

**MAHAKAUSHAL UNIVERSITY,
JABALPUR M.P.**

**Approved by Higher Education
and the Governor of M.P.**



**Faculty of Science
Scheme & Syllabus
For
Subject- Forensic Science
M.Sc. Programme
(1 Year PG Diploma/1 Year PG/2Year PG
Programme
I to IV Semester
2025-26**

Theory Paper: Scheme B-1 for Two Year PG Program

Program:	Class: M.Sc.I Semester	Year: 2025	Session: 2025-26
Subject: Forensic Science			
1	Course Code	MFOR0101-T	
2	Course Title	Forensic Science Investigation and Criminal Justice System: Theory	
3	Course Type		
4	Pre-Requisite (if any)		
5	Course Learning Outcome (CLO)	The fundamental principles and functions of forensic science and their significance to human society, the art of collecting, packaging, and preserving different types of physical and trace evidence at crime scenes, the importance of chain of custody, different types of crime scenes; various tools and techniques for analysis of different types of crime scene evidence and their processing in courts.	
6	Credit Value	6	
7	Total Marks	Max. Marks: 100	Minimum Passing Marks: 40

Total No. Of Lectures - Tutorial Practical (in hours per week):

L-T-P:

Unit	Topics	No. Of Lectures
I	Foundations of Forensic Science and Ethical Framework: The History and Development of Forensic Science, The Nature and Scope of Forensic Science. Organizational Structure of Forensic Science Laboratories at Central & State Level. Ethics in Forensic Science. Basic principles and its significance. Concept of Dharma, Nyaya (justice), and Satya (truth)	14
II	Definition, Theories of Causation of Crime: Pre-Classical and Neo-Classical, Constitutional, Geographical, Economic, Psychological, Sociological, Multiple Causation Approach. General Factors of Crime, Forms of Punishment in Brief, Radical Theory of Crime. Scene of Crime: Types, Protection of Scene of Crime, Crime Scene Documentation, Note Taking, Videography, Photography and Sketching Methods. Physical Evidence: Meaning, Types, Searching Methods, Collection and Preservation, Forwarding. chain of custody. Collection, Preservation, Packing and Forwarding of: Blood, Semen and Other Biological Stains, Firearm Exhibits, Documents, Fingerprint, Viscera, Hair & Fiber, Glass, Soil and Dust, Petroleum Products, Drugs and Poisons, etc. Investigation of the Following Crimes: Murder, Theft and House Breaking, Road Accident, Railways and Air Accidents, Arson, Sexual Assault Cases, Dowry Cases and Explosion	22

	Cases.	
III	Elements of Crime Scene Management- Information Management, Technology Management, Man-Power Management, and Logistic Management. An Introduction to Crime Scene Reconstruction, The Nature of Reconstruction, Physical Evidence and Reconstruction (Recognition, Identification, Individualization, and Reconstruction), Stages in Reconstruction, Types of Reconstruction, Pattern. Evidence in Reconstruction (Bloodstain Pattern Analysis for Reconstruction, Glass Fracture Pattern Fire Burn Patterns, Tire and Skid Mark Patterns), Shooting Scenes, Requirements for Reconstruction after Crime Scene Released, Writing a Reconstruction Report.	18
IV	Bhartiya Nyaya Sanhita (2023): Introduction, General Exceptions, Offences against Person, Offences against Property, Attempt to Suicide, Sexual Offences. Bhartiya Nagarik Suraksha Sanhita (2023): Introduction and General Idea of Sections: 173, 174, 175, 176,177, 178,179, 180, 181, 192,193, 194, 195 and 196. Bhartiya SakshyaAdhinyam (2023): Introduction and General Idea of Sections: 26, 39, 40, 41, 52, 53, 55, 72,140, 141,142 and 162.	18
V	Organization of Police in India , Organization of Courts in Courts Cases, Prosecution, F.I.R., Case Diary, Interrogation of Suspects, Interview of Witness, and Procedure in Court as Per Bhartiya Nagarik Suraksha Sanhita: Trial of Summons, Trial of Warrant, and Summary Trial. Report Writing and Evidence Evaluation Report Formats of Crime Scene and Laboratory Findings court Testimony: Admissibility of Expert Testimony, Pre Court Preparation and Court Appearance	18
Keywords/Tags: Evidence Investigation, Forensics, Analysis, Justice		

TextBooks,ReferenceBooks,Other Resources

Suggested Readings:

1. Ahuja R. (2001). Criminology. India, Rawat Pub.
2. Aitken C.G.G. & Stoney, D.A. (1991). The Use of Statistics in Forensic Science. England, Ellis Harwood Limited.
3. Bowen R.T. (2016). Ethics and the Practice of Forensic Science. USA, CRC Press.
4. Burke R.H. (2013). An Introduction to Criminological Theory, 4th ed., UK, Routledge-Taylor & Francis Group.
5. Horswell J. (2016). The Practice of Crime Scene Investigation. USA, CRC Press.
6. Indian Penal Code, Criminal Procedure Code, Indian Evidence Act.

Pattern of Marks Distribution THEORY PAPER for NEP PG courses

Assessment and Evaluation

Recommended Continuous Assessment Methods-: Maximum Marks: 100 Continuous Comprehensive Evaluation (CCE): 40 Marks University Examination: 60 Marks		
Internal Assessment: Continuous Comprehensive Evaluation (CCE):	Class Test Assignment/Presentation	20 Marks 20 Marks Total Marks = 40
External Assessment: University Examination: Time: 3 Hours	Section (A)- Five very short answer question (20 words each) Section (B)- Five short answer question (200 words each) Section (C)- Two long answer question (500 words each)	02 Marks x 05 Questions = 10 Marks <i>(All 5 Questions to be attempted)</i> 06 Marks x 05 Questions = 30 Marks <i>(5 Questions to be attempted out of total 8 Questions)</i> 10 Marks x 02 Questions = 20 Marks Marks <i>(2 Questions with each having internal choice)</i> Total Marks = 60

Program:			
Subject: Forensic Science	Class: M.Sc. I Semester	Year: 2025	Session: 2025-26
1			
2	Course Code	MFOR0101-P	
3	Course Title	Forensic Science Investigation and Criminal Justice System: Practical	
4	Course Type		
5	Pre-Requisite (if any)		
6	Course Learning Outcome (CLO)	Crime scene management and photography; different searching methods of crime scenes; different methods of crime scene sketching; collection, packing, labelling, and forwarding of physical evidence from the crime scene to the forensic science laboratory, methods of crime scene reconstruction.	
7	Credit Value	4	
Total Marks		Max. Marks: 100	Minimum Passing Marks: 40
Total No. Of Lectures-Tutorial-Practical (in hours per week): L-T-P:			
Topics			
1. Demonstration of Crime Scene Management. 2. Photography of Scene of Crime Digital Camera. 3. Methods for Searching for Physical Evidence at the Scene of Crime. 4. Sketching of an Outdoor Scene of Crime (Homicide or Suicide). 5. Sketching of an Outdoor Scene of Crime (Accident). 6. Sketching of Indoor Scene of Crime (Theft or Dacoity or Robbery). 7. Sketching of an Indoor Scene of Crime (Murder or Suicide). 8. Sketching of a Mobile Scene of Crime (Hit & Run Case). 9. Collection, Packing, Labeling and Forwarding of Physical Evidence from Scene of Crime to Forensic Science Laboratory. 10. Reconstruction of a Scene of Crime.			No. Of Lectures
Keywords/Tags: Evidence Investigation, Scene of Crime, Sketching, Searching			

Pattern of Marks Distribution PRACTICAL PAPER for NEP PG courses

Assessment and Evaluation

Suggested Continuous Evaluation Methods:			
Internal Assessment	Marks	External Assessment	Marks
Class Interaction /Quiz	15	Viva Voce on Practical	10
Attendance in the lab	10	Practical Record File	10
Assignments (Charts/ Model Seminar / Rural Service/ Technology Dissemination/ Report of Excursion/ Lab Visits/ Survey / Industrial visit)	15	Table work / Experiments	40
TOTAL	40		60

Theory Paper: Scheme B-1 for Two Year PG Program

Program:	Class: M.Sc. I Semester	Year: 2025	Session: 2025-26
Subject: Forensic Science			
1	Course Code	MFOR0102-T	
2	Course Title	Forensic Physics, Ballistics & Cyber Theory	
3	Course Type		
4	Pre-Requisite (if any)		
5	Course Learning Outcome (CLO)	Understanding firearms and their ammunition, Different fields of forensic ballistics which include Internal Ballistics, External and Terminal ballistics, Methods of investigation in shooting cases.	
6	Credit Value	6	
7	Total Marks	Max. Marks: 100	Minimum Passing Marks: 40

Total No. Of Lectures - Tutorial - Practical (in hours per week): L-T-P:

