



SWAMI VIVEKANAND
SUBHARTI
UNIVERSITY
Meerut
UGC Approved
Where Education is a Passion ...



Ordinance No. :- V-141-B-13

**(Approved in Academic Council meeting held on 11.03.2026
Proposed to be ratified in forthcoming executive council)**

**Evaluation Scheme and Syllabus
of**

**M.Sc. FORENSIC SCIENCE
TWO – YEAR POST GRADUATE
PROGRAM**

(AS PER NEP-2020)

**Keral Verma Subharti College of Science
Swami Vivekanand**

SUBHARTI UNIVERSITY

Meerut

(Effective from session 2025-26)

K V Subharti College of Science
S V Subharti University
NH-58 Bypass Road Meerut

SYLLABUS FOR M.Sc. IN FORENSIC SCIENCE

The National Education Policy (NEP-2020) emphasizes a transformative shift from teacher-centric to student-centric learning in higher education. At the postgraduate level, it promotes advanced training, research orientation, and a robust assessment system that nurtures innovation and problem-solving abilities. The M.Sc. Forensic Science curriculum is designed with these principles in mind, ensuring that learning outcomes and graduate attributes guide the development of courses, pedagogical strategies, and skill-based activities.

This curriculum framework provides advanced theoretical knowledge, hands-on laboratory competence, research aptitude, and analytical capabilities necessary for forensic investigations. It integrates modern technological tools, digital resources, and MOOCs to augment learning and prepare students for diverse professional roles. The program aims to create globally competitive forensic professionals equipped with scientific temper, ethical reasoning, and critical thinking skills essential in a knowledge-driven society.

Forensic Science, at its core, applies scientific principles and analytical techniques to support investigations and legal processes. Postgraduate training strengthens the ability to critically evaluate evidence, interpret scientific findings, and provide expert testimony in judicial settings. The M.Sc. program enhances depth in specialized areas of forensic science while fostering interdisciplinary knowledge and research skills.

PROGRAM OBJECTIVES



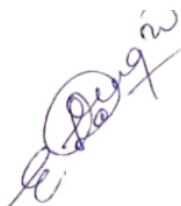
1. To develop advanced scientific knowledge and technical expertise essential for contributing to the criminal justice system.
2. To enable students to analyze and interpret complex physical, biological, chemical, and digital evidence for forensic and legal purposes.
3. To train students in the use of advanced technologies, analytical instruments, and digital tools for forensic investigation, including biometric analysis, cyber forensics, and image/video enhancement.
4. To provide a uniform, outcome-based academic structure aligned with national and global standards, facilitating mobility across institutions and enhancing employability.
5. To prepare graduates for professional roles in forensic laboratories, research institutions, law-enforcement agencies, and international forensic organizations.
6. To cultivate research aptitude, innovation, and capacity for independent scientific inquiry in forensic science.



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PROGRAM OUTCOMES

1. **PO1:** Demonstrate advanced understanding and application of scientific principles, analytical methods, and modern technologies for crime detection and forensic investigation.
2. **PO2:** Critically assess and integrate recent advancements, research findings, and technological innovations in forensic science to enhance academic and professional competence.
3. **PO3:** Evaluate the ethical, legal, and societal implications of forensic practices to uphold justice and maintain professional integrity.
4. **PO4:** Implement systematic, validated, and quality-controlled approaches in forensic examinations to ensure reliability and accuracy in scientific reporting.
5. **PO5:** Develop skilled human resources capable of addressing contemporary challenges in forensic science, contributing to national and international forensic standards.
6. **PO6:** Foster innovation, research collaboration, and interdisciplinary engagement by providing platforms for knowledge exchange, scientific exploration, and professional growth in forensic science.



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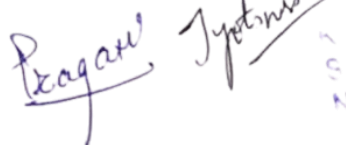
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KERAL VERMA SUBHARTI COLLEGE OF SCIENCE

DEPARTMENT OF FORENSIC SCIENCE

M.Sc. Program offered by Department of Forensic Science (Session 2025-26 Onwards)


		I	II	Internship after II Semester	III	IV	Total
1.	Core Course	16	16	4	8	4	44
2.	Elective (DEC)	-	-		8	8	16
3.	PC/Dissertation/Project Work	8	8		8	12	36
4.	SEMINAR/VAC/ OEC/EEC/CHM	2 (SEMINAR)	2 (CHM)		2 (OEC)	2 (EEC)	8
	Total	26	26		26	26	108

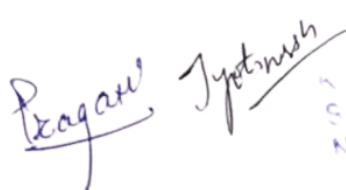


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I YEAR

SWAMI VIVEKANAD SUBHARTI UNIVERSITY MEERUT														
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DEPARTMENT OF FORENSIC SCIENCE														
Course Name -M.Sc. Forensic Science														
Batch:2025-26			SEM:I											
S.No.	Course Type	Course Code	Course Name	Teaching Load			Credits	Internal Assessment				External Assessment	Total	Remark
				L	T	P		Class participation	Quiz/PT/Assignment (10)	Mid Sem Test (15)	TOTAL			
THEORY AND PRACTICAL SUBJECTS														
1	Core Course-1	MSF S-101	Fundamentals of Forensic Science	4	0	0	4	5	10	15	30	70	100	
2	Core Course-2	MSF S-102	Forensic Psychology & Criminal Profiling	4	0	0	4	5	10	15	30	70	100	
3	Core Course-3	MSF S-103	Advanced Forensic Dermatoglyphics	4	0	0	4	5	10	15	30	70	100	
4	Core Course-4	MSF S-104	Advances in Forensic Documents Examination	4	0	0	4	5	10	15	30	70	100	
5	Practical Course-1	MSF S-105P	Crime Scene Investigation & Criminal Profiling Lab.	0	0	8	4	5	10	15	30	70	100	
6	Practical Course-2	MSF S-106P	Forensic Dermatoglyphics & Documents Examination Lab.	0	0	8	4	5	10	15	30	70	100	
7	Seminar	MSF S-107S		0	0	4	2	4	4	7	15	35	50	
TOTAL CREDITS / ASSESSMENT							26	34	64	97	195	455	650	



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KERAL VERMA SUBHARTI COLLEGE OF SCIENCE

DEPARTMENT OF FORENSIC SCIENCE

Course Name -M.Sc. Forensic Science

Batch:2025-26			SEM:II											
S. No.	Course Type	Course Code	Course Name	Teaching Load			Credits	Internal Assessment				External Assessment	Total	Remark
				L	T	P		Class participation	Quiz/PT/Assignment (10)	Mid Sem Test (15)	TOTAL			
THEORY AND PRACTICAL SUBJECTS														
1	Core Course-5	MSFS -201	Advanced Forensic Biology & Serology	4	0	0	4	5	10	15	30	70	100	
2	Core Course-6	MSFS -202	Forensics Genomics & DNA Profiling	4	0	0	4	5	10	15	30	70	100	
3	Core Course-7	MSFS -203	Forensic Physics & Ballistics	4	0	0	4	5	10	15	30	70	100	
4	Core Course-8	MSFS -204	Forensic Chemistry & Toxicology	4	0	0	4	5	10	15	30	70	100	
5	Practical Course-3	MSFS -205P	Biological & DNA Analysis Lab.	0	0	8	4	5	10	15	30	70	100	
6	Practical Course-4	MSFS -206P	Physical & Chemical Analysis Lab.	0	0	8	4	5	10	15	30	70	100	
7	Constitutional, Human and Moral Values and IPR (CHM)			2	0	0	2	4	4	7	15	35	50	
TOTAL CREDITS /ASSESSMENT							26	34	64	97	195	455	650	

1. AN INTERNSHIP COURSE OF 4 CREDITS OF 4-6 WEEKS DURATION DURING SUMMER VACATION AFTER IIND SEMSTER TO BE COPLETED BY EVERY STUDENTS INTERNSHIP CAN BE SITHER FOR ENHANCING THE EMPLOYAILITY OR AN DEVELOPING THE RESEACH APTITUDE.

2. THE POST GRADUATE DIPLOMA IN COMPUTER APPLICATION WILL BE AWARDED HERE AFTER THE SUBMISSION OF INTERNSHIP COURSES OF 04 CREDITS

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M.Sc. Forensic Science
Semester I
Fundamentals of Forensic Science

Credits: 4

Hours: 60

Course Title: Fundamentals of Forensic Science	Course Code:
Course Type: Core Course-1, L-T-P: 4-0-0	Course Credits: 4
Formative Assessment Marks: 30	Summative Assessment Marks: 70

Course Outcomes (COs): At the end of the course, the student should be able to:

1. Explain the history, scope, principles, and concepts of forensic science.
2. Describe tools, techniques, branches, and functional aspects of forensic science.
3. Apply scientific methods and report writing skills in forensic investigations.
4. Analyze the organizational setup and functions of forensic institutions and investigative agencies
5. Evaluate the roles of police, prosecution, judiciary, criminal justice system in justice delivery.
6. Prepare structured forensic reports and expert opinions for legal proceedings.

Credits: 4

Hours: 60

Unit 1: History and Basic Principles of Forensic Science

15Hours

History, Development & Scope of Forensic Science in India, Functions of Forensic Science, Definitions and concepts in Forensic Sciences, Various disciplines of Forensic Science and their applications in different approaches with theoretical concepts, Need of Forensic Science and Forensic Scientists, Basic principles and Ethics of Forensic Science.

Unit 2: Functional aspects of Forensic Science

15Hours

Contemporary Development in the academic and practices in Forensic Science-Advantage of Scientific investigations Tools and Techniques, Forensic Science in International Perspectives, INTERPOL, and FBI, Duties of Forensic Scientists, Code of conduct for Forensic Scientists, Data depiction, Report Writing, Data Interpretation and Expert Testimony

Unit 3: Organizational setup in Forensic Science

15Hours

Organizational & Hierarchical set up of Forensic Science Laboratories in India, Government Examiners of Questioned Documents, Fingerprint Bureaus, National Crime Records Bureau, Police & Detective Training Schools, NIA, Bureau of Police Research & Development, Directorate of Forensic Science & Mobile Crime Laboratories, and Police Academies.

Unit 4: Criminal Justice System

15 Hours

Broad Components of Criminal Justice System, Structure of Criminal Justice System in India; Role of Legislature & Law making; Coordination among Criminal Justice System and Policing styles, Police's power of investigation, Bailable and Non-Bailable offences; Investigation of Crimes; Complaint, F. I. R., Arrests, Search, Seizure, Police Custody, Role of Prosecution, Judiciary/Judicial Remand and Bail

Suggested Readings:

1. B.B. Nanda and R.K. Tiwari, *Forensic Science in India: A Vision for the Twenty First Century*, Select Publishers, New Delhi (2001).
2. M.K. Bhasin and S. Nath, *Role of Forensic Science in the New Millennium*, University of Delhi, Delhi (2002).
3. S.H. James and J.J. Nordby, *Forensic Science: An Introduction to Scientific and Investigative Techniques*, 2nd Edition, CRC Press, Boca Raton (2005).
4. W.G. Eckert and R.K. Wright in *Introduction to Forensic Sciences*, 2nd Edition, W.G. Eckert (ED.), CRC Press, Boca Raton (1997).
5. R. Saferstein, *Criminalistics*, 8th Edition, Prentice Hall, New Jersey (2004).
6. W.J. Tilstone, M.L. Hastrup and C. Hald, *Fisher's Techniques of Crime Scene Investigation*, CRC Press, Boca Raton (2013).

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Pedagogy: Written Assignment/Presentation/Project/Term Papers/Seminar

Formative Assessment

S.No	Assessment Occasion		Weightage in
1.	Internal Assessment	Class participation	05
2.		Quiz/PPT/ Assignment	10
		Mid semester test	15
Total			30

M.Sc.Forensic Science

Semester I

Forensic Psychology & Criminal Profiling

Credits: 4

Hours: 60

Course Title: Forensic Psychology& Criminal Profiling	Course Code:
Course Type: Core Course-2, L-T-P: 4-0-0	Course Credits: 4
Formative Assessment Marks: 30	Summative Assessment Marks: 70

Course Outcomes (COs): At the end of the course, the student should be able to:

1. Define core concepts of forensic psychology and legal aspects of mental competency and insanity.
2. Describe major psychiatric disorders and their relevance to criminal behavior.
3. Interpret psychological theories and socio-biological factors influencing crime.
4. Analyze behavioral evidence and offender characteristics for criminal profiling.
5. Evaluate techniques of deception detection with ethical and legal considerations.
6. Create basic psychological reports, offender profiles, and expert opinions for forensic use.

Credits: 4

Hours: 60

Unit 1: Basics of Forensic Psychology

15Hours

Definition and Fundamental concepts of Forensic Psychiatry, Psychology and Law, Ethical Issues in Forensic Psychology and Legal Controversies, Assessing Mental Competency, Psychology of Evidence –Eyewitness Testimony, Confession Evidence, Psychology in the Courtroom, with special reference to Section 84 IPC (McNaughton’s Rule), Durham Rule of Insanity, Psychology of criminal behaviour

Unit 2: Psychology and Criminal Behaviour

15Hours

Common Psychiatric Disorders; Schizophrenia, Bipolar Disorders, Anxiety Disorders, Phobia, Personality Disorder, Attention Deficit Hyperactive Disorder, Biological Factors of Crime; social learning theories, Psycho-Social Factors. Serial Murderers, Psychology of Terrorism. Gender & Crime, Child Abuse Juvenile Delinquency, Theories of Offending (Social Cognition and Moral Reasoning), Victimology

Unit 3: Criminal Profiling

15Hours

History of Profiling, Criminal Profiling; Need & Types, Behavioural Evidence Analysis, Approaches to Profiling: Inductive vs Deductive, Behavioral Evidence Analysis (BEA), Modus Operandi, Signature Behavior, & Staging, Criminal motivation, Psychological Autopsy, Classification by Motive: Visionary, Mission-oriented, Hedonistic, Power-Control, Victim Profiling and Victim-Offender Relationship

Unit 4: Deception Detection Tools

15Hours

Concept of Deception & Truthfulness, Nature and Types of Deception, Tools for Detection: Interviews, Non-Verbal Detection, Statement Analysis, Voice Stress Analyser, Hypnosis, Polygraphy; Operational & Question Formulation Techniques, Ethical and Legal Aspects, Guilty Knowledge Test Narco Analysis and Brain Fingerprinting ; Principle And Theory, Ethical And Legal Issues

Suggested Readings:

I. A.A. Moenssens, J. Starrs, C.E. Henderson and F.E. Inbau, Scientific Evidence in Civil and Criminal Cases, 4th Edition, The Foundation Press, Inc., New York (1995).

