from the Indian Evidence Act, Indian Penal code and Criminal Procedure code

PRACTICALS (INCLUDING DEMONSTRATIONS)

Practicals will be conducted in the laboratories.

Objective will be to assess proficiency in skills, conduct of experiment, interpretation of data and logical conclusion.

Emphasis should be on candidate's capacity in making observations and logical inferences in order to initiate enquiries in criminal matters and medico-legal problems.

Contents:

Part 1 Forensic Medicine

Report on:

1. Estimation/Certification of Age
2. Recording of fingerprints
3. Examination/Certification of the Injured
[Prescribed Forms]

4. Examination of the Causative Agents in cases of Injuries (e.g. Weapons, Instruments)
 - a) Hard and blunt weapons
 - b) Sharp cutting, sharp pointed and Sharp Heavy cutting weapons
 - c) Firearm weapons
5. Sexual offences :
 - a) Examination/Certification of Victim
 - b) Examination/Certification of Accused
6. Examination of Foetus to opine about age
7. Examination of Bones for Medico-legal purpose to determine age, sex, stature, cause of death, time since death
 - a. Skull and Mandible
 - b. Pelvis, Sternum
 - c. Femur, Humerus

Study of:

8. Medical certification of cause of Death as per Birth and Death registration Act [Prescribed Forms]
9. Studies of Skiagrams for estimation of age, bony injury, foreign body, and pregnancy
10. Photograph of different events of Medico-legal importance and post-mortem changes
11. Study of Various museum specimens of medico-legal significance
12. Study of Various slides of medico-legal significance
13. Demonstration of Instruments:
 - a) Used in treatment of acute poisoning cases
 - b) Used for causing abortions
 - c) Used for conducting autopsy (Dissection Set)

Part 2 Forensic Toxicology

1. Examination/Certification of Alcoholic [Prescribed Forms 'A' & 'B']
2. Study of Common poisons:

[Sulphuric Acid, Nitric Acid, Hydrochloric Acid, Carbolic Acid and Oxalic Acid, Phosphorous, Lead, Arsenic, Mercury, Copper, Glass powder, Castor, Croton, Calatropis Abrus Precatorius (Ratti), Dhatura, Cannabis Indica, Opium, Aconite, Yellow Oleander, Strychnine, Snakes, Scorpion, Alcohol, Methyl Alcohol, Kerosene, Organo-phosphorus compounds, Organo Chloro compounds, Carbamates (Carbaryl)] and other commonly used poisons, antidotes and preservatives

Part 3 Medical Jurisprudence

Study of Medical Certificates [Prescribed Forms]

- a. Sickness Certificate
- b. Fitness Certificate
- c. Certificate of Physical fitness
- d. Medical certificate prescribed under Mental Health Act: 1987
- e. Medical Certificate of Sound/Unsoundness of mind.

Part – 4 Legal procedures in medico-legal cases

Orientation of various formats of specified forms:

Consent to surgery Anaesthesia and other Medical services, Request for sterilization, Consent to access to hospital records, Authorization for Autopsy, Dead body Challan used for sending a dead body for post-mortem examination, Request for the second inquest by Magistrate on the dead body, Provisional post-mortem certificate, Post-mortem form, Pictorial Post-mortem form, Form for the Final cause of death, Forms for despatch of exhibits other than the viscera to chemical analyser, Forms for despatch of Viscera for Histopathological Examination, Form for dispatch of viscera to chemical analyser, Forensic Science Laboratory report form, Summons to witness.

Each student shall attend and record as a clerk

- a. As many as possible cases / items of medico-legal importance
- b. 10 cases of medico-legal autopsies

The Journal should be scrutinised by the teacher concerned and presented during the university examination.

Efforts be made so that each student will attend the court at least 2 cases when Medical Evidence is being recorded.