Unit	Topics	No. Of Lectures
I	Introduction: Density, Refractive Index, Birefringence; Other Optical Properties of Crystalline Material. Examination of the Following- 1. Hair and Fiber 2. Soil 3. Dust 4. Paints 5. Glass 6. Glass Fracture 7. Tool Marks 8. Explosives Restoration of Erased / Obliterated Marks. Examination of Wire/ Cables, Counterfeit Coins. Physical Matching of Severed / Broken Objects. Speaker Identification and Tape Authentication: Voice Production Theory-Vocal Anatomy, Speech Signal Processing & Pattern Recognition- Basic Factors of Sound in Speech, Acoustic Characteristics of Speech Signal, Fourier Analysis, Frequency & Time Domain Representation of Speech Signal, Analogue to Digital Signal and Conversion, Fast Fourier Transform, Quantization, Digitization, and Speech Enhancement, Analysis of Audio-Video Signal for Authenticity, Introduction to the Techniques of Pattern Recognition and Comparison.	14
II	History and background, their classification and characteristics, Shotgun and rifled firearms (including pistols, revolvers and assault rifles), Various Components of Firearms: Barrel: chamber, lead, bore (calibre and its nomenclature Rifling, Purpose of Rifling, Types of Rifling), Action: its components and various types including manual, semiautomatic and automatic stock Improvised/Country-Made/Imitative Firearms and their Constructional Features. Ammunition: Classification and Constructional Features of Different Types of Cartridges, Types of Primers and Priming Composition, Propellants and	22

	<p>their Compositions, Various Types of projectiles, Bullets and Compositional Aspects, Safety Aspects for Handling Firearms.</p> <p>Traditional Indian warfare technologies: bows, arrows, catapults, and projectiles in Dhanurveda and Shastra Vidya.</p>	
III	<p>Definition, Ignition of Propellants, Shape and Size of Propellants, Manner of Burning, Various Factors affecting the Internal Ballistics, Theory of recoil, Exterior Ballistics, Vacuum Trajectory, Effect of external and internal factors on Trajectory of cylinder-conoidal bullets and shotgun projectiles, Ricochet bullets, maximum and effective range. Concept of wound formation, Temporary and Permanent Cavities, Threshold Velocity for Penetration of Skin/Flesh/Bones, Effect of various types of projectiles on hitting the target, effect of various factors on wound formation: function of bullet shape, striking velocity, striking angle of intermediate target, tumbling of bullets, effect of instability of bullets, effect of intermediate targets, influence of range, yaw, stopping power.</p>	18
IV	<p>Identification of Firearms -Matching of crime and test: Principles and Practice of Identification of Firearms with fired projectiles in regular firearms and country made firearms. Gun-shot residue: its formation and analysis (chemical and instrumental methods), Reconstruction of crime scene: Range of fire, Time of Fire, Different Method Employed and their Limitations.</p> <p>Firearm Injuries- Nature of Wounds of Entry, Exit, and Initial Track with Various Ranges and Velocities with Evaluation of Injuries Caused by Shot-Gun, Rifle, Handguns, and Country Made Firearms, Post-Mortem and Antemortem Firearm Injuries.</p>	18
V	<p>What is Computer Forensic? Basic Introduction to Computers, Hardware and Accessories, Operating Systems and Software. Cyber Crime- Definition, Crimes on Internet, Hacking, Virus, Worms, Cookies, Obscenity and Pornography. Programme Manipulation. Software Piracy, Intellectual Property and Computer Security. Encryption and Decryption Methods. What is Computer Forensic? Basic Introduction to Computers, Hardware and Accessories, Operating Systems and Software. Cyber Crime- Definition, Crimes on Internet, Hacking, Virus, Worms, Cookies, Obscenity and Pornography. Programme, Manipulation. Software Piracy, Intellectual Property and Computer Security. Encryption and Decryption Methods.</p>	18
<p>Keywords/Tags: Computer Forensic, Firearms, Ballistics, Bullets</p>		

TextBooks,ReferenceBooks,Other Resources

Suggested Readings:

1. Ahuja R. (2001). Criminology. India, Rawat Pub.
2. Aitken C.G.G. & Stoney, D.A. (1991). The Use of Statistics in Forensic Science. England, Ellis Harwood Limited.
3. Bowen R.T. (2016). Ethics and the Practice of Forensic Science. USA, CRC Press.
4. Burke R.H. (2013). An Introduction to Criminological Theory, 4th ed., UK, Routledge-Taylor & Francis Group.
5. Horswell J. (2016). The Practice of Crime Scene Investigation. USA, CRC Press.
6. Indian Penal Code, Criminal Procedure Code, Indian Evidence Act.
7. James, S.H., and Nordby, J.J. (2003). Forensic Science: An Introduction to Scientific and Investigative Techniques. USA, CRC Press.
8. James S.H. (2014). Forensic Science: An Introduction to Scientific and Investigative Techniques. UK, Taylor & Francis.
9. Nordby J. (1999). Dead Reckoning-The Art of Forensic Science Detection. USA, CRC Press.
10. O'Hara & Osterberg, (1949). An Introduction to Criminalistics. New York, The Macmillan Company.

Pattern of Marks Distribution THEORY PAPER for NEP PG courses

Assessment and Evaluation

Recommended Continuous Assessment Methods-: Maximum Marks: 100 Continuous Comprehensive Evaluation (CCE): 40 Marks University Examination: 60 Marks		
Internal Assessment: Continuous Comprehensive Evaluation (CCE):	Class Test Assignment/Presentation	20 Marks 20 Marks Total Marks = 40
External Assessment: University Examination: Time: 3 Hours	Section (A) - Five very short answer question (20 words each) Section (B) - Five short answer question (200 words each) Section (C) - Two long answer question (500 words each)	02 Marks x 05 Questions = 10 Marks <i>(All 5 Questions to be attempted)</i> 06 Marks x 05 Questions = 30 Marks <i>(5 Questions to be attempted out of total 8 Questions)</i> 10 Marks x 02 Questions = 20 Marks <i>(2 Questions with each having internal choice)</i> Total Marks = 60

Program:		Class: M.Sc.I Semester	Year: 2025	Session: 2025-26
Subject: Forensic Science				
1	CourseCode	MFOR0102-P		
3	Course Title	Forensic Physics, Ballistics & Cyber Practical		
4	Course Type			
5	Pre-Requisite(if any)			
6	Course Learning Outcome(CLO)	Understanding of the density gradient method for matching soil, glass, glass fractures and the refractive index of glass. chemical treatment of erased tool marks, lifting and casting of footmarks, tyre marks, handling of a comparison microscope.		
7	Credit Value	4		
		Max.Marks: 100	Minimum PassingMarks: 40	
TotalMarks				
TotalNo.OfLectures-Tutorial-Practical(inhoursperweek): L-T-P:				
Topics				
1. Identification and Matching of Dust/ Soil Sample by Physical Method (Including Density Gradient Method). 2. Physical Matching of Cloth Sample and Identification of Glass Fractures. 3. Calculate the refractive index of glass with Abbe's Refractometer. 4. Restoration of an Erased Punched Mark on a Metal Piece by Chemical Treatment. 5. Comparison of Tool Marks and Fired Cartridge/ Bullet Using Comparison Microscope. 6. Identification of Shots and Pallets. 7. Collection and Handling of Digital Evidence. 8. Detection of Origin of e-Mails (IP Address) etc. 9. Data recovery from various storage devices by using data recovery software.				No.OfLectures
Keywords/Tags: Computer Forensic, Firearms, Ballistics, Bullets				

TextBooks,ReferenceBooks,Other Resources

Suggested Readings:

1. Bengold&Moryson N. (1999). Speech and Audio Signal Processing. USA, John Wiley & Sons.
2. Caddy B. (2001). Forensic Examination of Glass and Paint Analysis and Interpretation. UK, Taylor and Francis.
3. Hatcher, Jury, & Weller. (1977). Firearms Investigation, Identification, and Evidence. Harrisburg, Stackpole Books.
4. Heard B.J. (1997). Handbook of Firearms and Ballistics. London, John Willey.
5. Hogg. V. (1982). The Cartridges Guide - A Small Arms Ammunition Identification Manual. Harrisburg, The Stackpole Co.
6. Jenkins and White, (2003). Fundamentals of Optics. USA, McGraw Hill.
7. Johari M. (1980). Identification of Firearms, Ammunition and Firearms Injuries. India, BPR&D.
8. Maio V.D. (1999). Gunshot Wounds. US, CRC Press.
9. Mathews, J.H. & Thomas, C.C. (1973). Firearms Identification, Vols. 1, 2 & 3. Illinois, Springfield.
10. Murray, R.C. & Tedrew J.C.F. (1991). Forensic Geology. New Jersey, Prentic hall.
11. Santanam R., Sethumadhawan M. (2010). Cyber Security, Cyber Crime and Cyber Forensics: Applications and Cyber Forensics: Applications and Perspectives. NY, InformationScience Reference.
12. Wiles J., Reyes A. (2007). The Best Damn Cybercrime and Digital Forensics Book Period.US, Elsevier.
13. Nelson B, Philips A., Steuart C. (2014). Guide to Computer Forensics and Investigations. US, Cengage Learning