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2. R. Saferstein, *Criminalistics, 8th Edition, Prentice Hall, New Jersey (2004).*
3. J.C. DeLadurantey and D.R. Sullivan, *Criminal Investigation Standards, Harper & Row, New York (1980).*
4. J. Niehaus, *Investigative Forensic Hypnosis, CRC Press, Boca Raton (1999).*
5. E. Elaad in *Encyclopedia of Forensic Science, Volume 2, J.A. Siegel, P.J. Saukko and G.C. Knupfer (Eds.), Academic Press, London (2000).*

Pedagogy: Written Assignment/Presentation/Project/Term Papers/Seminar

Formative Assessment

S.No.	Assessment Occasion	Weightage in
1.	Class participation	05
2.	Quiz/PPT/Assignment	10
	Mid semester test	15
Total		30

**M.Sc.Forensic Science
Semester I
Advanced Forensic Dermatoglyphics**

Credits: 4

Hours: 60

Course Title: Advanced ForensicDermatoglyphics	Course Code:
Course Type: Core Course-3, L-T-P: 4-0-0	Course Credits: 4
Formative Assessment Marks: 30	Summative Assessment Marks: 70

Course Outcomes (COs): At the end of the course, the student should be able to:

1. Describe the history, biology, and basic principles of fingerprint science.
2. Explain and apply different fingerprint classification systems
3. Demonstrate physical, chemical, and digital methods for developing and preserving fingerprints.
4. Analyze fingerprint minutiae, ridge characteristics, poroscopy, and Edgescopyfor identification.
5. Examine lip prints, palatal Rugae, footprints, and ear prints for forensic identification.
6. Prepare and compile fingerprint records and expert reports for forensic investigation.

Credits: 4

Hours: 60

Unit 1: Basics of Fingerprints

15Hours

Introduction and History of Fingerprint Science, Biological Basis of Fingerprints and Ridge Formation, Constitutes of Sweat Residue, Types of Fingerprints, Fingerprint Patterns, Plain &Rolled Prints, Fingerprint Characters/Minutiae,Ridge Characteristics, Ridge Tracing, Ridge Counting, Poroscopy&Edgescopy, Factors affecting Fingerprints

Unit 2: Classification of Fingerprint.


15Hours

Various systems for Fingerprint classification, Henry Classification System, Numerical Value, Symbol, Primary Classification, Secondary Classification, Sub-Secondary Classification And Final Classification, Classification And Cataloguing of Fingerprint Record,National Crime Information Center (NCIC)Classification, Automated Fingerprint Identification System (AFIS)

Unit 3: Development of Fingerprints

15Hours

Development of Latent Prints & Lifting techniques, Physical &Chemical Methods: Powder Techniques & Various Chemical Techniques, Fingerprint Comparison & Identification, Preservation of Developed Fingerprints, Application of Light Sources in Fingerprint Detection, Digital imaging for fingerprint enhancement, Developing Fingerprints on Gloves. Fingerprinting the Deceased Persons, Metal deposition method VMD



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Unit 4: Other impressions**15Hours**

Cheiloscopy: Nature, Classification, Collection & Examination Of Lip Prints, Rugoscopy: Anatomy of the Palate and Palatal Rugae, Types and Classification of Palatal Rugae Patterns. Methods of Recording and role in Human Identification, Podiatry: Definition & Forensic Significance, Gait Pattern, Casting of Footprints, Electrostatic Lifting of Latent Footprints, Ear Prints and their Significance

Suggested Readings:

1. David R. Ashbaugh; *Quantitative and Qualitative Friction Ridge Analysis*, CRC Press
2. E. Roland Menzel; *Fingerprint Detection, with Lasers, Second edition*; Marcel, Dekker, Inc. USA.
3. James F. Cowger; *Friction Ridge skin* CRC Press London.
4. Mehta, M.K: *Identification of Thumb Impression & Cross Examination of Finger Prints*, N. M. Tripathi (P) Ltd, Bombay.
5. Moenssens: *Finger Prints Techniques*, Chitton Book Co. Philadelphia, New York.
6. Chatterjee S.K., *Speculation in Finger print identification*, Jantralekha, Printing Works, Kolkata.
7. Cowger, James F: *Friction ridge skin: Comparison and Identification of Fingerprints*; CRC Press, Boca Raton, New York.

Pedagogy: Written Assignment/Presentation/Project/Term Papers/Seminar**Formative Assessment**

S.No.	Assessment Occasion	Weightage in
1.	Class participation	05
2.	Internal Assessment	
	Quiz/PPT/Assignment	10
	Mid semester test	15
Total		30

**M.Sc.Forensic Science
Semester I**

Advances in Forensic Documents Examination**Credits: 4****Hours: 60**

Course Title: Advances in Forensic Documents Examination	Course Code:
Course Type: Core Course-4, L-T-P: 4-0-0	Course Credits: 4
Formative Assessment Marks: 30	Summative Assessment Marks: 70

Course Outcomes (COs): At the end of the course, the student should be able to:

1. Explain the scope, types, and handling of questioned documents.
2. Identify handwriting characteristics and compare exemplar samples.
3. Detect document forgery, alterations, and disguised writings.
4. Examine counterfeit documents, stamps, seals, and security papers.
5. Apply scientific tools for document and ink examination.
6. Prepare expert reports and present forensic document evidence in court.

Credits: 4**Hours: 60****Unit 1: Basics of Questioned Document****15Hours**

Definition, Scope and Importance of Questioned Document, Types of Forensic Documents; Collection, Handling, Preservation, Marking and Forwarding of Documents to the Laboratory; Writing Instruments and their Characteristics, Classification of Forensic Documents, Admitted, Request and Typescript specimens, Holographic documents, Nature & Characteristics of Questioned/Known Documents

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Unit 2: Handwriting and its Components**15 Hours**

Definition and Scope Of Handwriting Examination, Principle of Handwriting Identification, Handwriting and its Characteristics, Factors Affecting Handwriting, Comparison of Handwriting (Questioned and Known Handwriting), Examination of Signature Characteristics Merits and Demerits of Exemplar/Non Exemplar Samples, Standards for Comparison of Handwriting (Questioned and Known Handwriting)

Unit 3: Forgeries**15Hours**

Forgery: Types and its Examination, Alteration and Obliteration in Documents, Indented, Invisible and Disguised Writing, Anonymous Letters, Charred Documents, Detection of Tampering in Xeroxed, Digitally Printed, Scanned, and Photocopied Documents, Examination of Counterfeit Currency Notes (Indian), Examination of Passports, Visas, Stamp Papers, Seal, Rubber & Other Mechanical Impressions

Unit 4: Examination of Questioned Documents**15Hours**

Basic tools for Questioned Documents Examination: Ultraviolet Rays, Visible and Fluorescence Spectroscopy. Photomicrography, Microphotography, Video Spectral Comparator (VSC), Electrostatic Detection Apparatus (ESDA), Types of Paper, Ink and their Examination, Determining the Age of Documents, Decipherment of Damaged or Altered Documents, Restoration of Mutilated or Shredded Documents

Suggested Readings:

1. *Hardless H.R. (1988). Disputed Documents, Handwriting and Thumbs –Print Identification, Profusely Illustrated. India: Low Book Co.*
2. *Rev. ED.; Ordway Hilton; Scientific Examination. I of Questioned Documents, Elsevier, New York.*
3. *Charles C. Thomas, I.S.Q.D. Identification System for Questioned Documents; Billy Prior Bates Springfield, Illinois, USA.*
4. *Wilson R. Harrison; Suspect Documents -Their Scientific Examination; Universal Law Publishing, Delhi.*
5. *Hard less, H.R: Disputed Documents, handwriting and thumbs -print identification: profusely illustrated, Low Book Co., Allahabad.*
6. *Morris, Ron, N: Forensic handwriting identification, Acad Press, London.*

Pedagogy: Written Assignment/Presentation/Project/Term Papers/Seminar**Formative Assessment**

S.No.	Assessment Occasion	Weightage in
1.	Class participation	05
2.	Quiz/PPT/ Assignment	10
	Mid semester test	15
Total		30

M.Sc.Forensic Science**Semester I****Crime Scene Investigation & Criminal Profiling Lab.****Credits: 4****Hours: 120**

Course Title: Crime Scene Investigation & Criminal Profiling Lab.	Course Code:
Course Type: Practical Course-1, L-T-P: 0-0-8	Course Credits: 4
Formative Assessment Marks: 30	Summative Assessment Marks: 70

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Course Outcomes (COs): At the end of the course, the student should be able to:

1. Describe crime scene investigation steps and forensic organizational structure.
2. Explain and differentiate roles of forensic experts and police in investigations.
3. Apply crime reconstruction techniques to prepare a crime scene report.
4. Analyze criminal cases involving Daubert standards, profiling, and deception detection.
5. Evaluate ethical and legal issues related to juvenile justice and forensic practices.
6. Create psychological case reports using MMPI and Bhatia's intelligence test.

Credits: 4

Hours: 120

Crime Scene Investigation

1. To examine the steps involved in crime scene investigations.
2. To examine the hierarchical set up of different forensic science establishments.
3. To compare and contrast the role of a forensic expert and police personnel in crime investigation.
4. To cite examples of crime cases in which apprehensions arose because of Daubert standards.
5. To reconstruct a crime scene and prepare a report on evaluation of crime scene.

Criminal Profiling

1. To review crime cases where criminal profiling assisted the police to apprehend the accused.
2. To cite a crime case involving a juvenile and argue for and against lowering the juvenile age limit.
3. To cite a criminal case in which Narco-analysis/hypnosis was used as a means to detect deception.
4. To prepare a case report on Minnesota multiphase personality inventory test.
5. To prepare a case report on Bhatia's battery of performance test of intelligence.

Pedagogy: Written Assignment/Presentation/Project/Term Papers/Seminar

Formative Assessment

S.No.	Assessment Occasion	Weightage in
1.	Internal Assessment	Class participation
2.		Quiz/PPT/ Assignment
		Mid semester test
Total		30

**M.Sc.Forensic Science
Semester I**

Forensic Dermatoglyphics & Document Examination Lab.

Credits: 4

Hours: 120

Course Title: Forensic Dermatoglyphics & Document Examination Lab.	Course Code:
Course Type: Practical Course-2, L-T-P: 0-0-8	Course Credits: 4
Formative Assessment Marks: 30	Summative Assessment Marks: 70

Course Outcomes (COs): At the end of the course, the student should be able to:

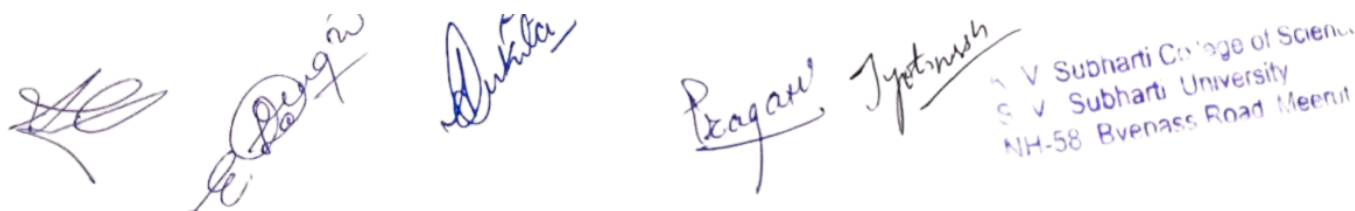
1. Explain basic concepts of fingerprinting and questioned document examination.
2. Demonstrate recording, development, and enhancement of fingerprints.
3. Classify and analyze fingerprint patterns using ten-digit systems.
4. Analyze handwriting features and natural variations for authorship.
5. Evaluate signatures, alterations, obliterations, and erasures in documents.
6. Prepare a concise forensic examination report

Credits 4

Hours: 120

Forensic Dermatoglyphics

1. To record plane and rolled fingerprints.
2. To identify and classify various fingerprint patterns.
3. To carry out 10 digit classification of fingerprints.



4. To develop Latent Fingerprint by physical and chemical method
5. To use different light sources for enhancing to develop fingerprints.

Document Examination

1. To study handwriting characters and determine the authorship of the given samples.
2. To study the natural variations in handwriting written in different circumstances.
3. To conduct comparative analysis of two given sets of signatures for forgery detection.
4. To examine documents for additions, alterations, and obliterations in the documents.
5. To examine documents for mechanical and chemical use of erasers on the documents.