BOOKS RECOMMENDED

1. Modi's Textbook of Medical Jurisprudence and Toxicology
2. The Essentials of Forensic Medicine & Toxicology by K.S. Narayan Reddy
3. Text Book of Forensic Medicine – J.B. Mukherjee VOL 1 & 2
4. Principles of Forensic Medicine - A. Nandy
5. Bernard Knight et. All: Cox's Medical Jurisprudence & Toxicology
6. Krishnan Handbook of Forensic Medicine, V.V. Pillay
7. Text Book of Forensic Medicine & Toxicology – Krishna Viz
8. Text Book of Forensic Medicine & Toxicology – R. Basu

REFERENCE BOOKS

1. Russell S. Fisher & Charles S. Petty: Forensic Pathology
2. Keith Simpson: Forensic Medicine
3. Jurgen Ludwig: Current Methods of autopsy practice.
4. Gradwohl – Legal Medicine
5. A Doctors Guide to Court – Simpson
6. Polson C.J. : The essentials of Forensic Medicine
7. Adelson, L.: The Pathology of Homicide.
8. Atlas of Legal Medicine (Tomro Watonbe)
9. Sptiz, W.U. & Fisher, R.S.: Medico-legal Investigation of Death.
10. A Hand Book of Legal Pathology (Director of Publicity)
11. Taylor's Principles & Practice of Medical Jurisprudence.
Edited by A.Keith Mant, Churchill Livingstone.
12. Ratanlal & Dhirajlal, The Indian Penal Code; Justice Hidayatullah & V.R. Manohar
13. Ratanlal & Dhirajlal, The Code of Criminal procedure; Justice Hidayatullah
& S.P. Sathe
14. Ratanlal & Dhirajlal, The Law of Evidence; Justice Hidayatullah & V.R. Manohar
15. Medical Law & Ethic in India – H.S. Mehta
16. Bernard Knight : Forensic Pathology
17. Code of medical ethics : Medical Council of India, approved by Central Government,
U/S 33 (m) of IMC Act, 1956 (Oct 1970)
18. Krogman, W.M.: The human skeleton in legal medicine.
19. FE Camps, JM Cameren, David Lanham : Practical Forensic Medicine

5. EVALUATION

METHODS

Theory, Practical & Viva

Passing: A candidate must obtain minimum 50% marks in Aggregate, with a minimum of 50% marks in Theory+Orals & minimum 50 % in Practicals in University examination.

PATTERN OF THEORY EXAMINATION

(A) First & Second Terminal Examination (Internal Assessment)

Nature of Question Paper

- i) Duration - 2 hrs (one paper of 2 hrs or 120 minutes)
- ii) The paper will have 3 sections

Suggested pattern and marking for paper of 40 marks

Section	Question	Pattern of Question	Number of Question	Marks	Time
A	1	Multiple choice questions (MCQ)	16 (all compulsory)	16 x ½ each = 08	20 minutes
B	2	Short answered questions (SAQ)	4 (out of 05)	04 x 02 each = 08	01 hour 40 minutes
	3	Structured long answer question (LAQ)	1 (compulsory)	01 x 08 = 08	
C	4	Short answered questions (SAQ)	4 (out of 05)	04 x 02 each = 08	
	5	Structured long answer question (LAQ)	1 (compulsory)	01 x 08 = 08	
Total				40 marks	02 hours

(B) Third Terminal / Preliminary (Internal Assessment) & University Examination

Nature of Question Paper

- i) Duration - 2 hrs (one paper of 2 hrs or 120 minutes)
- ii) The paper will have 2 sections

Suggested pattern and marking for paper of 40 marks

Section	Question	Pattern of Question	Number of Question	Marks	Time
A	1	Short answered questions (SAQ)	6 (out of 07)	06 x 02 each = 12	02 hours
	2	Structured long answer question (LAQ)	1 (compulsory)	01 x 08 = 08	
B	3	Short answered questions (SAQ)	6 (out of 07)	06 x 02 each = 12	
	4	Structured long answer question (LAQ)	1 (compulsory)	01 x 08 = 08	
Total				40 marks	02 hours

PATTERN OF PRACTICAL EXAMINATION

(A) First Terminal Examination (Internal Assessment)

PRACTICAL: Will be of 25 marks and the distribution of marks will be as follows:

- | | |
|----------------|----------|
| 1: Practical | 15 Marks |
| 2: Viva (oral) | 10 Marks |