Pattern of Marks Distribution PRACTICAL PAPER for NEP PG courses

Assessment and Evaluation

Suggested Continuous Evaluation Methods:			
Internal Assessment	Marks	External Assessment	Marks
Class Interaction /Quiz	15	Viva Voce on Practical	10
Attendance in the lab	10	Practical Record File	10
Assignments (Charts/ Model Seminar / Rural Service/ Technology Dissemination/ Report of Excursion/ Lab Visits/ Survey / Industrial visit)	15	Table work / Experiments	40
TOTAL	40		60

Subject: Forensic Science

1	Course Code	MFOR0201-T	
2	Course Title	Instrumental Method- Physical, Chemical and Biological: Theory	
3	Course Type		
4	Pre-Requisite(if any)		
5	Course Learning Outcome(CLO)	Understanding about the sample preparation, handling and extraction techniques the basic principle and working of chromatographic and spectroscopic technique that could lead to professional job opportunities in testing and pharmaceutical laboratories, the basic principle and working of spectroscopy, microscopy and other analytical instruments	
6	Credit Value	6	
7	Total Marks	Maximum marks: 100	Minimum marks: 40

Total No. Of Lectures-Tutorial-Practical(in hours per week): L-T-P:

Unit	Topics	No. Of Lectures
I	Instrumental Approach (Sample, Sampling, Storage of Samples), Simple Sample Separation (Distillation, filtration, evaporation, and crystallization. Solvent Extraction techniques like LLE, SPE, Micro SPE and Distribution Law) and Preparation (Acid Dissolution & Digestion, Fusions, Dry Ashing and Combustion), Basic Statistics and Data Handling (Significant Figures, Accuracy and Precision, Types of Errors, Quantifying Random Error, Rejection of Results), Performing the Measurement (Signals and Noise, Plotting Calibration Curves), Assessing the Data (Limit of Detection, Limit of Quantification).	14
II	General Idea on Spectroscopy, Electromagnetic Spectrum, Various Sources of Radiation and their utility and limitations, Interaction of Radiation with Matter, i.e., Reflection, Absorption, Fluorescence, Phosphorescence, Diffraction, Refraction, etc. Detection of Radiation, i.e., Photography, Photoelectric, etc. Introduction to optical systems used in Spectroscopy (Wavelength Selection Devices, Optical Slits, Detectors, Single- Beam and Double- Beam Optics), Dispersive Optical Layouts, and Fourier Transform Spectrometers. Forensic Applications of Spectroscopy.	22

III	Atomic Spectra- Energy Level, Quantum Number and Designation of States, Selection Rule. Molecular Spectra- Quantitative Discussion of Molecular Bindings, Molecular Orbital, Types of Molecular Energies, Discussion of Rotational, Vibrational, and Electronic Spectra. Ultraviolet-Visible and Infrared Spectrophotometry: Basic Principles, Instrumentation, Qualitative and Quantitative Analysis, Interpretation of Spectra, etc. Quantitative Analysis through Ultraviolet-Visible Spectroscopy, Forensic Application of UV-Vis. and IR Spectrophotometry. Mass Spectrometry: Principle and Instrumentation, Correlation of MS with Molecular Structure. A brief idea about the various forms of Mass Spectrometry Coupling with other instruments. Application of MS in Forensic Science. Radiochemical Techniques: Basic Principles and Theory, Introduction about Nuclear Reactions and Radiations, Neutron Activation Analysis (NAA), Nuclear Magnetic Resonance Spectroscopy (NMR)	18
IV	General Idea of Chromatography; Historical Aspect of Chromatography, Classification of Chromatography (Mobile Phase Mode, Technique, Development Mode, Separation Mechanism & other Systems of Classification), Theory and Classification of Chromatography (Planar and Column Chromatography, Adsorption and Partition Chromatography, Ion Exchange Chromatography, Exclusion Chromatography, Affinity Chromatography), Principles, Working and Forensic Application of Planar Chromatography; TLC, PC, HPTLC. General Principles, Working and Forensic Application of Column Chromatography General Idea on Working of HPLC and GC. Forensic Application of Chromatography.	18
V	Gel Electrophoresis, Isoelectric Focusing etc. General Idea and Working of Gel Electrophoresis, PAGE, SDS-PAGE, Capillary Electrophoresis, Forensic Application of Electrophoresis. Production of Antibodies, Precipitation Reaction, Gel Immunodiffusion, Immune-Electrophoresis, Complement Fixation. Molecular Biology Techniques, DNA Profiling and Microfluidics Outline of Genetic Manipulation Enzymes, Enzymes in Genetic Manipulation, Cloning Procedures, Isolation of Specific Nucleic Acid Sequences-Complementary DNA, Gene Libraries, Colony Hybridization, Nick Translation, Oligo-nucleotide Probes, Expression of Genes. DNA Profiling: Structure of DNA and its Polymorphic Marker, Basis of DNA Typing and Techniques: PCR, RFLP, etc. The Introduction of Microfluidics. Theory, Instrumentation, and its applications.	18
Keywords/Tags: Electrophoresis, Chromatography, Spectroscopy, Separation		

Text Books, Reference Books, Other Resources

Suggested Readings:

1. Chatwal and Anand. (2016). Instrumental Methods of Chemical Analysis. India, Himalaya Publishing House Pvt. Ltd.
2. Churáček J. (1993). Advanced Instrumental Methods of Chemical Analysis. Michigan, E. Harwood,

Pattern of Marks Distribution THEORY PAPER for NEP PG courses

Assessment and Evaluation

Recommended Continuous Assessment Methods-: Maximum Marks: 100 Continuous Comprehensive Evaluation (CCE): 40 Marks University Examination: 60 Marks		
Internal Assessment: Continuous Comprehensive Evaluation (CCE):	Class Test Assignment/Presentation	20 Marks 20 Marks Total Marks = 40
External Assessment: University Examination: Time: 3 Hours	Section (A)- Five very short answer question (20 words each) Section (B)- Five short answer question (200 words each) Section (C)- Two long answer question (500 words each)	02 Marks x 05 Questions = 10 Marks <i>(All 5 Questions to be attempted)</i> 06 Marks x 05 Questions = 30 Marks <i>(5 Questions to be attempted out of total 8 Questions)</i> 10 Marks x 02 Questions = 20 Marks <i>(2 Questions with each having internal choice)</i> Total Marks = 60

Program:			
Program:	Class:M.Sc.IISem ester	Year: 2025	Session:2025-26
Subject:Forensic Science			
1	CourseCode	MFOR0201-P	
2	Course Title	Instrumental Method- Physical, Chemical and Biological: Practical	
3	Course Type		
4	Pre-Requisite(if any)		
5	Course Learning Outcome(CLO)	Understanding about the sample preparation techniques, sample handling and extraction techniques, qualitative and quantitative analysis, the basic principle and working of chromatographic techniques like TLC, HPTLC, HPLC, GC etc. and spectroscopic technique like UV Spectroscopy, FTIR etc.	
6	Credit Value	4	
	TotalMarks	Max.Marks: 100	Minimum PassingMarks:40
TotalNo.OfLectures-Tutorial-Practical(inhoursperweek): L-T-P:			
Topics			
1. To Measure the pH of Different Substance using pH Meter. 2. To Know the Concentration of Given Liquid by Colorimeter. 3. Sample Preparation and Analysis of Drugs of Abuse by using UV-Visible spectrophotometer. 4. To separate and identify plant pigments by paper chromatography. 5. To know the Practical Working and Handling of High-Performance Thin Layer Chromatography by analyzing the ink sample. 6. To know the Practical Working and Handling of High-Performance Liquid Chromatography by analyzing depressant drugs. 7. To know the Practical Working and Handling of Gas Chromatography by analyzing volatile poisons. 8. Demonstration of Handling and Working of PCR. 9. To Perform Protein Estimation of Given Biological Samples. 10. To Separate Cell Organelles in Given Tissues using Centrifuge. 11. Demonstration of Working and Handling of Gel Electrophoresis. 12. Demonstration of Working and Handling of Compound, Stereo Microscope, SEM and TEM. 13. Demonstration of Working and Handling of the UV-Spectrophotometer for the Examination of Biological Samples.			No.OfLectures

TextBooks,ReferenceBooks,Other Resources

Suggested Readings:

1. Chatwal and Anand. (2016). Instrumental Methods of Chemical Analysis. India, Himalaya Publishing House Pvt. Ltd.
2. Churáček J. (1993). Advanced Instrumental Methods of Chemical Analysis. Michigan, E. Harwood,
3. Dean J. A. (1995). Analytical Chemistry Handbook. USA, McGraw Hill Inc.
4. Kalri P.S. (2001). Spectroscopy of Organic Compounds. India, New Age International Pub.
5. Khandpur R.S. (2004). Handbook of Analytical Instruments. USA, Tata McGraw Hill Pub. Co.
6. Khanna D.R. & Gulati H.R. (2002). Fundamentals of Optics Geometrical Physical & Quantum. India, R. Chand & Co.
7. Robards K. Jackson P.E. & Haddad P.A. (2012). Principles and Practice of Modern Chromatographic Methods. Germany, Elsevier pub.
8. Saferstein R. (2001). Forensic Science Handbook Vol. I. London, Prentice Hall
9. (1978). Biology Methods Manual. London: Metropolitan Police Forensic Science Laboratory.
10. Albert S., Bray B., Lewis D., Roberts K., and Watson J.D. (1989). Molecular Biology of the Cell. New York, Garland Pub.
11. Clifford B.J. (1971). The examination and typing of bloodstains in the Crime Laboratory. USA, US Court Printing Press.
12. Edwin & Caney, H. M. (1993). Human Genetics: The Molecular Revolution. London, Jones & Bartlett Pub.
13. Eppelen J. T., and Lubjumhin, T. (1995). DNA Profiling and DNA Fingerprinting. Basel, Birkhäuser Verlag.