Pedagogy: Written Assignment/Presentation/Project/Term Papers/Seminar

Formative Assessment

S.No.	Assessment Occasion		Weightage in
1.	Internal Assessment	Class participation	05
2.		Quiz/PPT/ Assignment	10
		Mid semester test	15
Total			30

M.Sc.Forensic Science

Semester II

Advanced Forensic Biology & Serology

Credits: 4

Hours: 60

Course Title: Advanced Forensic Biology & Serology	Course Code:
Course Type: Core Course-5, L-T-P: 4-0-0	Course Credits: 4
Formative Assessment Marks: 30	Summative Assessment Marks: 70

Course Outcomes: *At the end of the course, the student should be able to:*

1. Describe types and forensic importance of biological evidence.
2. Demonstrate collection, preservation, and documentation of biological samples.
3. Apply microscopic and analytical techniques for examining hair, fibre, blood, and semen.
4. Differentiate human and non-human biological materials and analyze biological patterns.
5. Interpret test findings and evaluate evidential value in investigations.
6. Prepare forensic reports and use biological evidence for crime reconstruction.

Credits: 4

Hours: 60

Unit 1: Biological Evidences

15 hours

Nature and Importance of Biological Evidence, Different Types of Biological Evidences. Collection, Preservation, Packing, Forwarding and Documentation. Types and Identification of Microbial Organisms Wood and Its Forensic Significances. Introduction to Palynology, Structure of Pollen, Identification, Comparison and Forensic Significance of Pollen, Diatoms and their Forensic Significance

Unit 2: Hair and Fibre Evidence

15 hours

Structure, Morphology and Biochemistry of Human Hair, Comparison of Human and Animal Hair, Collection, Packaging and Preservation, Comparison and Forensics Examination of Hair Samples, Introduction and Classification of Fibres, Collection, Packaging and Preservation, Identification and Comparisons, Forensic Examination of Fibres Using Different Microscopic, Spectroscopic and Chromatographic Techniques

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Unit 3: Blood Evidence**15 hours**

Composition and Functions of Blood, ABO, Rh and Other Forensically Relevant Blood Groups, Collection and Preservation of Blood Evidence, Distinction Between Human and Non-Human Blood, Antigens and Antibodies, Typing of Dried Stains, Forensic Examination of Blood Evidence, Forensic Characterization Of Bloodstains, Documentation of Bloodstain Pattern. Bloodstain Pattern Analysis and Its Role in Crime Scene Reconstruction

Unit 4: Semen and Other Body Fluids**15 hours**

Composition and Morphology of Spermatozoa, Forensic Significance of Semen, Sexual Assault Examination and Sexual Assault Kits, Collection, Preservation, and Test Examination of Semen, Individualization on the Basis of Semen Examination, Semen Detection in Washed or Aged Samples, Composition, Functions and Forensic Significance of Saliva, Sweat and Urine, Tests for their Identifications

Suggested Readings:

1. Robertson, J. (1996): *Forensic Examination of Hair*. Taylor and Francis, USA.
2. Saferstein, R. (1982): *Science Handbook, Vol. I, II and III*, Prentice Hall, New Jersey.
3. *Blood Group Serology – Boorman KE, Dodd BE and LOncoln PJ*, Chuchill Livingstone Inc. New York.
4. W.G. Eckert and S.H. James, *Interpretation of Bloodstain Evidence at Crime Scenes*, CRC Press, Boca Raton (1989).
5. T. Bevel and R.M. Gardner, *Bloodstain Pattern Analysis, 3rd Edition*, CRC Press, Boca Raton (2008).

Pedagogy: Written Assignment/Presentation/Project/Term Papers/Seminar

Formative Assessment

S.No.	Assessment Occasion		Weightage in
1.	Internal Assessment	Class participation	05
2.		Quiz/PPT/ Assignment	10
		Mid semester test	15
Total			30

M.Sc.Forensic Science**Semester II****Forensic Genomics & DNA Profiling****Credits:4****Hours: 60**

Course Title: Forensic Genomics&DNA Profiling	Course Code:
Course Type: Core Course-6, L-T-P: 4-0-0	Course Credits: 4
Formative Assessment Marks: 30	Summative Assessment Marks: 70

Course Outcomes: At the end of the course, the student should be able:

1. Explain basic concepts of DNA, genome organization, and forensic relevance.
2. Describe genetic markers, heredity principles, and their applications in forensic casework.
3. Perform DNA collection, preservation, quantization, amplification, and typing procedures.
4. Interpret DNA profiles using allele frequency, and Hardy-Weinberg principles.
5. Assess DNA evidence for legal admissibility, quality control, and complex case challenges.
6. Prepare legally admissible forensic DNA reports with statistical conclusions.

Credits:4**Hours: 60**

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Unit 1: Basics of Forensic Genomics**15 Hours**

Definition and Scope of Genomics, History and Evolution of Genetics. DNA as a Blueprint of Life. Structure and Functions of DNA, Alternate Forms of DNA Double Helix, Chromosomes, Genes, and Genome Organization, Forensic Significance of DNA, Sources of DNA, Collection and Preservation, DNA Binding Proteins, Factors Affecting DNA Stability

Unit 2: Genetic markers**15 Hours**

Principles of Heredity, Mendelian Laws of Parentage Testing, Concept of Sequence Variation: VNTRs, STRs, Mini STRs, SNPs, Mitochondrial DNA, Touch DNA, Genealogy and its Applications in Forensic Genetics, Disputed Paternity Cases, Missing Person Identity, Population Genetics and Legal Admissibility of DNA Evidence, Reference Populations and DNA Databases

Unit 3: DNA amplification and DNA Typing**15 Hours**

Quantitation of DNA: Yield Gel Quantitation and Slot Blot Quantitation, Y-chromosome and X-chromosome Markers in Forensic Applications, Low-Copy Number DNA analysis and forensic challenges, Next Generation Sequencing (NGS) in Forensic Genomics. Quality Assurance and Quality Control in DNA Forensics, Whole Genome and Whole Exome Sequencing (WGS/WES) Applications, RNA Analysis in Forensic Investigations

Unit 4: Interpretation and Report writing**15 Hours**

Evaluation of Forensic Analysis Results, Probability of Match, Random Match Probability (RMP), Likelihood Ratio (LR), Allele Frequency Determination. Interpretation of Mixed DNA Profile, Report Writing: Role of DNA Typing in Identifying Unrecognizable Bodies, Hardy-Weinberg law, Probability Determination in a Population Database, Benefits of DNA Data Banking

Suggested readings

1. *DNA Profiling and DNA fingerprinting (1999)* Edited by Jorg T. Epplen and Thomas Lubjuhn; Birkhauser Verlag, Switzerland.
2. J.M. Butler, *Forensic DNA Typing*, Elsevier, Burlington (2005).
3. Albertis B, Jhonson A, Lewis L, Morgan D, Raff M, Roberts K, Emeritus, Walter P (2014) *Molecular Biology of the Cell*. 6th Edition, Garland Science
4. *Forensic DNA Typing, Second Edition: Biology, Technology, and Genetics of STR Markers 2nd Edition (2005)* - John M. Butler, Academic Press, ISBN:0121479528.
5. *An Introduction to Forensic Genetics 2nd Edition (2010)* - William Goodwin, Adrian Linacre and Sibte Hadi, Wiley-Blackwell, ISBN: 978-0470710197.

Pedagogy: Written Assignment/Presentation/Project/Term Papers/Seminar**Formative Assessment**

S.No.	Assessment Occasion	Weightage in
1.	Internal Assessment	Class participation
2.		Quiz/PPT/ Assignment
		Mid semester test
Total		30

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M.Sc.Forensic Science
Semester II
Forensic Physics & Ballistics

Credits: 4

Hours: 60

Course Title: Forensic Physics & Ballistics	Course Code:
Course Type: Core Course-7, L-T-P: 4-0-0	Course Credits: 4
Formative Assessment Marks: 30	Summative Assessment Marks: 70

Course Outcomes (COs): At the end of the course, the student should be able to:

1. Describe types and forensic relevance of glass, soil, paint, toolmarks, firearms, and ammunition.
2. Explain principles of impact, ballistics, trajectories, and characteristics of firearm evidence.
3. Apply proper methods for collection, preservation, and analysis of physical forensic evidence.
4. Analyze toolmarks, bullets, GSR, and physical properties like refractive index and soil composition.
5. Evaluate instrumental and chemical techniques for interpretation of forensic evidence.
6. Prepare forensic reports integrating analytical, ballistic, and identification findings.

Credits: 4

Hours: 60

Unit 1: Glass and Soil

15 Hours

Types of Glass and Their Compositions, Collection and Preservation of Glass Evidences, Analysis and Direction of Impact Determination, Forensic Examination: Mechanical Fit, Refractive Index Measurements and Analysis by Spectroscopic Methods, Soil and its Composition, Collection, Preservation and Analysis of Soil Sample, Forensic Analysis: Physical, Chemical and Instrumental

Unit 2: Paint and Tool marks

15 Hours

Types of Paint, Collection and Preservation of Paint Samples, Macroscopic and Microscopic Techniques for Characterization of Paint Fragments, Physical, Chemical & Instrumental analysis of paint, Interpretation of Paint Evidence Analysis, Classification of Tool marks, Collection, Preservation and Matching of Tool marks, Restoration of Erased Serial Numbers And Engraved Marks, Forensic importance of Tool marks

Unit 3: Basics of Ballistics

15 Hours

Characteristics & classification of Firearms, Operating Principle of Firearms, Classifications of Ammunition, Characteristics & Working Mechanism of Firearms, Firing Mechanism, Internal, External, and Terminal Ballistics. Trajectory Formation & its Computation, Vacuum Trajectories & its Measurement, Influence of Earth Trajectory, Effect of Air Resistance on Trajectories, Effect of Projectile on Target

Unit 4: Analysis of Firearm and Gunshot Residues (GSR)

15 Hours

Comparison of Bullets and Cartridge Case, Identification of Bullets, Pellets and Wads Fired from Improvised, Country Made Firearms, Class Characteristics & Individual Characteristics (Identifiable marks), Determination of Range of Fire and Time of Fire, Analysis of GSR: Composition of GSR, Location & Collection, Mechanism of Formation, Chemical & Instrumental Techniques, Shooter Identification Technique

Suggested Readings:

1. M. Byrd, *Crime Scene Evidence: A Guide to the Recovery and Collection of Physical Evidence*, CRC Press, Boca Raton (2001).
2. S.H. James and J.J. Nordby, *Forensic Science: An Introduction to Scientific and Investigative Techniques*, 2nd Edition, CRC Press, Boca Raton (2005).
3. Hatcher, Jury And Weller, *Firearms Investigation, Identification And Evidence*; Stackpole Books, Harrisburg, P. A.
4. Vincent Di Maio, *Gunshot Wounds*; CRC Press, Washington, Dc.
5. Brain J. Heard., *Hand Book Of Firearms And Ballistics*; John Willey, England.

Pedagogy: Written Assignment/Presentation/Project/Term Papers/Seminar

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Formative Assessment

S.No.	Assessment Occasion	Weightage in
1.	Internal Assessment	Class participation
2.		Quiz/PPT/ Assignment
		Mid semester test
Total		30

M.Sc.Forensic Science Semester II Forensic Chemistry & Toxicology

Credits: 4

Hours: 60

Course Title: Forensic Chemistry & Toxicology	Course Code:
Course Type: Core Course-8, L-T-P: 4-0-0	Course Credits: 4
Formative Assessment Marks: 30	Summative Assessment Marks: 70

Course Outcomes (COs): At the end of the course, the student should be able to:

1. Describe fire chemistry, explosives, and explosion mechanisms.
2. Identify and classify petroleum products, poisons, and food adulterants.
3. Apply analytical methods for examining arson, petroleum, and toxicological evidence.
4. Analyze alcohols, narcotics, drugs, and their physiological effects.
5. Evaluate toxicological and drug evidence using screening and confirmatory tests.
6. Develop proper procedures for collection, preservation, and interpretation of forensic evidence.

Credits: 4

Hours: 60

Unit 1: Arson and Explosives

15 Hours

Chemistry of Fire, Fire Scene Patterns, Location of Point of Ignition, Recognition of Fire Types, Searching the Fire Scene, Collection and Preservation of Arson Evidence, Analysis of Fire Debris, Scientific Investigation and Evaluation of Clue Materials, Classification and Types of Explosives, Synthesis and Characteristics of TNT, PETN and RDX, Explosion Process, Blast Waves, Bomb Scene Management, Mechanism of Explosion

Unit 2: Petroleum, Poisons and Food Chemistry

15 Hours

Introduction to Petroleum and Petroleum Products, Collection and Analysis of Petrol, Kerosene and Diesel As Per BIS Specifications, Classification of Poisons, Physico-chemical Characteristics and Mode of Action of Poisons, Accidental, Suicidal and Homicidal Poisonings, Signs and Symptoms of Common Poisoning and Their Antidotes, Collection and Preservation of Evidences for Various Poison Cases, Identification of Biocides and Metal Salts in Body Fluids, Cosmetics and Detective Dyes, Common Food Poisonings and Food Adulterants

Unit 3: Alcohol, Narcotics, Drugs and Psychotropic Substances

15 Hours

Definition and Classification of Liquors, Characteristics of Beer, Wines and Whisky, Congeners in Alcoholic Beverages, Analysis and Identification of Ethyl Alcohol, Determination of Alcoholic Strength, Definition of Narcotics, Drugs and Psychotropic Substances, Broad Classification of Drugs of Abuse, Designer Drugs, Tolerance, Addiction and Withdrawal Symptoms. Dose-Response Relationship NDPS Act

Unit 4: Forensic Analysis of Toxicological evidences

15 Hours

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Crime Scene Search for Narcotics, Drugs and Psychotropic Substances, Clandestine drug laboratories. Collection and Preservation of Drug Evidence, Dope Tests, Screening, presumptive and Confirmatory Tests for Drugs, Techniques Used in Toxicology Analysis, Analysis of Drug Of Abuse From Body Fluids. Isolation Techniques for Purifying Narcotics, Drugs and Psychotropic Substances, Postmortem Toxicology, Significance of Toxicological Findings

Suggested Readings:

1. *Moffat, A.C.: Osselton, D. M. Widdop, B.: Clarke's Analysis of Drugs and Poisons in Pharmaceuticals, body fluids and postmortem material, 3rd ed., Pharmaceutical Press 2004.*
2. *Bogusz, M. J., Hand Book of Analytical Separations, Vol. 2: Forensic Science, 1st ed., Elsevier Science, 2000.*
3. *Siegel, J.A., Saukko, P. J., Knupfer, G.: Encyclopedia of Forensic Sciences (Vol3), Academic Press, 2000.*
4. *Eckert; An Introduction to Forensic Science, CRC Press*
5. *James, S. H. and Nordby, J. J.: Forensic Science: An Introduction to Scientific and Investigative Techniques, 2003.*

Pedagogy: Written Assignment/Presentation/Project/Term Papers/Seminar

Formative Assessment

S.No.	Assessment Occasion		Weightage in
1.	Internal Assessment	Class participation	05
2.		Quiz/PPT/ Assignment	10
		Mid semester test	15
Total			30

**M.Sc. Forensic Science
Semester II
Biological & DNA Analysis Lab.**

Credits: 4

Hours: 120

Course Title: Biological & DNA analysis Lab.	Course Code:
Course Type: Practical Course-3, L-T-P: 0-0-8	Course Credits: 4
Formative Assessment Marks: 30	Summative Assessment Marks: 70

Course Outcomes (COs): At the end of the course, the student should be able to:

1. Identify hair, diatoms, blood, saliva, semen, and urine samples using various techniques.
2. Apply standard laboratory methods to determine blood groups from fresh and dried samples.
3. Perform chemical and crystal tests for the detection of blood and other body fluids.
4. Extract and quantify DNA from biological samples and perform gel electrophoresis for visualization.
5. Analyze DNA profiles, interpret allele patterns, and deduce match or exclusion in forensic cases.
6. Prepare a forensic DNA profiling report based on experimental results.