Practical: Distribution recommended as follows:

- | | |
|---|----------|
| 1) Structured question station (2 marks each × 5 Nos) | 10 Marks |
| 2) Certificate (5 marks × 1 Nos) | 05 Marks |

Note:

1. Structured question station includes: Bones, Weapons, X rays, Photographs, Specimens etc.
2. Certificates include:- Death/Sickness/Fitness/Physical fitness Certificate
 - Report of Examination for Age/Drunkeness/Injury/Sexual offence (Victim & Accused)

(B) Second Terminal Examination (Internal Assessment)

PRACTICAL: Will be of 40 marks and the distribution of marks will be as follows:

1: Practical	30 Marks
2: Viva (oral)	10 Marks

Practical: Distribution recommended as follows:

1) Structured question station (2 marks each × 10 Nos)	20 Marks
2) Certificates (5 marks each × 2 Nos)	10 Marks

Note:

1. Structured question station includes:
Bones, Weapons, X rays, Photographs, Specimens etc.
2. Certificates include:
 - (a) Medical Certificate: Death/Sickness/Fitness/Physical fitness certificate.
 - (b) Medico-legal Report/Certificate: Examination for Age/Drunkenness/Injury/
Sexual offence (Victim & Accused)

(C) Third Terminal / Preliminary (Internal Assessment) & University Examination

PRACTICAL: Will be of 40 marks and the distribution of marks will be as follows:

1: Practical	30 Marks
2: Viva (oral)	10 Marks

Practical: Distribution recommended as follows:

1) Structured question station (1.5 marks each × 10 Nos)	15 Marks
2) Certificates (5 marks each × 2 Nos)	10 Marks
3) Toxicology Spots (1 mark each × 5 Nos)	05 Marks

Note:

1. Structured question station includes:
Bones, Weapons, X rays, Photographs, Specimens etc.
2. Certificates includes:
 - (a) Medical Certificate: Death/Sickness/Fitness/Physical fitness certificate.
 - (b) Medico-legal Report/Certificate: Examination for Age/Drunkenness/Injury/
Sexual offence (Victim & Accused).
3. Toxicology spots includes: Poisons, Drugs, Articles.

Viva/Oral: Distribution recommended as follows:

Table 1: Forensic Medicine:	05 Marks
Table 2: Toxicology, Psychiatry, Legal Procedures, Medical Jurisprudence:	05 Marks

PATTERN OF INTERNAL ASSESMENT

III Semester:

- 1) Mid Term Exam: 15 marks
- 2) Terminal Exam:
Theory: One Paper: 40 marks, Practicals including Viva: 25 marks

IV Semester:

- 1) Mid Term Exam: 15 marks
- 2) Terminal Exam:
Theory: One Paper: 40 marks , Practicals including Viva: 40 marks

V Semester:

- 1) Mid Term Exam: 15 marks
- 2) Preliminary Exam:
Theory: One Paper: 40 marks, Practicals including Viva: 40 marks

Note: Best 2 (out of 3) Mid term exam marks will be added to Theory marks.

Theory: Marks secured in Theory & Mid term examinations will be converted to out of 10 marks.

Practicals: - Marks secured in Practical examinations will be converted to out of 7 marks.
- Day to day practical work and record will be evaluated for 3 marks.

Total Internal Assessment Marks: 10 (Theory) + 10 (Practicals) = 20 marks

Internal Assessment Calculation: Fraction will be rounded to nearest whole figure e.g. if less than $\frac{1}{2}$ it will be brought to previous round figure. If it is $\frac{1}{2}$ or more it will be taken to next round figure.

NOTE: For qualifying for University Examination, a Candidate should obtain minimum 35% marks in internal assessment.

Heads of Passing In University Examination

Theory + Orals (40+10)	Practicals	Internal Assessment (Theory 10 + Practical 10)	Total
50 marks	30 marks	20 marks	100 marks

Passing: A candidate must obtain minimum 50% aggregate marks with a minimum 50% marks in Theory+Orals & minimum 50% marks in Practicals.