Pattern of Marks Distribution PRACTICAL PAPER for NEP PG courses

Assessment and Evaluation

Suggested Continuous Evaluation Methods:			
Internal Assessment	Marks	External Assessment	Marks
Class Interaction /Quiz	15	Viva Voce on Practical	10
Attendance in the lab	10	Practical Record File	10
Assignments (Charts/ Model Seminar / Rural Service/ Technology Dissemination/ Report of Excursion/ Lab Visits/ Survey / Industrial visit)	15	Table work / Experiments	40
TOTAL	40		60

Program:		Class:M.Sc.II Semester	Year: 2025	Session:2025-26
Subject:Forensic Science				
1	CourseCode	MFOR0202-T		
2	Course Title	Dactylography, Biometrics and Questioned Documents: Theory		
3	Course Type			
4	Pre-Requisite(if any)			
5	Course Learning Outcome(CLO)	Understanding about the basics of fingerprint, history, patterns & classification, types of fingerprints, location, development, photography & comparison, ear biometrics and iris recognition, retina biometrics and face recognition.		
6	Credit Value	6		
7	Total Marks	Max. Marks: 100	Minimum Passing Marks:40	

Total No. Of Lectures-Tutorial-Practical(in hours per week): L-T-P:

Unit	Topics	No. Of Lectures
I	History of Fingerprints , Formation of Ridges, Different Fingerprint Patterns and Areas, Ridge Characteristics, Ridge Count, Ridge Tracing, Levels of Fingerprint Identification, Classification of Fingerprint- Henry system of classification, single digit classification, extension of the Henry system. Types of Fingerprint; Latent, Visible, and Plastic Prints, Location of Fingerprints; Development of Latent Prints by Physical and Chemical Methods. Photography and Comparison of Fingerprints, 3-D Development of Fingerprints Ancient Indian palmistry (Hasta Samudrika Shastra): Individual fingerprint patterns for personality and destiny.	14
II	Fingerprint Biometrics: Introduction to AFIS, Working of AFIS System, AFIS Components, Digitization & Processing of Fingerprints: Acquisition, Normalization & Segmentation, Enhancement, Binarization, Thinning & Post-processing, Minutiae Extraction, Fingerprint Matching in AFIS, Indexing & Retrieval. AMBIS- Integrated Biometric Identification System, CCTNS. Iris Recognition: Introduction, Anatomical and Physiological Underpinnings; Iris Signature Representation and Matching; Localization, Representation; Matching. Retina Biometrics: Structure of Eye; Human Retina and Structure; Unique Pattern of Blood Vessels; Retina Pattern and Identification.	22

III	<p>Voice Production, Theory-Vocal Anatomy, Speech Signal Processing & Pattern Recognition- Basic Factors of Sound in Speech, Acoustic Characteristics of Speech Signal. An Introduction to the Techniques of Pattern Recognition and Comparison.</p> <p>Face Recognition and Facial Reconstruction Face Recognition: Introduction, Detection, Representation, and Classification, Techniques and their Applications. Facial reconstruction: 2D & 3D Facial reconstruction. Face reading and body proportion analysis to determine personality and identity (Samudrika Shastra and Ayurveda)</p>	18
IV	<p>Definition of Questioned Document, Types of Questioned Document, Collection, Preservation & Handling of Questioned Document, Photography of Questioned Document, Preliminary Examination of Questioned Document. Basic Tools Needed for Forensic Document Examination- Ultraviolet, Visible, Infrared, and Fluorescence Spectroscopy, Photomicrography, Microphotography, Visible Spectral Comparator, Electrostatic Detection Apparatus, Determining the Age and Relative Age of Documents.</p>	18
V	<p>Comparison of Handwriting, Development of Individuality in Handwriting, Natural Variations and Fundamental Divergences in Handwriting, Class & Individual Characteristics. Standards for Comparison of Handwriting. Comparison of Paper, Ink, Printed Documents, Typed Documents, Xeroxed Documents. Alterations in Documents, Including Erasures, Additions, Overwriting, and Obliterations. Indented and Invisible Writings. Charred Documents. Examination of Counterfeit Indian Currency Notes, Passports, Visas, and Stamp Pads.</p> <p>Role of handwriting in resolving disputes in ancient India (Document examination in Dharamasastra)</p>	18
<p>Keywords/Tags: Comparison, Document, Voice, Biometrics</p>		

Text Books, Reference Books, Other Resources

Suggested Readings:

1. James S. H. (2014). Forensic Science: An Introduction to Scientific and Investigative Techniques. USA, Taylor & Francis Group.
2. Ashbaugh D. R., (1999). Quantitative and Qualitative Friction ridge analysis. NY, CRS Press.
3. Daluz H. M., (2014). Fundamentals of Fingerprint Analysis. NY, CRC Press.
4. Das R. (2014). Biometric Technology: Authentication, Bio Cryptography, and Cloud-Based.
5. Nickolls, L.C. (1956). Scientific Investigation of Crime. London, Bulterwest.
6. Kelly J. S. & Lindblom B. S. (2006). Scientific Examination of Questioned Documents. NY, CRC Press.

Pattern of Marks Distribution THEORY PAPER for NEP PG courses

Assessment and Evaluation

Recommended Continuous Assessment Methods-: Maximum Marks: 100 Continuous Comprehensive Evaluation (CCE): 40 Marks University Examination: 60 Marks		
Internal Assessment: Continuous Comprehensive Evaluation (CCE):	Class Test Assignment/Presentation	20 Marks 20 Marks Total Marks = 40
External Assessment: University Examination: Time: 3 Hours	Section (A)- Five very short answer question (20 words each) Section (B)- Five short answer question (200 words each) Section (C)- Two long answer question (500 words each)	02 Marks x 05 Questions = 10 Marks <i>(All 5 Questions to be attempted)</i> 06 Marks x 05 Questions = 30 Marks <i>(5 Questions to be attempted out of total 8 Questions)</i> 10 Marks x 02 Questions = 20 Marks <i>(2 Questions with each having internal choice)</i> Total Marks = 60

Program:	Class: M.Sc.IISem ester	Year: 2025	Session: 2025-26
Subject:Forensic Science			
1.	CourseCode	MFOR0202-P	
2.	Course Title	Dactylography, Biometrics and Questioned Documents: Practical	
3.	Course Type		
4.	Pre-Requisite(if any)		
5.	Course Learning Outcome(CLO)	Understanding about Collection, Preservation, Handling & Forwarding of Charred Document, Comparison of Forged and Genuine Document, Examination of ink by TLC, and Collection and Handling of Digital Evidence.	
6.	Credit Value	4	
	TotalMarks	Max.Marks: 100	Minimum PassingMarks: 40
TotalNo.OfLectures-Tutorial-Practical(inhoursperweek): L-T-P:			
Topics			
1. To Record a Fingerprint Chart by Direct Print Method and Rolling Method. 2. To Identify the Fingerprint Patterns along with Core and Delta. 3. To Perform Ridge Tracing and Ridge Counting of the Fingerprints. 4. Development of Latent Prints by Powder Method and Chemical Methods on Porous and Non-Porous Surfaces. 5. Lifting of Fingerprints by Different Methods. 6. Identification of Chance Prints Found on Different Surfaces. 7. Collection, Preservation, Handling & Forwarding of Charred Document. 8. Photographic Comparison of Handwriting & Signature. 9. Comparison of Forged and Genuine Document by VSC & Other Methods. 10. Decipher of Secret Writing by Physical and Chemical Methods. 11. Examination of Questioned Document & Currency by VSC. 12. Examination of ink by TLC			No.OfLectures

TextBooks,ReferenceBooks,Other Resources

Suggested Readings:

Suggested Readings:

1. James S. H. (2014). Forensic Science: An Introduction to Scientific and Investigative Techniques. USA, Taylor & Francis Group.
2. Ashbaugh D. R., (1999). Quantitative and Qualitative Friction ridge analysis. NY, CRS Press.
3. Daluz H. M., (2014). Fundamentals of Fingerprint Analysis. NY, CRC Press.
4. Das R. (2014). Biometric Technology: Authentication, Bio Cryptography, and Cloud-Based.
5. Nickolls, L.C. (1956). Scientific Investigation of Crime. London, Bulterwest.
6. Kelly J. S. & Lindblom B. S. (2006). Scientific Examination of Questioned Documents.NY,CRC Press.