Credits: 4

Hours: 120

Forensic Biology and Serology (Biological Analysis)

1. Microscopic examination of hairs – identification of species origin.
2. Examination of diatoms from different water bodies.
3. To determine blood group from fresh and dry blood samples.
4. To carry out the chemical and crystal tests for blood.
5. Biochemical and microscopic examination of Saliva, Semen stain and Urine

DNA Analysis

1. To isolation of DNA from blood and its quantification.

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- To carry out the gel electrophoresis of DNA sample.
- To review past criminal cases where DNA helps in the conviction of the criminal.
- To analyse DNA profiles and interpret allele patterns for match/exclusion.
- To prepare a forensic DNA profiling report based on the analysed results.

Pedagogy: Written Assignment/Presentation/Project/Term Papers/Seminar

Formative Assessment

S.No.	Assessment Occasion	Weightage in
1.	Internal Assessment	Class participation
2.		Quiz/PPT/ Assignment
		Mid semester test
Total		30

**M.Sc.Forensic Science
Semester II
Physical & Chemical Analysis Lab.**

Credits: 4

Hours: 120

Course Title: Physical & Chemical Analysis Lab.	Course Code:
Course Type: Practical Course-4, L-T-P: 0-0-8	Course Credits: 4
Formative Assessment Marks: 30	Summative Assessment Marks: 70

Course Outcomes (COs): At the end of the course, the student should be able to:

- Identify and compare glass fragments, tool marks, bullets, and cartridge cases.
- Differentiate contact, close-range, and distant gunshot wound and interpret forensic significance.
- Detect gunshot residues (GSR) using chemical methods and evaluate their evidential relevance
- Analyze petroleum products, food items, and detect adulterants using standard forensic chemical tests.
- Perform TLC, spot tests, and instrumental analysis for drugs of abuse and toxic substances.
- Prepare and interpret toxicological analysis reports for investigative and legal purposes.

Credits: 4

Hours: 120

Forensic Physics & Ballistics (Physical Analysis)

- To identify and compare glass evidence based on the physical matching and refractive index method.
- To identify and compare the different tool marks.
- To carry out the comparison of fired bullets and cartridge cases.
- To carry out the detection of gunshot residues (GSR) using chemical tests.
- To differentiate between contact, close-range, and distant gunshot wounds injuries.

Forensic Chemistry & Toxicology (Chemical Analysis)

- To carry out the examinations of petroleum products as per BIS specifications.
- To detect and identify adulterants present in common food items.
- To carry out the TLC and spot test of alkaloids of drugs of abuse and toxic substances.
- Detection and identification of doping drugs from hair and body fluids.
- To carry out the isolation and instrumental analysis of different toxic substances and drugs.

Pedagogy: Written Assignment/Presentation/Project/Term Papers/Seminar

Formative Assessment

S.No.	Assessment Occasion	Weightage in
1.	Internal Assessment	Attendance
2.		Written Assignment/Presentation (PPT) /Quiz
		Mid semester test
Total		30

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II YEAR

SWAMI VIVEKANAD SUBHARTI UNIVERSITY MEERUT														
KERAL VERMA SUBHARTI COLLEGE OF SCIENCE														
DEPARTMENT OF FORENSIC SCIENCE														
Course Name -M.Sc. Forensic Science														
Batch:2025-26			SEM:III											
S.No.	Course Type	Course Code	Course Name	Teaching Load			Credits	Internal Assessment				External Assessment	Total	Remark
				L	T	P		Class participation	Quiz/PT/Assignment (10)	Mid Sem Test (15)	TOTAL			
THEORY AND PRACTICAL SUBJECTS														
1	Core Course-9	MSFS-301	Computer Forensics & Digital Investigation	4	0	0	4	5	10	15	30	70	100	
2	Core Course-10	MSFS-302	Forensic Medicine & Anthropology	4	0	0	4	5	10	15	30	70	100	
3	Discipline Elective Course -1	MSFS-303 A	Laws & Ethics in Forensic Science	4	0	0	4	5	10	15	30	70	100	
		MSFS-303 B	Crime Scene Documentation & Forensic Photography											
		MSFS-303 C	Research Methodology & Statistics											
4	Discipline Elective Course -1	MSFS-304 A	Arson & Explosives Investigation	4	0	0	4	5	10	15	30	70	100	
		MSFS-304 B	Forensic Botany & Microbiology											
		MSFS-304 C	Audio & Video Analysis											
5	Practical Course- 5	MSFS-305P	Computer Forensics Lab.	0	0	8	4	5	10	15	30	70	100	
6	Practical Course-6	MSFS-306P	Forensic Medicine & Anthropology Lab.	0	0	8	4	5	10	15	30	70	100	
7	Open Elective Course (OEC)		Forensic Analysis of Controlled Drugs	2	0	0	2	4	4	7	15	35	50	
			Accident Investigation											
			Environmental & Marine Forensics											
TOTAL CREDITS/ASSESSMENT							26	34	64	97	195	455	650	

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SWAMI VIVEKANAD SUBHARTI UNIVERSITY MEERUT

KERAL VERMA SUBHARTI COLLEGE OF SCIENCE

DEPARTMENT OF FORENSIC SCIENCE

Course Name -M.Sc. Forensic Science

Batch:2025-26			SEM:IV											
S. No.	Course Type	Course Code	Course Name	Teaching Load			Credits	Internal Assessment			TOTAL	External Assessment	Total	Remark
				L	T	P		Class participation	Quiz/PPT/Assignment (10)	Mid Sem Test (15)				
THEORY AND PRACTICAL SUBJECTS														
1	Core Course-11	MSFS-401	Instrumental Techniques in Forensic Science	4	0	0	4	5	10	15	30	70	100	
3	Discipline Elective Course -3	MSFS-402A	Molecular Biology & rDNA Technology	4	0	0	4	5	10	15	30	70	100	
		MSFS-402B	Introduction to Cyber Crime & Artificial Intelligence											
		MSFS-402C	Handwriting Identification & Examination											
4	Discipline Elective Course -4	MSFS-403A	Applied Forensic Entomology & Wildlife Forensics	4	0	0	4	5	10	15	30	70	100	
		MSFS-403B	Anti-Dope Forensics											
		MSFS-403C	Incident Response & Management											
5	Dissertation	MSFS-404R		0	0	24	12	20	30	50	100	200	300	
7	Employability, Entrepreneurship Skill Course (EEC)		Quality Management in Forensic Science	0	0	0	2	4	4	7	15	35	50	
			Forensic Evidence Management & Report Writing											
			Network & Mobile Forensics											
TOTAL CREDITS / ASSESSMENT							26	39	64	102	205	445	650	



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M.Sc.Forensic Science
Semester III
Computer Forensics & Digital Investigation

Credits: 4

Hours: 60

Course Title: Computer Forensics & Digital Investigation	Course Code:
Course Type: Core Course-9, L-T-P: 4-0-0	Course Credits: 4
Formative Assessment Marks: 30	Summative Assessment Marks: 70

Course Outcomes (COs): At the end of the course, the student should be able to:

1. Define basic concepts of computer systems, networks, and cybercrimes.
2. Explain various cyber-attacks, malware, and fraud techniques.
3. Apply proper methods for digital evidence collection, preservation, imaging, and recovery.
4. Analyze digital artifacts like file systems, logs, emails, and registry for investigation.
5. Evaluate ethical, legal, and IT Act provisions in digital forensic
6. Prepare forensic reports using standard tools, following legal and ethical norms.

Credits: 4

Hours: 60

Unit 1: Introduction to Computers and Networks

15 Hours

Definition and History of Computer, Hardware and Software, Primary and Secondary Storage Devices; Basics of Operating System, Introduction to Filesystems, Windows and Linux OS architectures, Definition of Computer Network, Components of Network, Topology and Types of Network, Introduction to Websites and Webpages, Understanding Firewall, IDS and IPS; Introduction to Computer Related Crimes

Unit 2: Types of Cyber Crimes

15 Hours

Introduction and Types of Cyber-Crimes, Mail Spoofing, Phishing: Types and Techniques, Spamming, Unauthorized Access to Computer, Denial-of-Service (DoS) Attack, Malwares, Virus and Trojan Infections. E-Mail Bombing, Salami Attack, Software Piracy, Industrial Espionage, Cyber-crime Against Women and Children, Crimes on Social Media, Online and Banking Frauds, Intellectual Property Frauds, Different Stages of Cyber-Attack

Unit 3: Cyber-crime investigation

15 Hours

Incident Response and First Responder at Crime Scene, Types and Source of Digital Evidences, Principles for Collection of Digital Evidence, Forensic Readiness: Planning and Pre-search Requirement, and Qualities, Seizure, Collection and Preservation of Volatile and Non-volatile Evidence, Introduction to Imaging, Hashing, Deleted Data Recovery, Code of Ethics, Benefits and Challenges in Digital Forensics

Unit 4: Forensic Analysis of Digital Evidences

15 Hours

File System Analysis (NTFS, FAT, EXT, APFS), Metadata Analysis, log Analysis, Registry Analysis, Deleted Data and File Recovery Techniques, Email, Browser History, Chat Data, and Multimedia Forensics, Tools: EnCase, FTK, Autopsy, Cellebrite, Oxygen, Volatility, Legal Considerations of Digital Signature and Electronic Records, IT Act 2000, Penal Provisions for Various Cyber Crimes

Suggested Readings:

1. *Computer Forensics and Legal Perspectives*, Wiley Publications, 2011.
2. Bill Nelson, Amelia Phillips and Christopher Steuart, "Guide to Computer Forensics and Investigations, 5th Edition", Cengage, 2010 BBS.
3. William Stallings. "Cryptography and Network Security: Principles and Practices, 5th Edition", Prentice Hall Publication Inc., 2007.
4. Majid Yar, "Cybercrime and Society", Sage Publications, 2006.

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5. Michael E. Whiteman and Herbert J. Mattord, "Principles of Information Security", Vikas Publishing House, New Delhi, 2003.

Pedagogy: Written Assignment/Presentation/Project/Term Papers/Seminar

Formative Assessment

S.No.	Assessment Occasion		Weightage in
1.	Internal Assessment	Class participation	05
2.		Quiz/PPT/ Assignment	10
		Mid semester test	15
Total			30

**M.Sc.Forensic Science
Semester III
Forensic Medicine & Anthropology**

Credits: 4

Hours: 60

Course Title: Forensic Medicine& Anthropology	Course Code:
Course Type: Core Course-10, L-T-P: 4-0-0	Course Credits: 4
Formative Assessment Marks: 30	Summative Assessment Marks: 70

Course Outcomes (COs): At the end of the course, the student should be able to:

1. Define concepts of injuries, death, anthropology, and odontology.
2. Explain types of injuries, postmortem changes, skeletal and dental identification.
3. Apply forensic techniques in death investigation, recovery, and bite mark analysis.
4. Analyze trauma, skeletal remains, dental evidence, and postmortem findings.
5. Evaluate medico-legal, ethical, and psychological aspects in forensic cases.
6. Prepare forensic reports using anthropological and odontological evidence.