Pattern of Marks Distribution PRACTICAL PAPER for NEP PG courses

Assessment and Evaluation

Suggested Continuous Evaluation Methods:			
Internal Assessment	Marks	External Assessment	Marks
Class Interaction /Quiz	15	Viva Voce on Practical	10
Attendance in the lab	10	Practical Record File	10
Assignments (Charts/ Model Seminar / Rural Service/ Technology Dissemination/ Report of Excursion/ Lab Visits/ Survey / Industrial visit)	15	Table work / Experiments	40
TOTAL	40		60

Theory Paper: Scheme B-1 for Two Year PG Program

Program:	Class: M.Sc. III Semester	Year: 2025	Session: 2025-26
Subject: Forensic Science			
1	Course Code	MFOR0301-T	
2	Course Title	Forensic Biology, Serology, DNA and Forensic Medicine: Theory	
3	Course Type		
4	Pre-Requisite (if any)		
5	Course Learning Outcome (CLO)	To understanding of the nature and importance of cells in the human body and different biological materials and their examination also importance of autopsy, knowledge on different types of injury and wound, the different techniques of facial reconstruction and their forensic importance, importance of forensic Medicine.	
6	Credit Value	6	
7	Total Marks	Max. Marks: 100	Minimum Passing Marks: 40

Total No. Of Lectures - Tutorial - Practical (in hours per week): L-T-P:

Unit	Topics	No. Of Lectures
I	Definition, Meaning, and History of Histology. Cell: Definition, Theories, Classification and Significance of Cells in Forensic Science. Cell Organelles and their Functions, Difference between Eukaryotic and Prokaryotic Cell, Difference between Plant and Animal Cell. Cell Division: Definition, Types, Difference between Somatic, Germinal Cell, Totipotency and Apoptosis. Basic Concept in Brief for Anatomy and Physiology of Digestive, Respiratory, Circulatory, Skeleton, Nervous, Excretory, and Reproductive System, etc. Definition, Classification, General Properties of amino acids, proteins and carbohydrates.	14
II	History, Biochemistry and Genetics of ABO, Rh, Mn, and other Systems, Methods of ABO Blood Grouping (Absorption-Inhibition, Mixed Agglutination, And Absorption Elution) from Blood Stains and other Body Fluids/Stains, Determination of Secretor/Non-Secretor Status, Lewis Antigen, Bombay. Blood Spatter Pattern Identification, Identification of Menstrual and Other Stains by Various Methods. Semen: Composition, Structure of Spermatozoa, Forensic Methods of Detection and Identification of Semen and Seminal Stain. Origin of Species: Determination of Human and Animal Origin from Bones, Hair, Flesh, Nails, Skin, Teeth, Body Tissue, Fluids/Stains viz. Blood, Menstrual Blood, Semen, Saliva, Sweat, Tear, Pus, Vomit, etc., Through Immuno-Diffusion and Immuno-Electrophoresis, Cross Reactivity among Closely Related Species. Immunology: Immune System, Immune Response, Epitopes, Paratopes, Haptens and Adjuvant, Antigens and Antibodies, Antigen-Antibody Reaction.	22

III	<p>Mendel Ion Genetics, Genotypes, Phenotypes, Mutation, Multiple Alleles. Biochemical Markers of Individuality: General Understanding, Classification of Markers, Biochemical Basis of Genetic Variation. Structure of DNA, Damage to DNA, Variation in DNA, DNA as Excellent Polymorphic Marker, and Sources of DNA as Forensic Evidence. Different Extraction Techniques of DNA, Basic DNA Typing Techniques; RFLP, PCR, Electrophoresis, and Detection Methods. Polymorphic Enzymes Typing- PGM, ESD, EAP, AK, etc., and their Forensic Significance, HLA Typing, Role of Serogenetic Markers in Individualization, Paternity Disputes, etc.</p>	18
IV	<p>Definition, Developmental History, Brief knowledge about legal procedures in courts, inquests, criminal courts and their powers, subpoenas, and oaths of medical experts. Recording of Medical Experts' Evidence in Courts. Types of Medical Evidence, Kinds of Witness, and Rules for Giving Evidence. Definition and Importance of Personal Identification. Parameters Contributing to Personal Identity- Race, Sex, Age, Complexion, Features & Photographs, Anthropometric measurements etc.</p>	18
V	<p>Thanatology: Definition, Meaning, Death, Type of Death, Concept of Death, Modes of Death and their Causes and Sign (Immediate Changes, Early Changes, Late Changes) and Symptoms, Manner of Death, Cause of Death, Asphyxia Death, Suspended Animation and Medico Legal Importance of Death. Autopsy: Definition, Classification, Concepts, Objectives, Legal Formalities for Autopsy, Autopsy Procedure, Skin Incisions, etc. Post-Mortem Examination: Importance, Post-Mortem Report Format, External & Internal Examination in Brief. Viscera & Its Preservation. Examination of Asphyxia Death, Examination of Decomposed and Mutilated Bodies. Precautions to be taken during Post Mortem Examination.</p> <p>Injuries: Definition, classification, Mechanical Injuries (Abrasion, Contusion, Laceration, Fracture and Dislocation of Bone/ Teeth, Incised Wounds, Chop Wound, Stab Wounds and Firearm Wounds), Regional Injuries, Thermal Injuries (Injuries due to Cold and Heat), Chemical Injuries, Miscellaneous Injuries. Medico-Legal Aspects, Post Mortem & Ante Mortem Wounds, General Characteristics of Injuries from Burns, Scalds, Lightning, Electricity and Radiation.</p> <p>Ancient legal medicine practices: Injury classification; <i>Abhighata, Vrana, Chinna, Bhinna</i>, etc. Cause and manner of death analysis (<i>Marma points, vital organ injuries</i>).</p>	18

TextBooks,ReferenceBooks,Other Resources

Suggested Readings:

1. Albert S., Bray B. Lewis D, Roberts K. & Watson J.D. (1989). Molecular Biology of Cell. New York, Garland Pub.
2. Ball S., (1991). Environmental Law – The Law and Policy relating to Protection of Environment. India, Universal Law Pub Co, Delhi.
3. Biology Methods Manual (1978). London, Metropolitan Police Forensic Science Laboratory Pub.
4. Catts E.P. & Haskell N.H. (1990). Entomology and Death: A Procedural Guide. London, Joyce's Print Shop.
5. Clifford & B.J.(1971). The Examination and Typing of Bloodstains in the Crime Laboratory. USA, US Court Printing Press.
6. Edwin & Cancy H. M. (1993). Human Genetics: The Molecular Revolution. London, Jones & Bartlett Pub.
7. Gardner E.J., Simmons M. I. & Snustad D.P.(1991). Principles of Genetics. New York, John Wiley.
8. Jason P. J. & Simpson K. (2014). Simpson's Forensic Medicine, NY, CRC Press.
9. Mallet X. (2014). Advances in Forensic Human Identification. NY, CRC Press.
10. Modi J.S. (2011). Medical Jurisprudence and Toxicology, India, Law Publishers.
11. Molina D. K., & M.D. (2009). Handbook of Forensic Toxicology for Medical Examiners. USA, CRC Press.

Pattern of Marks Distribution THEORY PAPER for NEP PG courses

Assessment and Evaluation

Recommended Continuous Assessment Methods:- Maximum Marks: 100 Continuous Comprehensive Evaluation (CCE): 40 Marks University Examination: 60 Marks		
Internal Assessment: Continuous Comprehensive Evaluation (CCE):	Class Test Assignment/Presentation	20 Marks 20 Marks Total Marks = 40
External Assessment: University Examination: Time: 3 Hours	Section (A)- Five very short answer question (20 words each) Section (B)- Five short answer question (200 words each) Section (C)- Two long answer question (500 words each)	02 Marks x 05 Questions = 10 Marks <i>(All 5 Questions to be attempted)</i> 06 Marks x 05 Questions = 30 Marks <i>(5 Questions to be attempted out of total 8 Questions)</i> 10 Marks x 02 Questions = 20 Marks <i>(2 Questions with each having internal choice)</i> Total Marks = 60

Program:		Class: M.Sc.III Semester	Year: 2025	Session: 2025-26
Subject:Forensic Science				
1	CourseCode	MFOR0301-P		
2	Course Title	Forensic Biology, Serology, DNA and Forensic Medicine: Practical		
3	Course Type			
4	Pre-Requisite(if any)			
5	Course Learning Outcome(CLO)	Understanding about Blood/ blood group examination, origin of species by hair samples,identification of fibres by physical and chemical methods, microscopic examination of pollenand diatoms.		
6	Credit Value	4		
		Max.Marks: 100	Minimum PassingMarks:40	
TotalMarks				
TotalNo.OfLectures-Tutorial-Practical(inhoursperweek): L-T-P:				
Topics				
1. Primary and Confirmatory Examination of Blood/ Semen Samples. 2. Microscopic Examination of Seminal Stains for the Detection of Spermatozoa. 3. Identification of Species from the Hair Sample. 4. Examination of Fiber by Physical and Chemical Methods. 5. Determination of species from Blood Samples. 6. Detection & Examination of Salivary Stains. 7. Draw and label the bones of the human body. 8. Determination of Age and Sex of a Person from Long Bones. 9. Determination of Age and Sex of a Person from Skull. 10. Recording of Bite Marks by Casting& their Photography. 11.Collection and Identification of Pollen Grains, Diatoms of Forensic Importance. 12. Examination of Lip Prints.				No.OfLectures
Keyword/Tag: DNA, Injuries,Genetics,Post Mortem				

TextBooks,ReferenceBooks,Other Resources

Suggested Readings:

1. Albert S., Bray B. Lewis D, Roberts K. & Watson J.D. (1989). Molecular Biology of Cell. New York, Garland Pub.
2. Ball S., (1991). Environmental Law – The Law and Policy relating to Protection of Environment. India, Universal Law Pub Co, Delhi.
3. Biology Methods Manual (1978). London, Metropolitan Police Forensic Science Laboratory Pub.
4. Catts E.P. & Haskell N.H. (1990). Entomology and Death: A Procedural Guide. London, Joyce's Print Shop.
5. Clifford & B.J. (1971). The Examination and Typing of Bloodstains in the Crime Laboratory. USA, US Court Printing Press.
6. Edwin & Caney H. M. (1993). Human Genetics: The Molecular Revolution. London, Jones & Bartlett Pub.
7. Gardner E.J., Simmons M. I. & Snustad D.P. (1991). Principles of Genetics. New York, John Wiley.
8. Jason P. J. & Simpson K. (2014). Simpson's Forensic Medicine, NY, CRC Press.
9. Mallet X. (2014). Advances in Forensic Human Identification. NY, CRC Press.
10. Modi J.S. (2011). Medical Jurisprudence and Toxicology, India, Law Publishers.
11. Molina D. K., & M.D. (2009). Handbook of Forensic Toxicology for Medical Examiners. USA, CRC Press.

Pattern of Marks Distribution PRACTICAL PAPER for NEP PG courses

Assessment and Evaluation

Suggested Continuous Evaluation Methods:			
Internal Assessment	Marks	External Assessment	Marks
Class Interaction /Quiz	15	Viva Voce on Practical	10
Attendance in the lab	10	Practical Record File	10
Assignments (Charts/ Model Seminar / Rural Service/ Technology Dissemination/ Report of Excursion/ Lab Visits/ Survey / Industrial visit)	15	Table work / Experiments	40
TOTAL	40		60

Theory Paper: Scheme B-1 for Two Year PG Program

Program:	Class: M.Sc. III Semester	Year: 2025	Session: 2025-26
Subject: Forensic Science			
1	Course Code	MFOR0302-T	
2	Course Title	Forensic Chemistry Toxicology and Pharmacology: Theory	
3	Course Type		
4	Pre-Requisite (if any)		
5	Course Learning Outcome (CLO)	To understanding of the nature and importance of cells in the human body and different biological materials and their examination also importance of autopsy, knowledge on different types of injury and wound, the different techniques of facial reconstruction and their forensic importance, importance of forensic Medicine.	
6	Credit Value	6	
7	Total Marks	Max. Marks: 100	Minimum Passing Marks: 100

Total No. Of Lectures - Tutorial - Practical (in hours per week): L-T-P:

Unit	Topics	No. Of Lectures
I	Introduction, Concept, and Significance. Poisons: Definition, Classification of Poisons, Types of Poisoning, Mode of Action, Factors Modifying the Action of Poisons, Toxicological Exhibits in Fatal and Survival Cases, Their Preservation, Treatment in Cases of Poisoning, Analysis Report. General Study and Analysis- Alkaloids: Definition, Classification, Isolation and General Characterization. Vegetable Poison: General Studies and Analysis of Some Vegetable Poisons, Opium, Abrus, cyanogenetic Glycosides, Dhatura, Marking Nuts, Nux-Vomica, Oleander Aconite, etc. Ancient classification of Poison: Sthavara (plant-based), Jangama (animal-based), Krtrima (artificial/compound poisons) Traditional detoxification and antidotes: <ul style="list-style-type: none"> • Agada (antidote formulations) • Vamana (emesis), Virechana (purgation), Swedana (sweating) – therapeutic detox protocols 	14

II	Extraction, Isolation and Clean-Up Procedures- Extraction of Non-Volatile Organic Poison, Stas-Otto, Dovbriey Nickolls(Ammonium Sulphate) Method, Acid Digest and Valov (Tungstate) Methods, Solid Phase MicroExtraction Techniques, Solvent Extraction Methods. Volatile Poisons: Industrial Solvent Acid and Basic Distillation. Toxic Cations: Dry Ashing and Wet Digestion Process. Toxic Anions: Dialysis Method, Total Alcoholic Extract.	22
III	Barbiturates, Methaqualone, Hydromorphone, Methadone, Meprobamate, Mescaline, Amphetamines, LDS, Heroin, Cannabinoids, Phinothiazines. Insecticides: Types, General Methods for their Analysis. Metallic Poisons: Arsenic, Mercury, Lead, Bismuth, Copper, Aluminium, Iron, Barium, Zinc, Snake Venoms and Other Animal Poisons, Irrespirable Gases, etc. Pharmacological Studies: Absorption, Distribution, Metabolism, Pathways of Drug Metabolism. Pharmacodynamics: Introduction, Nature & Scope.	18
IV	Forensic Chemistry and its Scope, Analysis of Beverages: Alcohol and Non- Alcoholic, Country Made Liquor etc. Adulterated food material. Drugs of Abuse: Introduction, Classification, Narcotic Drugs & Psychotropic Substances, Sampling, Specific Drugs Types (Cannabis, Heroin, Cocaine, Amphetamine), Drugs of Abuse in Sports. Brief Introduction to Drugs and Cosmetic Act, Excise Act, NDPS Act. An Overview of Clandestine Laboratories. Recent Advancement in Drugs: Rave Drugs, Drug Designing, Doping, Drug Discovery Program, Structural Modification in Drugs, and Drug Monitoring Agencies.	18
V	Examination of Petroleum Products: Distillation & Fractionation, Various Fractions and their Commercial Uses. Standard Methods of Analysis of Petroleum Products for Adulteration. Trap Cases: Purpose, Examination of Chemicals Used in Trap Case. Classification explosives and their Examination. Examination of Building Materials: Types of Cement and their Composition, Determination of Adulterants by Physical, Chemical and Instrumental Methods, Examination of Brick, Analysis of Cement Mortar and Concrete, Analysis of Gold and Other Metals in Cheating Cases.	18
Keyword/Tags: Toxicology, Poison, Drug, Examination		

Practical Paper: Scheme B-1 for Two Year PG Program

Text Books, Reference Books, Other Resources

Suggested Readings:

1. Aggrawal A. (2016). Textbook of Forensic Medicine and Toxicology. India, Avichal Publishing Company.
2. Bardale R. (2011). Principles of Forensic Medicine & toxicology. India, Jaypee Brothers Medical Publishers (P) Ltd.
3. Krishan V. (2014). Textbook of Forensic Medicine & Toxicology: Principles & Practice. UK, Elsevier Health Sciences.
4. Modi J.S. (2011). Medical jurisprudence and Toxicology. India, Law Publishers. 8. Jason P. J. & Simpson K. (2014). Simpson's Forensic Medicine, NY, CRC Press.
5. Chatwal and Anand. (2016). Instrumental Methods of Chemical Analysis. India, Himalaya Publishing House Pvt. Ltd.
6. Churáček J. (1993). Advanced Instrumental Methods of Chemical Analysis. Michigan, E. Harwood,
7. Dean J. A. (1995). Analytical Chemistry Handbook. USA, McGraw Hill Inc

Pattern of Marks Distribution THEORY PAPER for NEP PG courses

Assessment and Evaluation

Recommended Continuous Assessment Methods:- Maximum Marks: 100 Continuous Comprehensive Evaluation (CCE): 40 Marks University Examination: 60 Marks		
Internal Assessment: Continuous Comprehensive Evaluation (CCE):	Class Test Assignment/Presentation	20 Marks 20 Marks Total Marks = 40
External Assessment: University Examination: Time: 3 Hours	Section (A) - Five very short answer question (20 words each) Section (B) - Five short answer question (200 words each) Section (C) - Two long answer question (500 words each)	02 Marks x 05 Questions = 10 Marks <i>(All 5 Questions to be attempted)</i> 06 Marks x 05 Questions = 30 Marks <i>(5 Questions to be attempted out of total 8 Questions)</i> 10 Marks x 02 Questions = 20 Marks <i>(2 Questions with each having internal choice)</i> Total Marks = 60