Credits: 4

Hours: 60

Unit 1:Traumatology and Thanatology

15 Hours

Injuries and Its Types,Ante Mortem and Post-Mortem Injuries, Aging of Injuries, Self-inflicted Injuries, Thermal Deaths: Electrocutation, Sexual OffencesInvestigations of victim and Accused,Definition of Death, Types and Causes of Death, Mode of Death, Post-Mortem Changes,Estimation of Time Since Death, Molecular and Systemic Death, Various Types of Asphyxia, Death by drowning

Unit 2: Death Investigations

15 Hours

Fundamental Aspects, Scope and Need of Forensic Medicine,Approaching and Documenting the Scene of Death, Inquest, Recording Dying Declaration, Indexing the Death Investigation,Handling Buried Body Cases,Search for Buried Bodies, Methods of Exhumation, Suicide Cases: Evaluating the Type of Injuries, Gauging the Psychological State of Victim, Suicide Notes, Medico Legal Aspects of Death

Unit 3:Basics of Forensic Medicine

15 Hours

Definition, History and Scope of Forensic Anthropology, HumanOsteology: Determination of Age, Sex, Stature,Collection and Preservation of Anthropological Evidenced,Techniques for Recovering Skeletonised Human Remains,Trauma Analysis and Identifying Skeletal Pathology,Pathological Changes in Bone, Portrait Parley,Identity of a Person by Superimposition Techniques, Facial Reconstructionand Musculo-Skeletal Reconstruction

Unit 4: Forensic Odontology

15 Hours

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Human Dentition: Structure and Types of Teeth, Definition and Dental Formula, Identification of Individuals From Teeth, Determination of Age, Sex and Race From Teeth, Forensic Significance of Teeth in Identifying an Individual, Bite Marks and its Forensic Significance, Photography, Lifting and Preservation of Bite Marks. Comparison and Evaluation of Bite Mark Evidences

Suggested Readings:

1. K. Smyth, *the Cause of Death*, Van Nostrand and Company, New York (1982).
2. M. Bernstein, *Forensic odontology in, Introduction to Forensic Sciences, 2nd Ed., W. G. Eckert (Ed.), CRC Press, Boca Raton (1997).*
3. J. Dix, *Handbook for Death Scene Investigations*, CRC Press, Boca Raton (1999).
4. H. B. Baldwin and C. P. Mayin, *Encyclopaedia in Forensic Science, Volume 1, J. A. Siegel, P.J. Saukko and G.C. Knupfer (Eds.), Academic Press, London (2000).*
5. V. J. Geberth, *Practical Homicide Investigation*, CRC Press, Boca Raton (2006).

Pedagogy: Written Assignment/Presentation/Project/Term Papers/Seminar

Formative Assessment

S.No.	Assessment Occasion		Weightage in
1.	Internal Assessment	Class participation	05
2.		Quiz/PPT/ Assignment	10
		Mid semester test	15
Total			30

**M.Sc. Forensic Science
Discipline Elective Course (DEC)
Semester III
Laws & Ethics in Forensic Science**

Credits: 4

Hours: 60

Course Title: Laws & Ethic in Forensic Science	Course Code:
Course Type: Discipline Elective Course-1A, L-T-P: 4-0-0	Course Credits: 4
Formative Assessment Marks: 30	Summative Assessment Marks: 70

Course Outcomes (COs): At the end of the course, the student should be able to:

1. Understand legal frameworks and judicial processes in forensics.
2. Apply ethical guidelines, professional standards and regulatory norms in forensic practice.
3. Analyze evidentiary value, admissibility and legal implications of forensic findings.
4. Evaluate ethical issues, misconduct and quality challenges.
5. Interpret laws, human rights principles and scientific duties.
6. Create legally compliant and ethically sound forensic reports and expert opinions.

Credits: 4

Hours: 60

Unit 1: Legal Foundations of Forensic Science

15 Hours

Meaning, Purpose and Scope of Forensic Laws in the Criminal Justice System, Structure of The Indian Judiciary and Criminal Justice Administration, Concepts of Crime, Evidence and Investigation as Defined Under IPC, CrPC and IEA, Types of Evidence and Their Legal Significance, Admissibility of Forensic Evidence, Competency of Expert Testimony, and Roles of Forensic Experts in Court, Judicial Expectations and Legal Accountability in Forensic Practice

Unit 2: Statutory Provisions, Case Laws and Forensic Relevance

15 Hours

Provisions of The Indian Evidence Act Related to Documentary, Material, Digital and Expert Evidence,

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Relevant Sections of CrPC Governing Search, Seizure, Arrest and Evidence Collection, Key IPC Sections Associated with Forensic Investigations, Landmark Case Laws Influencing Forensic Science Development, Legal Standards Governing the Chain Of Custody, Preservation of Evidence, and Admissibility Under Daubert, Frye and Indian Judicial Precedents

Unit 3: Ethics, Professional Conduct and Quality Management

15 Hours

Ethical Principles in Forensic Science Including Neutrality, Impartiality, Honesty and Scientific Integrity, Codes of Conduct for Forensic Professionals, Confidentiality Norms and Responsibility Towards Victims, Suspects and Society, Avoidance of Bias, Conflict of Interest and Malpractice Issues, Accreditation Systems Such as ISO/IEC 17025, NABL Guidelines and Laboratory Quality Control Protocols, Good Laboratory Practices, Documentation Ethics and Error Management

Unit 4: Applied Ethical and Legal Issues in Contemporary Forensic Science

15 Hours

Human Rights Considerations in Forensic Investigations, Treatment of Biological Samples, Privacy Rights and Informed Consent, Ethical and Legal Challenges in Emerging Fields such as DNA Profiling, Cybersecurity, AI-Based Forensics, Biometric Systems and Surveillance Technologies, Forensic Implications in Mass Disasters, DVI Protocols and Culturally Sensitive Investigations, Wrongful Convictions Due to Forensic Errors and Strategies for Reform, Expert Report Writing, Interpretation Standards and Ethical Courtroom Presentation

Suggested Readings:

1. D.A. Bronstein, *Law for the Expert Witness*, CRC Press, Boca Raton (1999).
2. Vipa P. Sarthi, *Law of Evidence*, 6th Edition, Eastern Book Co., Lucknow (2006).
3. A.S. Pillia, *Criminal Law*, 6th Edition, N.M. Tripathi Pvt Ltd., Mumbai (1983).
4. R.C. Nigam, *Law of Crimes in India, Volume I*, Asia Publishing House, New Delhi (1965).
5. (Chief Justice) M. Monir, *Law of Evidence*, 6th Edition, Universal Law Publishing Co. Pvt. Ltd., New Delhi (2002).

Pedagogy: Written Assignment/Presentation/Project/Term Papers/Seminar

Formative Assessment

S.No.	Assessment Occasion	Weightage in
1.	Class participation	05
2.	Internal Assessment	Quiz/PPT/ Assignment
	Mid semester test	15
Total		30

**M.Sc. Forensic Science
Discipline Elective Course (DEC)
Semester III**

Crime Scene Documentation & Forensic Photography

Credits: 4

Hours: 60

Course Title: Crime Scene Documentation & Forensic Photography	Course Code:
Course Type: Discipline Elective Course-1B, L-T-P: 4-0-0	Course Credits: 4
Formative Assessment Marks: 30	Summative Assessment Marks: 70

Course Outcomes (COs): At the end of the course, the student should be able to:

1. Explain the principles, purpose and importance of crime scene documentation and photography.
2. Apply proper methods for recording crime scenes through notes, sketches, videography and photography.
3. Analyze crime scenes to select appropriate photographic techniques, lighting and angles.
4. Evaluate the quality and admissibility of crime scene photographs and documentation.
5. Interpret documented information to reconstruct events and establish scene relationships.

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6. Create comprehensive crime scene records integrating notes, sketches, photographs and reports.

Credits: 4

Hours: 60

Unit 1: Introduction to Crime Scene Documentation

15 Hours

Definition, Scope and Importance of Documenting Crime Scenes, Types of Documentation: Notes, Observation Records, Sketches, Photography and Videography, Characteristics of Good Documentation: Accuracy, Clarity, Completeness and Objectivity, Legal Significance of Documented Evidence and Maintaining Chain Of Custody, Role of First Responders and Forensic Experts, Role of Crime Scene Documentation in Reconstruction

Unit 2: Crime Scene Notes, Sketching and Reports

15 Hours

Components of Crime Scene Notes: Time, Date, Location, Environmental Conditions, Observations and Actions Taken, Types of Crime Scene Sketches: Rough Sketch, Final Sketch, Perspective Sketch and Exploded View, Measuring Techniques and Establishing Reference Points, Preparing Crime Scene Reports and Documentation Formats, Common Errors in Documentation and Methods to Avoid Them

Unit 3: Basics of Crime Scene Photography

15 Hours

Purpose and Principles of Forensic Photography, Types of Crime Scene Photographs: Overall, Mid-Range and Close-Up, Digital Photography Basics: Resolution, Pixels, Exposure, Aperture, Shutter Speed and ISO. Lighting Techniques, Use of Flash, Oblique Lighting and Low-Light Photography, Equipment Essentials: DSLR, Tripod, Lenses, Scales and Forensic Photo Markers

Unit 4: Advanced Photography Techniques and Legal Considerations

15 Hours

Photographing Fingerprints, Footprints, Bloodstain Patterns, Weapons, Documents, Dead Bodies and Trace Evidence, Techniques such as Macro Photography, Alternate Light Source Photography and Night Photography, Photo Documentation for Reconstruction, Maintaining Photo Logs, Metadata and Storage Protocols, Admissibility of Forensic Photographs in Court and Photo Integrity Issues

Suggested Readings:

1. W.G. Eckert and R.K. Wright in *Introduction to Forensic Sciences, 2nd Edition, W.G. Eckert (ED.), CRC Press, Boca Raton (1997).*
2. R. Saferstein, *Criminalistics, 8th Edition, Prentice Hall, New Jersey (2004).*
3. W.J. Tilstone, M.L. Hastrup and C. Hald, *Fisher's Techniques of Crime Scene Investigation, CRC Press, Boca Raton (2013).*
4. Gernsheim Helmut; "A concise history of Photography", 3rdEd., Dover Publications, 1986.
5. Freeman Michael; "The Complete Guide to Digital Photography", 4thEd., Lark Books,

Pedagogy: Written Assignment/Presentation/Project/Term Papers/Seminar

Formative Assessment

S.No.	Assessment Occasion	Weightage in
1.	Class participation	05
2.	Quiz/PPT/ Assignment	10
	Mid semester test	15
Total		30

**M.Sc. Forensic Science
Discipline Elective Course (DEC)
Semester III
Research Methodology & Statistics**

Credits: 4

Hours: 60

Course Title: Research Methodology & Statistics	Course Code:
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Course Type: Discipline Elective Course-1C, L-T-P: 2-0-0	Course Credits: 4
Formative Assessment Marks: 30	Summative Assessment Marks: 70

Course Outcomes (COs): At the end of the course, the student should be able to:

1. Define basic concepts of research, types, designs, and data collection methods.
2. Explain sampling concepts, research methodology, and hypothesis testing.
3. Apply suitable data collection techniques and basic statistical tools.
4. Analyze data using statistical tests, correlation, and regression.
5. Evaluate research designs, sampling methods, and test outcomes.
6. Develop simple research frameworks and statistical reports.

Credits: 4

Hours: 60

Unit 1: Introduction to Research

15 Hours

Meaning, Definition and Scope of Research in Forensic Science, Objectives, Characteristics, and Significance of Research. Types of Research: Basic, Applied, Qualitative, Quantitative, Exploratory, Descriptive, Experimental, Research Approaches: Inductive, Deductive, Mixed Methods, Research Methods Vs Methodology. Criteria of Good Research. Experimental and Non-Experimental Research Designs, Methods of Data Collection: Observation, Questionnaires, Interviews, Schedules, Case Study

Unit 2: Research Design and Data Collection

15 Hours

Concepts: Statistical Population, Sample, Sampling Frame, Sampling Error, Probability and Non-Probability Sampling Techniques, Characteristics of a Good Sample and Sample Distribution, Determining Sample Size and Practical Considerations, Research Ethics and Plagiarism, Review of Literature and Formulation of Research Problem and Hypothesis, Report Writing: Structure, References, Citation Styles (APA, Vancouver)

Unit 3: Data Analysis and Statistical Testing

15 Hours

Introduction to Statistics: Types, Importance and Applications, Probability and Probability Distributions, Parametric Tests: t-test, z-test, F-test, ANOVA, Chi-square Test. Non-parametric Tests: Sign test, Mann-Whitney U test, Rank test. Concepts of Hypothesis Testing, Level of Significance, p-value, Type I & II Errors, Procedure and Flowchart for Hypothesis Testing (one-tailed and two-tailed tests)

Unit 4: Statistical Interpretation and Reporting

15 Hours

Measures of Central Tendency: Mean, Median, Mode. Measures of dispersion: Range, Variance, Standard Deviation, Skewness and Kurtosis. Correlation and Regression Analysis: Karl Pearson's Correlation, Regression Lines, Data Presentation: Tables, Graphs, Charts, Histograms. Use of Statistical Software (SPSS, Excel, R) in Research, Interpretation of Results and Preparation of Research Reports, Thesis, and Publications

Suggested Readings:

1. Broota, K.D., *Experimental designs in psychological research*, Wiley eastern, NewYork, 1992.
2. Flick, U. (2018). *An Introduction to Qualitative Research*. Sage Publications.
3. Rajamanickam, M., *Statistical Methods in Psychological and Educational Research*, Concept Publishing Co. New Delhi, India, 1983.
4. Field, A. (2013). *Discovering Statistics Using IBM SPSS Statistics*. Sage Publications.
5. Kumar, R. (2019). *Research Methodology: A Step-by-Step Guide for Beginners*. Sage Publications.

Pedagogy: Written Assignment/Presentation/Project/Term Papers/Seminar

Formative Assessment

S.No.	Assessment Occasion	Weightage in
1.	Class participation	05
2.	Quiz/PPT/ Assignment	10
	Mid semester test	15
Total		30

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M.Sc. Forensic Science
Discipline Elective Course (DEC)
Semester III
Arson and Explosives Investigation

Credits: 4

Hours: 60

Course Title: Arson and Explosives Investigation	Course Code:
Course Type: Discipline Elective Course-2A, L-T-P: 4-0-0	Course Credits: 4
Formative Assessment Marks: 30	Summative Assessment Marks: 70

Course Outcomes (COs): At the end of the course, the student should be able to:

1. Recall basic concepts of fire science, combustion, and legal definitions of arson.
2. Explain fire behavior, stages of fire, heat transfer, and arson indicators.
3. Apply systematic procedures for fire scene investigation and evidence handling.
4. Analyze fire debris and explosive residues using instrumental techniques.
5. Evaluate fire and blast scenes to determine cause, origin, and event reconstruction.
6. Prepare forensic reports and present scientific findings in legal contexts.