Program:	Class:M.Sc.III Semester	Year: 2025	Session:2025-26
Subject:Forensic Science			
1	CourseCode	MFOR0302-P	
2	Course Title	Forensic Chemistry ToxicologyandPharmacology: Practical	
3	Course Type		
4	Pre-Requisite(if any)		
5	Course Learning Outcome(CLO)	Understanding about different Vegetable Poisons, Extraction and Identification of Insecticides and Pesticides, Identification of Drugs/ Toxicants, Identification of Metallic Poisons from Viscera.	
6	Credit Value	4	
TotalMarks		Max.Marks: 100	Minimum PassingMarks:40
TotalNo.OfLectures-Tutorial-Practical(inhoursperweek): L-T-P:			
Topics			
1. Identification of Common Plants i.e., Calotropis, Cannabis, Dhatura, Nux-Vomica, MarkingNut, Abrus precatorius, Opium Poppy etc. by Physical Examination and Color Test. 2. Identification of Different Vegetable Poisons by Thin Layer Chromatography etc. 3. Extraction and Identification of Insecticides and Pesticides by Colour Test/TLC. 4. Extraction and Identification of Drugs/ Toxicants from Biological Matrix and their Detection. 5. Identification of Salts and Metals by Simple Color Test in Case of Metallic Poisoning. 6. Extraction and Identification of Metallic Poisons from Viscera Using Dry Ashing MethodFollowed by Reinsch'sTest. 7.Preliminary & Confirmatory Examination of Chemicals Used in Trap Cases. 8.Preliminary & Confirmatory Examination of the Chemicals Seized in Case of Acid Attack. 9. Estimation Analysis of Petroleum Products using different methods like Density,Viscosityetc. 10. Detection of Adulterants in Cement Samples. 11. Determination of Percentage of Proof Sprit of Ethyl Alcohol in Illicit Liquorby UV-VIS Spectrophotometry. 12. Separation and Identification of Volatile Liquid by Simple Distillation. 13. Preliminary Examination Black Powder.			No.OfLectures
Keyword/Tags: Toxicology, Poison, Drug, Examination			

TextBooks,ReferenceBooks,Other Resources

Suggested Readings:

1. Aggrawal A. (2016). Textbook of Forensic Medicine and Toxicology. India, Avichal Publishing Company.
2. Bardale R. (2011). Principles of Forensic Medicine & toxicology. India, Jaypee Brothers Medical Publishers (P) Ltd.
3. Krishan V. (2014).Textbook of Forensic Medicine & Toxicology: Principles & Practice. UK, Elsevier Health Sciences.
4. Modi J.S. (2011).Medical jurisprudence and Toxicology. India, Law Publishers.
5. Khandpur R.S. (2004).Handbook of Analytical Instruments. USA, Tata McGraw Hill Pub. Co.
6. Khanna D.R. &Gulati H.R. (2002). Fundamentals of Optics Geometrical Physical & Quantum. India, R. Chand & Co.
7. Patania V.B. (2004). Spectroscopy. India, Campus Books International.
8. Robinson J.W. (1996). Atomic Spectroscopy, Revised & Expanded. NY, Marcel Dekkar, Inc.

Pattern of Marks Distribution PRACTICAL PAPER for NEP PG courses

Assessment and Evaluation

Suggested Continuous Evaluation Methods:			
Internal Assessment	Marks	External Assessment	Marks
Class Interaction /Quiz	15	Viva Voce on Practical	10
Attendance in the lab	10	Practical Record File	10
Assignments (Charts/ Model Seminar / Rural Service/ Technology Dissemination/ Report of Excursion/ Lab Visits/ Survey / Industrial visit)	15	Table work / Experiments	40
TOTAL	40		60

Program:		Class:M.Sc.IV Semester	Year: 2025	Session:2025-26
Subject: Forensic Science				
1	CourseCode	MFOR040J-T		
2	Course Title	Emerging Trends in Forensic Science Theory		
3	Course Type			
4	Pre-Requisite(if any)			
5	Course Learning Outcome(CLO)	Understanding Modern Surveillance Tools, Advancements in Detection of Street Drugs, Geo-Forensics, Environmental Forensics, Wildlife Forensics.		
6	Credit Value	6		
7	TotalMarks	Max. Marks: 100	Minimum Passing Marks: 40	

TotalNo.OfLectures-Tutorial-Practical(inhoursperweek): L-T-P:

Unit	Topics	No. OfLectures
I	Modern Surveillance Tools: Surveillance using biometrics, ID cards, and communications data Security Tools- Types (Airborne, Deployable, Fixed, Mobile, etc.), Advantages and Disadvantages.	18
II	Advancements in Detection of Street Drugs Kitbased detection, Instrument Advancements in Drugs, Hyphenated Chromatographic, 2D GasChromatography, Electronic Nose, Advance Kits, Drug Early warning system, Non invasive matrix indrug detection, Non-Conventional Substance of Abuse..	18
III	Forensic Geology Types of soil evidence, Color analysis, Particle analysis, Mineralogical analysis, Major and traceelement composition, Procedures for soil and sediment sampling and storage, Analysis of gems/ coloredstones, Evaluation of the significance of geological evidence.	18

IV	Environmental Forensics Introduction, Environmental pollutants, Toxicity of environmental contaminants, Fate of chemicals in the environment, Bioconcentration, Bioaccumulation and Biomagnification, contamination, atmospheric dispersion of pollutants.	18
V	WildLife Forensics Introduction to Wildlife, Protected and Endangered Species of Animals and Plants, WildLife Species -Identification and Examination of Physical Evidence by Conventional and Modern Methods, Identification of Pug Marks of Various Animals, Wildlife Census, Wildlife and Environment Protection Act.	18
Keywords/Tags: Forensics, Tools Wildlife, Toxicity, Pollutants		

TextBooks, ReferenceBooks, Other Resources

Suggested Readings:

1. Murray, R.C. (2004). Evidence from the Earth: Forensic Geology and Criminal Investigation. Mountain Press, Publishing Company, Missoula, Montana.
2. Petraco, N., Kubic, T. (2000). A density gradient technique for use in forensic soil analysis. Forensic Science International.
3. Reynolds, J.M. (1997). An introduction to applied and environmental geophysics. John Wiley & Sons, Ltd, Chichester.
4. Wildlife DNA Analysis: Applications in Forensic Science. (2013, May 28). Wiley.Com

Pattern of Marks Distribution THEORY PAPER for NEP PG courses

Assessment and Evaluation

Recommended Continuous Assessment Methods:- Maximum Marks: 100 Continuous Comprehensive Evaluation (CCE): 40 Marks University Examination: 60 Marks		
Internal Assessment: Continuous Comprehensive Evaluation (CCE):	Class Test Assignment/Presentation	20 Marks 20 Marks Total Marks = 40
External Assessment: University Examination: Time: 3 Hours	Section (A)- Five very short answer question (20 words each) Section (B)- Five short answer question (200 words each) Section (C)- Two long answer question (500 words each)	02 Marks x 05 Questions = 10 Marks <i>(All 5 Questions to be attempted)</i> 06 Marks x 05 Questions = 30 Marks <i>(5 Questions to be attempted out of total 8 Questions)</i> 10 Marks x 02 Questions = 20 Marks <i>(2 Questions with each having internal choice)</i> Total Marks = 60

Program:	Class:M.Sc.IV Semester	Year: 2025	Session:2025-26
Subject:Forensic Science			
1	CourseCode	MFOR0401-P	
2	Course Title	Emerging Trends in Forensic Science Practical	
3	Course Type		
4	Pre-Requisite(if any)		
5	Course Learning Outcome(CLO)	Understanding about different Vegetable Poisons, Extraction and Identification of Insecticides and Pesticides, Identification of Drugs/ Toxicants, Identification of Metallic Poisons from Viscera.	
6	Credit Value	4	
	TotalMarks	Max.Marks:100	Minimum PassingMarks: 40
TotalNo.OfLectures-Tutorial-Practical(inhoursperweek): L-T-P:			
Topics			
1. Pugmark Identification and characterization of common large mammals. 2. Use of different techniques in identification of different parts and products of flora and fauna reported in the wildlife trade. 3. To identify drugs of abuse by spot tests/rapid test kit. 4. To separate drugs of abuse by thin layer chromatography. 5. Comparison of soil samples.			No.OfLectures
Keywords/Tags: Forensics, Tools Wildlife, Toxicity, Pollutants			

TextBooks,ReferenceBooks,Other Resources

Suggested Readings:

1. Murray, R.C. (2004). Evidence from the Earth: Forensic Geology and Criminal Investigation. Mountain Press, Publishing Company, Missoula, Montana.
2. Petraco, N., Kubic, T. (2000). A density gradient technique for use in forensic soil analysis. Forensic Science International.
3. Reynolds, J.M. (1997). An introduction to applied and environmental geophysics. John Wiley & Sons, Ltd, Chichester.
4. Wildlife DNA Analysis: Applications in Forensic Science. (2013, May 28). Wiley.Com

Pattern of Marks Distribution PRACTICAL PAPER for NEP PG courses

Assessment and Evaluation

Suggested Continuous Evaluation Methods:			
Internal Assessment	Marks	External Assessment	Marks
Class Interaction /Quiz	15	Viva Voce on Practical	10
Attendance in the lab	10	Practical Record File	10
Assignments (Charts/ Model Seminar / Rural Service/ Technology Dissemination/ Report of Excursion/ Lab Visits/ Survey / Industrial visit)	15	Table work / Experiments	40
TOTAL	40		60

Theory Paper: Scheme B-1 for Two Year PG Program

Program:	Class: M.Sc. IV Semester	Year: 2025	Session: 2025-26
Subject: Forensic Science			
1	Course Code	MFOR0402-T	
2	Course Title	Forensic Neuroscience & Behavior, Narcotics and Drugs of Abuse: Theory	
3	Course Type		
4	Pre-Requisite (if any)		
5	Course Learning Outcome (CLO)	Understanding the neuroscience behind drug addiction and brain function Analyzing the behavioral patterns of substance abuse and its forensic implications Applying knowledge of neurobiology to investigate drug-related crimes Developing expertise in interpreting evidence related to narcotics and substance abuse.	
6	Credit Value	6	
7	Total Marks	Max. Marks: 100	Minimum Passing Marks: 40

Total No. Of Lectures - Tutorial - Practical (in hours per week): L-T-P:

Unit	Topics	No. Of Lectures
I	Forensic Neuroscience - Introduction to Forensic Neuroscience; Neuroscience in Criminal Investigation and Justice System. Introduction to the Structure and Function of the Vertebrate Nervous System. Anatomy of Nervous System, Neurons, Synapse and Neurotransmitter. Cellular Basis of Neuronal Activities, Physiological Bases of Motor Control, Sensory Systems, Motivated Behaviors and Higher Mental Processes. Trigunas (Three qualities of mind): • Sattva (purity, harmony), Rajas (activity, passion), Tamas (inertia, ignorance) – their role in criminal tendencies.	18
II	Action Potential Generation, Synaptic Transmission, Molecular and Physiological Studies of Ion Channels, Second Messengers, Simple Neural Circuits, Synaptic Plasticity, Learning and Memory, and Neural Development. Neurobiology of Motivation, Violence, Empathy, Deception, Aggression, Depression and Suicidal Ideation. Neurobiology of Brain Disorders. Behavioral Analysis and Neuropsychiatric Disorders Including Depression, Schizophrenia and Anxiety.	18

III	Principles of Brain Imaging and Rules of Scientific Evidence. Behavioral Neuroscience and Brain Imaging Techniques, Functional and Structural Magnetic Resonance Imaging (MRI) and Positron Emission Tomography (PET), Role of Behavioral Sciences in Courtroom Decision-Making. Use of Behavioral Neuroscience Evidence in the Justice System. Evaluation of Brain Imaging and other Neuroscience Data in Forensic and Legal Settings.	18
IV	Narcotics Drugs and Psychotropic Substances, Narcotics, Drug and Cosmetics Act, Classification and Characteristics of Narcotics Drugs, Legal Issues and Challenges. Types and Classification of Drugs, Drugs of Abuse, Drug Addiction, Drug Dependency; Synergistic Effect of Drugs, Drug Trafficking, Safety Measures and Precautions. Traditional use of psychoactive substances in spiritual, medicinal, and recreational contexts: <ul style="list-style-type: none"> • Bhang, Soma, Datura, Cannabis, Opium, and other plant-based intoxicants. 	18
V	Barbiturates, Methaqualone, Hydromorphone, Methadone, Meprobamate, Mescaline, Amphetamines, LSD, Heroin, Cannabinoids, Phinothiazines. Forensic Examination of Drugs of Abuse. Rave Drugs, Drug Designing, Doping, Drug Discovery Program, Structural Modification In Drugs, Drug Monitoring Agencies.	18
Keywords/Tags: Drugs, Abuse, Brain, Neuroscience		

Text Books, Reference Books, Other Resources

Suggested Readings:

1. Andreasen N. C. (1989). Brain Imaging: Applications in Psychiatry. USA, American Psychiatric Pub.
2. Benarroch E. E. (2006). Basic Neurosciences with Clinical Applications. USA, Elsevier.
3. Bohlen O. V., Halbach & Dermietzel R. (2006). Neurotransmitters and Neuromodulators: Handbook of Receptors and Biological Effects. England, John Wiley & Sons.
4. Davies G.M. & Beech A.R. (2012). Forensic Psychology: Crime, Justice, Law Interventions. England, John Wiley & Sons.
5. Flanagan C. (2008). Psychology: Complete Study and Revision Guide. England,

Pattern of Marks Distribution THEORY PAPER for NEP PG courses

Assessment and Evaluation

Recommended Continuous Assessment Methods-: Maximum Marks: 100 Continuous Comprehensive Evaluation (CCE): 40 Marks University Examination: 60 Marks		
Internal Assessment: Continuous Comprehensive Evaluation (CCE):	Class Test Assignment/Presentation	20 Marks 20 Marks Total Marks = 40
External Assessment: University Examination: Time: 3 Hours	Section (A)- Five very short answer question (20 words each) Section (B)- Five short answer question (200 words each) Section (C)- Two long answer question (500 words each)	02 Marks x 05 Questions = 10 Marks <i>(All 5 Questions to be attempted)</i> 06 Marks x 05 Questions = 30 Marks <i>(5 Questions to be attempted out of total 8 Questions)</i> 10 Marks x 02 Questions = 20 Marks <i>(2 Questions with each having internal choice)</i> Total Marks = 60

Practical Paper: Scheme B-1 for Two Year PG Program			
Program:	Class: M.Sc. IV Semester	Year: 2025	Session: 2025-26
Subject: Forensic Science			
1	Course Code	MFOR0402-P	
2	Course Title	Forensic Neuroscience & Behavior, Narcotics and Drugs of Abuse: Practical	
3	Course Type		
4	Pre-Requisite (if any)		
5	Course Learning Outcome (CLO)	Understanding the neuroscience behind drug addiction and brain function Analyzing the behavioral patterns of substance abuse and its forensic implications Applying knowledge of neurobiology to investigate drug-related crimes Developing expertise in interpreting evidence related to narcotics and substance abuse.	
6	Credit Value	4	
	Total Marks	Max. Marks: 100	Minimum Passing Marks: 40
Total No. Of Lectures - Tutorial - Practical (in hours per week): L-T-P:			
Topics			
1. Identification of Common Plant i.e. Cannabis, Tobacco and Opium Poppy by Morphological Features. 2. Preliminary Examination of Drugs Used for Committing Drug Facilitated Sexual Assaults. 3. Systematic Extraction and Identification of Narcotic/ Sedative/ Tranquilizer Drugs from Viscera/ Blood/ Urine (Simulated Sample). 4. Separation of Abusive Drugs from the Suspected Sample by HPLC. 5. Extraction of The Alcohol Content from the Country Made Liquor Using Simple Distillation Technique and its Preliminary Examination. 6. Examination of Drugs of Abuse by UV-Vis Spectrophotometer.			No. Of Lectures
Keywords/Tags: Drugs, Abuse, Brain, Neuroscience			

TextBooks,ReferenceBooks,Other Resources

Suggested Readings:

1. Working Procedure Manual – Chemistry, Explosives and Narcotics(2000). India, BPR&D Pub.
2. Aggrawal A. (2016). Textbook of Forensic Medicine and Toxicology. India, Avichal Publishing Company.
3. Burger A. (2004). Medicinal Chemistry & Drug Discovery. NY, John Wiley & Sons.
4. Clark E.G.C. (1986). Isolation and Identification of Drugs, Vol. I and Vol. II. Britain, Academic Press.
5. Connors K.A. (1975). A Text Book of Pharmaceuticals analysis. New York, Inter Science Pub.
5. Davies S., Johnston A. & Holt D. (2016). Forensic Toxicology: Drug Use and Misuse. England, Royal Society of Chemistry.

Pattern of Marks Distribution PRACTICAL PAPER for NEP PG courses

Assessment and Evaluation

Suggested Continuous Evaluation Methods:			
Internal Assessment	Marks	External Assessment	Marks
Class Interaction /Quiz	15	Viva Voce on Practical	10
Attendance in the lab	10	Practical Record File	10
Assignments (Charts/ Model Seminar / Rural Service/ Technology Dissemination/ Report of Excursion/ Lab Visits/ Survey / Industrial visit)	15	Table work / Experiments	40
TOTAL	40		60

**Value Added Course [Constitutional Human and Moral Values
(CHM)/Employability and Entrepreneurship Skill Course (EESC)] (2 Credits)**

Suggested Continuous Evaluation Methods:

Maximum Marks: 100

- **CHM: Only Term End Exam (Theory)**
- **EESC: Only Term End Exam (Theory)**