Credits: 4

Hours: 60

Unit 1: Fundamentals of Fire Science and Arson Investigation

15 Hours

Nature, Chemistry and Physics Of Fire. Fire Tetrahedron, Ignition Sources, Combustion Processes and Flame Characteristics, Classification of Fires, Heat Transfer Mechanisms and Stages of Fire Development, Indicators of Arson Including Multiple Ignition Points, Unusual Burn Patterns and Accelerant Presence, Legal Definitions of Arson, Intent, Motive and Criminal Liability, Role of Forensic Scientists in Fire Investigation

Unit 2: Arson Crime Scene Examination and Fire Debris Analysis

15 Hours

Systematic Approach to Fire Scene Investigation, Scene Safety, Extinguishing Considerations and Securing The Site, Identification of Areas of Origin, Point of Ignition and Burn Pattern Interpretation, Collection and Preservation of Fire Debris, Accelerant Residues, Soot and Charred Materials, Laboratory Analysis of Fire Debris Using Chromatographic and Spectroscopic Techniques, Detection and Identification of Ignitable Liquids, Fuel Components and Petrochemical Residues, Documentation, Photography and Reconstruction of Fire Events

Unit 3: Explosives, Detonators and Blast Dynamics

15 Hours

Classification of Explosives: Low and High Explosives, Primary and Secondary Explosives, Military and Commercial Explosives, Chemical Composition, Properties and Mechanisms of Detonation, Types of Detonators, Fuses, Timing Devices and Triggering Mechanisms, Blast Waves, Explosion Pressure Effects, Fragmentation Patterns and Post-Blast Damage Assessment, Safety Protocols and Risk Management While Handling Explosive Evidence

Unit 4: Post-Blast Investigation and Legal Aspects

15 Hours

Examination of Blast Scenes, Crater Analysis, Debris Distribution and Damage Characterization, Collection, Preservation and Packaging of Explosive Residues, Instrumental Analysis of Explosives Using GC-MS, HPLC, FTIR, XRD and SEM-EDX. Identification of Inorganic and Organic Explosive Compounds Including Nitrates, Nitrites, RDX, TNT, PETN and ANFO, Legal Provisions Related to Explosives Under National and International Regulations, Preparation Of Forensic Reports, Interpretation of Findings and Courtroom Presentation of Arson and Explosive Evidence

Suggested Readings:

1. DeHaan, J. D., & Icove, D. J. (2011). *Kirk's fire investigation (7th ed.)*. Pearson.
2. Friedman, R. (2013). *Principles of fire protection chemistry and physics (3rd ed.)*. National Fire Protection Association.
3. James, S. H., & Nordby, J. J. (2005). *Forensic science: An introduction to scientific and investigative techniques*. CRC Press.
4. Lentini, J. J. (2013). *Scientific protocols for fire investigation (2nd ed.)*. CRC Press.

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5. Thurman, J. T. (2015). *Practical bomb scene investigation* (2nd ed.). CRC Press.

Pedagogy: Written Assignment/Presentation/Project/Term Papers/Seminar

Formative Assessment

S.No.	Assessment Occasion		Weightage in
1.	Internal Assessment	Class participation	05
2.		Quiz/PPT/ Assignment	10
		Mid semester test	15
Total			30

M.Sc. Forensic Science
Discipline Elective Course (DEC)
Semester IV
Forensic Botany and Microbiology

Credits: 4

Hours: 60

Course Title: Forensic Botany and Microbiology	Course Code:
Course Type: Discipline Elective Course-2B, L-T-P: 4-0-0	Course Credits: 4
Formative Assessment Marks: 30	Summative Assessment Marks: 70

Course Outcomes (COs): At the end of the course, the student should be able to:

1. Explain the concepts and importance of forensic botany and microbiology in investigations.
2. Use proper botanical and microbiological methods for evidence collection, preservation, and analysis.
3. Examine plant parts, pollen, diatoms, and microbial characteristics using scientific techniques.
4. Evaluate botanical and microbial evidence to link individuals and estimate postmortem interval.
5. Interpret evidence using molecular, DNA-based, and genomic techniques.
6. Integrate plant and microbial evidence for comprehensive forensic case interpretation.

Credits: 4

Hours: 60

Unit 1: Foundations of Forensic Botany

15 Hours

Definition, Scope And Applications Of Forensic Botany in Crime Scene Investigations, Classification and Identification Of Plants, Morphology of Roots, Stems, Leaves, Flowers, Fruits and Seeds, Role of Plants as Trace Evidence, Importance of Botanical Materials in Linking Suspects and Crime Scenes, Legal Aspects and Evidentiary Value of Plant Remains

Unit 2: Analytical and DNA Approaches in Forensic Botany

15 Hours

Collection, Preservation and Documentation of Botanical Evidence: Leaves, Seeds, Fibers and Wood, Botanical Microscopy and Slide Preparation, Palynology and Forensic Analysis of Pollen, Diatom Testing in Drowning Cases, Anatomical and Chemical Examination of Plant Tissues. Plant DNA Extraction, Amplification, Molecular Identification and its Role in Forensic Casework

Unit 3: Foundations of Forensic Microbiology

15 Hours

Definition, Scope and importance of Forensic Microbiology, Classification of Microorganisms Including Bacteria, Fungi, Viruses and Protozoa, Role of Microbes in Decomposition, Microbial Succession as an Indicator of Postmortem Interval, Transmission and Transfer of Microorganisms as Forensic Trace Evidence, Relevance of Microbial Contamination in Investigations

Unit 4: Forensic Microbial Analysis

15 Hours

Collection, Preservation And Culturing of Microbial Evidence, Microscopic Examination and Biochemical

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Tests for Identifying Bacteria and Fungi. Analysis of Microbial Toxins, Spores and Biofilms, Molecular Techniques Including DNA Extraction, PCR and Microbial Genomics, Microbiome-based Identification of Body Fluids and PMI Estimation, Applications in Bioterrorism, Pathogen Tracing and Forensic Case Studies

Suggested Readings:

1. Coyle, H. M. (Ed.). (2005). *Forensic botany: Principles and applications*. CRC Press.
2. Hall, D. W. (2012). *Forensic botany: A practical guide*. Wiley-Blackwell.
3. Fahn, A. (1990). *Plant anatomy (4th ed.)*. Pergamon Press.
4. Sharma, O. P. (1993). *Plant taxonomy*. Tata McGraw-Hill.
5. Jain, V. K. (2014). *Fundamentals of plant physiology*. S. Chand Publishing.
6. Bhattacharya, K., Majumdar, M., & Pal, S. (2010). *Textbook of palynology*. New Central Book Agency.

Pedagogy: Written Assignment/Presentation/Project/Term Papers/Seminar

Formative Assessment

S.No.	Assessment Occasion		Weightage in
1.	Internal Assessment	Class participation	05
2.		Quiz/PPT/ Assignment	10
		Mid semester test	15
Total			30

**M.Sc. Forensic Science
Discipline Elective Course (DEC)
Semester IV
Audio and Video Analysis**

Credits: 4

Hours: 60

Course Title: Audio and Video Analysis	Course Code:
Course Type: Core Course-8, L-T-P: 4-0-0	Course Credits: 4
Formative Assessment Marks: 30	Summative Assessment Marks: 70

Course Outcomes (COs): At the end of the course, the student should be able to:

1. Explain the fundamental concepts and forensic importance of audio-video evidence.
2. Apply appropriate procedures for repair, recovery and preservation of damaged audio-video media.
3. Analyze audio and video recordings using scientific enhancement techniques.
4. Evaluate the authenticity and integrity of recordings through technical and forensic examinations.
5. Perform comparative identification of persons, voices and objects from audio-video evidence.
6. Create case-based interpretations by integrating enhanced and authenticated forensic multimedia evidence.

Credits: 4

Hours: 60

Unit 1: Introduction to Forensic Audio & Video Analysis

15 Hours

Nature, Scope and Importance of Forensic Audio-Video Analysis, Sources of recordings: CCTV, Mobile Phones, Body-Worn Cameras, Digital Recorders and Surveillance Systems, Basics of Sound, Acoustics, Frequency, Wavelength, Amplitude, Video Resolution, Frame Rate and Imaging Concepts, Legal Aspects of Audio-Video Evidence, Chain of Custody and Admissibility in Court, Challenges in Analysis such as Low Resolution, Poor Lighting, Background Noise and Environmental Disturbances

Unit 2: Repair, Recovery and Preservation of Audio-Video Evidence

15 Hours

Types of damage in Analog and Digital Media such as Magnetic Tapes, CDs, DVDs, Memory Cards and Mobile Devices, Methods for Repairing Damaged Tapes and Digital Devices, Recovery of Digital Files and Extraction from Proprietary CCTV Systems, Documentation during Evidence Collection, Device Details and

Camera Placements, Preservation through creation of Working Copies, Safeguarding Original Recordings, and Maintaining Metadata Integrity

Unit 3: Enhancement Techniques for Audio and Video Evidence **15 Hours**

Video Enhancement Techniques: Brightness and Contrast Adjustment, Color Correction, Cropping, Resizing, Sharpening, Edge Enhancement, De-Interlacing, Demultiplexing and Video Stabilization, Audio Enhancement Techniques: Noise Reduction, Filtering, Equalization, Spectral Analysis, Speech Frequency Isolation, Compression And Leveling, Waveform study for Identifying Faint Sounds, Distortions And Hidden Details

Unit 4: Authentication, Interpretation and Identification **15 Hours**

Authentication of recordings by Detecting Edits, Splicing, Discontinuities and Distortions, Examination of Waveform Anomalies, Ambient Sound Changes and Electrical Hum Patterns, Temporal and Spatial Analysis for Estimating Distance, Time Of Day and Environmental Context, Image Content Analysis for Identifying Persons, Vehicles And Objects, Introduction to Voice Comparison, Similarities, Dissimilarities and Limitations

Suggested Readings:

1. *Forensic Voice Identification* by Harry Hollien
2. *The Acoustic Analysis of Speech* by Ray D Kent & Charles Read
3. *Speech Language & Hearing Disorders* by Franklin H Silverman
4. *Voice Recognition* by Richard L Klevans & Robert D Rodman
5. *Multimedia Forensics and Security: Foundations, Innovations, and Applications* by Mohamed Mostafa Fouad et al

Pedagogy: Written Assignment/Presentation/Project/Term Papers/Seminar

Formative Assessment

S.No.	Assessment Occasion	Weightage in
1.	Class participation	05
2.	Internal Assessment	Quiz/PPT/ Assignment
		Mid semester test
Total		30

**M.Sc.Forensic Science
Semester III
Computer Forensics Lab.**

Credits: 4

Hours: 120

Course Title: Computer Forensics Lab.	Course Code:
Course Type: Practical Course-5, L-T-P: 0-0-8	Course Credits: 4
Formative Assessment Marks: 30	Summative Assessment Marks: 70

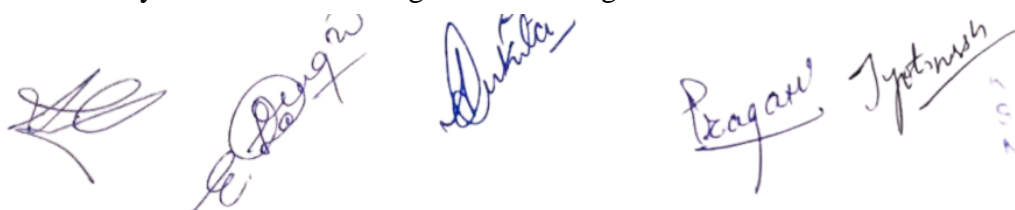
Course Outcomes (COs): At the end of the course, the student should be able to:

1. Identify, acquire, and preserve digital evidence using standard forensic procedures.
2. Trace digital footprints such as IP addresses and e-mail headers for investigations.
3. Analyze Windows logs, browser history, and system artifacts for forensic insights.
4. Use tools like FTK Imager, HxD, and FTK for imaging, data recovery, and analysis.
5. Apply digital signatures to secure e-mails and online transactions.
6. Implement and use a SIEM tool for monitoring and analyzing security events.

Credits: 4

Hours: 120

1. To identify, seize and preserve digital evidence from crime scenes.
2. To track the IP address of the sender of e-mails.
3. To study about Windows Logs and Filter logs based on scenarios.



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4. To use digital signatures for securing e-mail and online transactions.
5. To perform acquisition of any drive (HDD, SSD, USB) using FTKImager.
6. To perform the recovery of data, copying and imaging
7. Analysing Browser History and Browser Caches of windows system
8. To perform detailed analysis of Forensic Image using Forensic Toolkit.
9. To perform an Encrypting and decrypting of files
10. To perform primary level analysis using HxDeditor.

Pedagogy: Written Assignment/Presentation/Project/Term Papers/Seminar

Formative Assessment

S.No.	Assessment Occasion	Weightage in
1.	Internal Assessment	Attendance
2.		Written Assignment/Presentation (PPT) /Quiz
		Mid semester test
Total		30

**M.Sc.Forensic Science
Semester III**

Forensic Medicine & Anthropology Lab.

Credits: 4

Hours: 120

Course Title: Forensic Medicine & Anthropology Lab.	Course Code:
Course Type: Practical Course-6, L-T-P: 0-0-8	Course Credits: 4
Formative Assessment Marks: 30	Summative Assessment Marks: 70

Course Outcomes (COs): At the end of the course, the student should be able to:

1. Analyze and manage death scenes using forensic checklists and protocols.
2. Identify and distinguish ante-mortem, post-mortem, and asphyxia injuries.
3. Examine post-mortem changes for estimating time since death.
4. Determine age and sex using skeletal and dental characteristics.
5. Identify and differentiate human and animal bones.
6. Analyze and compare bite marks for forensic identification.

Credits: 4

Hours: 120

Forensic Medicine

1. To design a checklist for the forensic scientists at the death scene.
2. To design a questionnaire for the first responder to the death scene.
3. To identify and distinguish between ante-mortem and post-mortem injuries.
4. To carryout postmortem examination in various Asphyxial deaths
5. To observe and study the different types of post-mortem changes (Rigor mortis, lividity, algor mortis, decomposition stages)

Forensic Anthropology

1. Determination of age from skull and teeth
2. To determine the sex from pelvic girdle and Skull.
3. To study identification and description of bones and their measurements.
4. To investigate the differences between animal and human bones.
5. To analyse and compare bite marks.

Pedagogy: Written Assignment/Presentation/Project/Term Papers/Seminar

Formative Assessment

S.No.	Assessment Occasion	Weightage in
1.	Attendance	05

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2.	Internal Assessment	Written Assignment/Presentation (PPT) /Quiz	10
		Mid semester test	15
Total			30

M.Sc. Forensic Science
Open Elective Course (OEC)
Semester III
Forensic Analysis of Controlled Drugs

Credits: 2

Hours: 30

Course Title: Forensic Analysis of Controlled Drugs	Course Code:
Course Type: Open Elective Course-1A, L-T-P: 2-0-0	Course Credits: 2
Formative Assessment Marks: 30	Summative Assessment Marks: 70

Course Outcomes (COs): At the end of the course, the student should be able to:

1. Explain classifications, pharmacology, and legal aspects of controlled drugs.
2. Apply scientific procedures for sampling, extraction, and identification of narcotic substances.
3. Analyze drugs using chromatographic, spectroscopic, and instrumental techniques.
4. Evaluate adulterants, purity, and chemical profiling for forensic interpretation.
5. Interpret analytical data for drug identification, quantification, and reporting.
6. Create scientifically valid and legally admissible forensic drug analysis reports.

Credits: 2

Hours: 30

Unit 1: Introduction to Controlled Drugs and Narcotics

10 Hours

Definition, Scope and Forensic Significance of Controlled Drugs, Classification of Narcotic Drugs and Psychotropic Substances: Opiates, Opioids, Stimulants, Depressants, Hallucinogens, Cannabinoids and Synthetic Drugs, Drug Dependence, Tolerance, Addiction and Pharmacological Effects, Sources, Distribution Routes and Patterns Of Drug Trafficking. National and International Drug Control Laws Including NDPS Act, UN Conventions and Regulatory Frameworks

Unit 2: Sampling, Extraction and Preliminary Examination of Drugs

10 Hours

Sampling Methods for Seized Materials, Powders, Tablets, Plant Materials, Clandestine Chemicals and Biological Samples, Presumptive and Color Tests for Narcotics and Psychotropics Substances, Extraction Procedures for Organic and Inorganic Drug Compounds, Isolation of Active Ingredients from Mixtures. Microscopic Examination of Plant-Based Drugs: Cannabis, Opium, Poppy, Coca and Psilocybin Mushrooms, Detection of Adulterants and Cutting Agents

Unit 3: Instrumental Techniques for Drug Identification and Quantification

10 Hours

Chromatographic Methods: TLC, HPLC, GC and GC-MS for Drug Separation and Identification, Spectroscopic Techniques: UV-Vis, FTIR, NMR and Mass Spectrometry, Electrochemical and Immunoassay Techniques for Rapid Screening, Chemical Profiling of Heroin, Cocaine, Amphetamines, Benzodiazepines, Barbiturates and Designer Drugs, Quantitative Analysis and Purity Determination, Profiling Impurity Signatures and Comparative Analysis of Seized Samples

Suggested Readings:

1. Clarke EGC. *Clarke's Analysis of Drugs and Poisons*. 4th ed. London: Pharmaceutical Press; 2011.
2. Karch SB. *Drug Abuse Handbook*. 2nd ed. Boca Raton: CRC Press; 2006.
3. Baselt RC. *Disposition of Toxic Drugs and Chemicals in Man*. 11th ed. Seal Beach: Biomedical Publications; 2017.
4. Maurer HH. *Mass Spectral Data of Drugs and Poisons*. Weinheim: Wiley-VCH; 2016.
5. Casarett LJ, Doull J. *Toxicology: The Basic Science of Poisons*. 8th ed. New York: McGraw-Hill; 2013.
6. Jaffe JH. *Drug Addiction and Substance Misuse*. Oxford: Oxford University Press; 2018.

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Pedagogy: Written Assignment/Presentation/Project/Term Papers/Seminar

Formative Assessment

S.No.	Assessment Occasion		Weightage in
1.	Internal Assessment	Class participation	05
2.		Quiz/PPT/ Assignment	10
		Mid semester test	15
Total			30

**M.Sc. Forensic Science
Open Elective Course (OEC)
Semester III
Accident Investigation**

Credits: 2

Hours: 30

Course Title: Accident Investigation	Course Code:
Course Type: Open Elective Course-1B, L-T-P: 2-0-0	Course Credits: 2
Formative Assessment Marks: 30	Summative Assessment Marks: 70

Course Outcomes (COs): At the end of the course, the student should be able to:

1. Recall key concepts of motor vehicle accidents, scene evidence, and types of road marks.
2. Explain accident reconstruction elements, collision models, and injury biomechanics.
3. Apply methods for speed estimation, hit-and-run analysis, and vehicle evaluation
4. Analyze eyewitness accounts, trace evidence, tachograph data, and injury patterns.
5. Evaluate reliability and authenticity of tachograph records and accident evidence.
6. Create basic accident reconstruction reports using scene and tachograph data.

Credits: 2

Hours: 30

Unit 1: Motor Vehicle Accidents

10 Hours

Accident Scene, Sources of Forensic Information, Eyewitness Accounts, Extent of Vehicle Damage, Visibility Conditions, Photographs of Accident Site, Estimation of Speed, Tire Marks, Skid Marks, Scuff Marks, Maintenance of Vehicles, Abandoned Vehicles, Importance Of Air Bags, Railway Accidents

Unit 2: Accident Analysis

10 Hours

Pre-crash Movement, Post-crash Movement, Collision Model, Gauging Driver's Reaction, Occupants's Kinematics, Types Of Injuries Resulting From Accident, Biomechanics of Injuries, Hit and Run Investigations, Trace Evidence at Accident Sites

Unit 3: Tachographs

10 Hours

Forensic significance of Tachograph Data, Tachograph Charts, Principles of Chart Analysis, Accuracy of Speed Record, Tire Slip Effects, Falsification and Diagnostic Signals, Route Tracing

Suggested Readings:

1. T.S. Ferry, *Modern Accident Investigation and Analysis*, Wiley, New York (1988).
2. D. Lowe, *The Tachograph*, 2nd Edition, Kogan Page, London (1989).
3. T.L. Bohan and A.C. Damask, *Forensic Accident Investigation: Motor Vehicles*, Michie Butterworth, Charlottesville (1995).

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4. S.C. Batterman and S.D. Batterman in *Encyclopedia of Forensic Sciences, Volume 1*, J.A. Siegel, P.J. Saukko and G.C. Knupfer (Eds.), Academic Press, London (2000).

Pedagogy: Written Assignment/Presentation/Project/Term Papers/Seminar

Formative Assessment

S.No.	Assessment Occasion		Weightage in
1.		Class participation	05
2.	Internal Assessment	Quiz/PPT/ Assignment	10
		Mid semester test	15
Total			30

**M.Sc. Forensic Science
Open Elective Course (OEC)
Semester III
Environmental & Marine Forensics**

Credits: 2

Hours: 30

Course Title: Environmental & Marine Forensics	Course Code:
Course Type: Open Elective Course-1C, L-T-P: 2-0-0	Course Credits: 2
Formative Assessment Marks: 30	Summative Assessment Marks: 70

Course Outcomes (COs): At the end of the course, the student should be able to:

1. Explain the basic concepts of environmental and marine forensics.
2. Apply analytical techniques for detecting metallic poisons, asbestos, pesticides, PAHs and xenobiotics.
3. Perform underwater evidence recovery and preservation using standard tools and protocols.
4. Analyze drowning indicators and post-mortem changes in aquatic environments.
5. Evaluate the forensic value of biological, ballistic, toolmark and trace evidence from water bodies.
6. Formulate an investigation plan for marine forensic cases integrating field and laboratory findings.

Credits: 2

Hours: 30

Unit 1: Introduction to Environmental Forensics

10 Hours

Introduction to Environmental Forensics, Sources and Detection of Metallic poisons (Mercury, Lead, Arsenic), Asbestos: Sources and Detection in Air, Water, Fibers, Pesticides: Types, Analytical Testing and Forensic Techniques, Polycyclic Aromatic Hydrocarbons (PAHs): Sources, Types and Analytical Techniques, Ecosystem Characteristics, Structure and Function, Environmental Pollution, Xenobiotic and Recalcitrance

Unit 2: Fundamentals of Marine Forensics

10 Hours


Introduction and Scope of Marine Forensics, Agencies involved in Marine Forensic Investigations, Drowning: Types, Mechanism, Forensic Indicators, Postmortem Changes In Water: Adipocere Formation, Maceration, Floation, Marine Scavenging and Predation Patterns, Diatom Test and its Forensic Significance, Recovery and Examination of Biological Evidence from Aquatic Settings

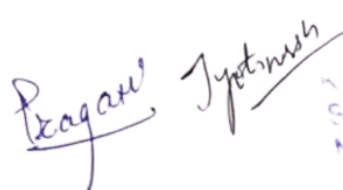
Unit 3: Forensic analysis of Marine evidences

10 Hours

Evidence Recovery Techniques from Underwater (SCUBA, sonar, submersibles), Preservation of Marine Forensic Evidence, Forensic Taphonomy in Aquatic Settings, Underwater Crime Scene Investigation Protocols, Ballistic, Toolmark and Trace Evidence Examination in Aquatic Environments

Suggested Readings:



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1. Morrison RD, Murphy BL. *Introduction to Environmental Forensics*. 2nd ed. Elsevier/Academic Press; 2007
2. Morrison RD. *Environmental Forensics: Principles & Applications*. CRC Press; 1999.
3. Mudge SM. *Methods in Environmental Forensics*. CRC Press (or relevant publisher); 2008.
4. Hester RE, Harrison RM. *Environmental Forensics. Issues in Environmental Science and Technology Series*; 2008.

Pedagogy: Written Assignment/Presentation/Project/Term Papers/Seminar

Formative Assessment

S.No.	Assessment Occasion	Weightage in
1.	Class participation	05
2.	Quiz/PPT/ Assignment	10
	Mid semester test	15
Total		30

**M.Sc.Forensic Science
Semester IV**

Instrumental Techniques in Forensic Science

Credits: 4

Hours: 60

Course Title: Instrumental Techniques in Forensic Science	Course Code:
Course Type: Core Course-11, L-T-P: 4-0-0	Course Credits: 4
Formative Assessment Marks: 30	Summative Assessment Marks: 70

Course Outcomes (COs): At the end of the course, the student should be able to:

1. Understand the principles and forensic applications of chromatographic techniques.
2. Apply spectroscopic methods for the identification and analysis of forensic substances.
3. Demonstrate knowledge of electrophoresis, colorimetry, and NAA in forensic testing.
4. Identify and examine forensic samples using various microscopic and imaging techniques.
5. Integrate analytical instrumentation techniques in forensic investigations of various evidences.
6. Design an integrated workflow using analytical techniques for comprehensive forensic analysis.

Credits: 4

Hours: 60

Unit 1: Microscopy

15

Hours

Mirrors & Lenses, Basic Principles of Microscopy, Simple and Compound Microscope, Study of Different Types of Microscopes: Light Microscope, Electron Microscope, Comparison microscope, Phase Contrast Microscope, Stereoscopic Microscope, Polarizing Microscope, Fluorescence Microscopy, IR Microscopy, Scanning Electron Microscope (SEM), Transmission Electron Microscope (TEM)

Unit 2: Chromatographic Techniques

15 Hours

Introduction and Types of Chromatography: Partition, Adsorption, Ion exchange, Affinity Chromatography, Size Exclusion Chromatography, Forensic Applications of Chromatography, Principle, Instrumentation and Applications of Gas Chromatography, Gas-liquid and gas-Solid Chromatography, GC – MS, GC – MS – MS (Tandem), High Performance Liquid Chromatography, LC – MS, LC – MS – MS (Tandem)

Unit 3: Spectroscopic Techniques

15 Hours

Infrared Spectroscopy: Molecular Vibration, Theory of IR Absorption, IR Sources and Instrumentation, FT-IR Applications; Raman Spectroscopy: Theory of Raman spectroscopy, Instrumentation and Applications. Differences & Similarities between Raman & IR spectroscopy, FT-NIR spectroscopy: Theory, Instrumentation & Applications, Neutron Magnetic Resonance: Theory, Instrumentation & Application, Mass Spectrometry: Theory, Instrumentation and Applications

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Unit 4: Other Techniques**15****Hours**

Principles and Applications of X-Ray Diffraction (XRD) and X-Ray Fluorescence (XRF) for Material and Elemental Analysis, Thermal Analysis Techniques (DSC, TGA, DTA) in Characterization of Explosives, Polymers, and Trace Materials, Electro-analytical methods: Potentiometry, Conductometry, Voltammetry, and Polarography in Toxicological and Chemical Analysis, Introduction to Atomic Emission Spectroscopy (AES), Inductively Coupled Plasma–Mass Spectrometry (ICP–MS)

Suggested Readings:

1. D.A.Skoog, F.J.Holler and T.A.Neman, *Harcoust Principles of Instrumental Analysis college publishers, Singapore*
2. Roux, C., Bull, S., & Crispino, F. (2023). *Fundamentals of Forensic Science Instrumentation and Techniques. Academic Press.*
3. Sharma, R. K., & Sharma, R. (2021). *Analytical Techniques in Forensic Science. Wiley.*
4. Jain, R., & Pundir, C. S. (2022). *Modern Analytical Techniques in Forensic Science. Springer.*
5. Saferstein, R. (2023). *Forensic Science Handbook: Volume II, Instrumental Analysis and Applications (3rd Edition). CRC Press.*
6. R.C.Grob, *Modern Techniques of Gas Chromatography, Marcel Dekker, New York.*

Pedagogy: Written Assignment/Presentation/Project/Term Papers/Seminar**Formative Assessment**

S.No.	Assessment Occasion	Weightage in
1.	Class participation	05
2.	Internal Assessment	Quiz/PPT/ Assignment
		Mid semester test
Total		30

**M.Sc.Forensic Science
Discipline Elective Course (DEC)
Semester IV
Molecular Biology & rDNA Technology**

Credits: 4**Hours: 60**


Course Title: Molecular Biology & rDNA Technology	Course Code:
Course Type: Discipline Elective Course-3A, L-T-P: 4-0-0	Course Credits: 4
Formative Assessment Marks: 30	Summative Assessment Marks: 70

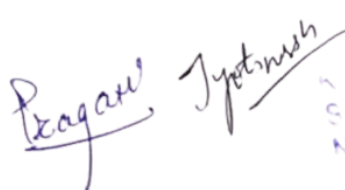
Course Outcomes (COs): At the end of the course, the student should be able to:

1. Explain the structure and functions of nucleic acids.
2. Describe DNA replication, transcription, translation, and post-translational modifications.
3. Apply population genetics and linkage analysis to study genetic variation.
4. Analyze molecular biology data using sequencing and phylogenetic tools.
5. Evaluate vectors, hosts, and expression systems for recombinant DNA experiments.
6. Design and implement recombinant DNA experiments for functional studies.

Credits: 4**Hours: 60**

Unit 1: Structure and functions of Nucleic acids 15 Hours
Nucleosides & Nucleotides, Purines and Pyrimidines, Watson and Crick Model of DNA Structure, A, B & Z forms of DNA, Supercoiled and relaxed DNA, RNA Structure and Types of RNA, Ribosome Structure, Genetic



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Code and their Properties, Organization of Genome in Prokaryotes and Eukaryotes, Mechanism of DNA Replication in Prokaryotes and Eukaryotes

Unit 2: Central Dogma

15

Hours

Transcription: RNA Polymerases, Features of Prokaryotic and Eukaryotic Transcription, Transport of RNA within Eukaryotic Cells, Translation: Role of t-RNA in Protein Synthesis, Initiation, Elongation and Termination and Post Translational Modifications

Unit 3: Population Genetics and Molecular Biology Techniques

15

Hours

Basic Concepts in Population Genetics, Hardy-Weinberg Principle and Linkage disequilibrium, Causes of Evolution-Admixture, Selection, Mutation, Drift, Genetic Diversity and Variations; Haplotype Analysis, Various Tools for Phylogenetic Analysis, Sanger Sequencing, Next Generation Sequencing Techniques, DNA Modifying Enzymes, Genomic and DNA libraries, Biosafety Guidelines and Containment Strategies

Unit 4: rDNA Technology

15 Hours

General Introduction and Concept of Recombinant DNA Technology, Vectors: Types of Vectors and Choice of Vectors- Plasmids, Cosmids, Lambda Phage vectors, Shuttle Vectors, BACs and YACs, Choice of Hosts, Expression Systems in Eukaryotic Cells, Yeast, Bacteria, Insect Cell Lines, Gene Screening; Methods for Transferring Recombinant DNA to Host Cells (Transformation and Transfection)

Suggested Readings:

1. *Markers 2nd Edition (2005) - John M. Butler, Academic Press, ISBN:0121479528*
2. *An Introduction to Population Genetics Theory and Applications. Rasmus*
3. *Nielsen, Montgomery Slatkin. Publisher: Sinauer Associates, Year of Publication-2013.*
4. *Fundamentals of Molecular Biology (2009)- J.K. Pal, Oxford*
5. *Fundamentals of Forensic DNA Typing (2010)- John. M. Butler, Academic Press*
6. *DNA Science: A First Course- D.A. Micklos, Cold Spring*

Pedagogy: Written Assignment/Presentation/Project/Term Papers/Seminar

Formative Assessment

S.No.	Assessment Occasion		Weightage in
1.	Internal Assessment	Class participation	05
2.		Quiz/PPT/ Assignment	10
		Mid semester test	15
Total			30

**M.Sc. Forensic Science
Discipline Elective Course (DEC)
Semester IV**

Introduction to Cyber Crime & Artificial Intelligence

Credits: 4

Hours: 60

Course Title: Introduction to Cyber Crime & Artificial Intelligence	Course Code:
Course Type: Discipline Elective Course-3B, L-T-P: 4-0-0	Course Credits: 4
Formative Assessment Marks: 30	Summative Assessment Marks: 70

Course Outcomes (COs): At the end of the course, the student should be able to:

1. Explain the fundamental concepts, types and scope of cyber crime and artificial intelligence
2. Apply basic tools and techniques for cyber crime investigation and AI-based problem solving.

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3. Analyze digital evidence, cyber threats and AI decision processes used in investigations.
4. Evaluate cyber security measures, AI algorithms and their ethical and legal implications.
5. Interpret AI-driven forensic applications to detect, prevent and respond to cyber offences.
6. Create integrated cyber investigation approaches using AI tools, digital evidence and analytical techniques.

Credits: 4

Hours: 60

Unit 1: Introduction to Cyber Crime

15 Hours

Definition, Scope and Evolution of Cyber Crime, Types of Cyber Crimes: Hacking, Phishing, Identity Theft, Cyber Stalking, Ransomware, Data Breaches, Online Frauds and Cyber Terrorism, Cyber Criminals, Motives and Modus Operandi. Cyber Crime Against Individuals, Property, Government and Society, Emerging trends in Digital Offences and Global Challenges in Cyber Security

Unit 2: Cyber Crime Investigation and Digital Evidence

15 Hours

Introduction to Cyber Forensic Investigation, Identification, Collection and Preservation of Digital Evidence, Basics of Operating System Artifacts, File Systems and Network Logs, Email Tracing, IP Tracking and Browser Forensics, Cyber Law, IT Act Provisions and Legal Admissibility of Digital Evidence, Challenges in Cyber Investigation, Anonymity Tools and Dark Web Issues

Unit 3: Introduction to Artificial Intelligence

15 Hours

Meaning, Nature and Scope of Artificial Intelligence, Characteristics of Intelligent Systems, AI Components: Machine Learning, Neural Networks, Natural Language Processing and Expert Systems, Data, Algorithms and Pattern Recognition, Applications of AI in Security, Automation, Surveillance and Decision-Making, Ethical, Social and Legal Issues Related to AI

Unit 4: AI in Cyber Security and Forensic Investigations

15

Hours

Role of AI in Detecting Cyber Threats, Malware and Intrusions, AI-based Anomaly Detection, Behavioral Analysis and Risk Prediction, Use of Machine Learning for Fraud Detection, Spam Filtering and Identity Verification, AI-driven Digital Forensic Tools and Automated Investigation Support, Challenges of AI-enabled Attacks, Deepfakes and Adversarial AI. Future Trends in AI-assisted Policing and Cyber Defense

Suggested Readings:

1. Nelson B, Phillips A, Steuart C. *Guide to Computer Forensics and Cyber Crime*. Boston: Cengage Learning; 2014.
2. Stallings W. *Computer Security: Principles and Practice*. 4th ed. Boston: Pearson; 2017.
3. Casey E. *Digital Evidence and Computer Crime*. 3rd ed. London: Academic Press; 2011.
4. Russell S, Norvig P. *Artificial Intelligence: A Modern Approach*. 4th ed. Boston: Pearson; 2020.
5. Bishop CM. *Pattern Recognition and Machine Learning*. New York: Springer; 2006.
6. Goodfellow I, Bengio Y, Courville A. *Deep Learning*. Cambridge: MIT Press; 2016.

Pedagogy: Written Assignment/Presentation/Project/Term Papers/Seminar

Formative Assessment

S.No.	Assessment Occasion		Weightage in
1.	Internal Assessment	Class participation	05
2.		Quiz/PPT/ Assignment	10
		Mid semester test	15
Total			30

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M.Sc.Forensic Science
Discipline Elective Course (DEC)
Semester IV

Handwriting Identification & Examination

Credits: 4

Hours: 60

Course Title: Handwriting Identification and Examination	Course Code:
Course Type: Discipline Elective Course-3C, L-T-P: 4-0-0	Course Credits: 4
Formative Assessment Marks: 30	Summative Assessment Marks: 70

Course Outcomes (COs): At the end of the course, the student should be able to:

1. Explain handwriting principles, neuromuscular coordination, and writing physiology.
2. Apply scientific techniques to examine and compare handwriting, signatures, and writing habits.
3. Analyze natural variations, abnormalities, disguises, and forged writings in forensic contexts.
4. Evaluate questioned documents using microscopic, optical, and digital tools for authentication.
5. Interpret individual characteristics and formulate expert forensic opinions.
6. Create clear, scientific, and legally admissible handwriting examination reports.

Credits: 4

Hours: 60

Unit 1: Scientific Foundations of Handwriting

15 Hours

Concept, Scope and Evolution of Handwriting Examination, Writing as a Neuromuscular Process Involving Brain-Hand Coordination, Principles of Handwriting Individuality and Natural Variation, Classification of Handwriting Characteristics Including Class and Individual Features, Factors Influencing Handwriting such as Age, Health, Emotional State, Writing Speed, Writing Instruments and Surfaces, Legal Significance and Admissibility of Handwriting Evidence

Unit 2: Handwriting Characteristics and Signature Analysis

15 Hours

Detailed Analysis of Fundamental, Individual and Habitual Handwriting Characteristics: Slant, spacing, Alignment, Pen Lifts, Pen Pressure, Rhythm, Speed and Letter Formations, Signature Examination: genuine, Forged, Traced, Simulated and Disguised Signatures, Evaluation of Movement Analysis, Connecting Strokes, Hesitations and Tremors, Study of Pictorial Signatures, Initials and Monograms, Identification of Writing Patterns in Multilingual Scripts

Unit 3: Detection of Forgery and Alterations Handwriting

15 Hours

Types of Handwriting Forgeries: Traced, Freehand Simulation and Digitally Generated Forgeries, Identification of Disguised Writing, Deliberate Alterations and Attempts to Distort Personal Writing Habits, Detection of Erasures, Obliterations, Overwriting, Retouching and Insertions in Handwritten Documents, Examination of Anonymous Letters, Blackmail Notes, Suicide Notes and Problematic or Illegible Writing, Determination of Line Sequence and Stroke Order

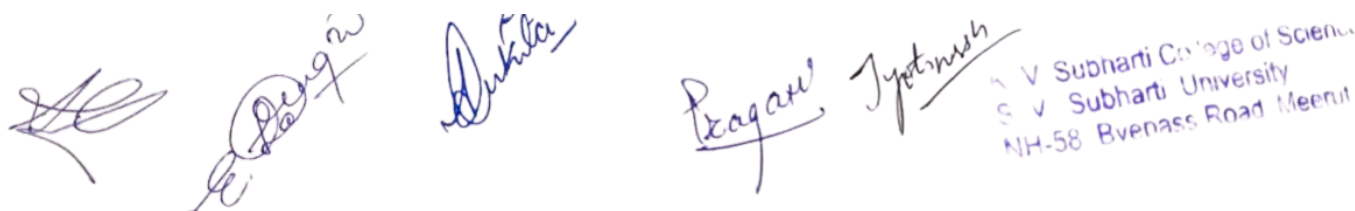
Unit 4: Instrumental and Digital Techniques

15 Hours

Principles of Stereomicroscope, VSC, Digital Microscopes, ESDA and Oblique Lighting in Handwriting Analysis, Infrared, Ultraviolet and Filtered Light Examinations for Ink and Stroke Differentiation, Digital Comparison Systems, Biometric Handwriting Tools and Automated Handwriting Recognition Approaches, Preparation of Expert Reports: Observations, Comparison Charts, Photographic Evidence and Scientifically Justified Opinions, Courtroom Presentation and Limitations of Handwriting Identification

Suggested Readings:

1. Huber RA, Headrick AM. *Handwriting Identification: Facts and Fundamentals*. Boca Raton: CRC Press; 1999.
2. Harrison WR. *Suspect Documents: Their Scientific Examination*. London: Sweet & Maxwell; 1958.
3. Hilton O. *Restoration of Handwriting and Signatures*. Springfield: Charles C. Thomas; 1982.
4. Kelly J, Lindblom B. *Scientific Examination of Questioned Documents*. Boca Raton: CRC Press; 2006.
5. Ellen D. *Scientific Examination of Documents*. Boca Raton: CRC Press; 1997.



6. Shah RK. *Questioned Documents*. Ahmedabad: University Press; 2008.

Pedagogy: Written Assignment/Presentation/Project/Term Papers/Seminar

Formative Assessment

S.No.	Assessment Occasion	Weightage in
1.	Class participation	05
2.	Quiz/PPT/ Assignment	10
	Mid semester test	15
Total		30

**M.Sc.Forensic Science
Discipline Elective Course (DEC)**

Semester IV

Applied Forensic Entomology & Wildlife Forensics

Credits: 4

Hours: 60

Course Title: Applied Forensic Entomology & Wildlife Forensics	Course Code:
Course Type: Discipline Elective Course-4A, L-T-P: 4-0-0	Course Credits: 4
Formative Assessment Marks: 30	Summative Assessment Marks: 70

Course Outcomes (COs): At the end of the course, the student should be able to:

1. Understand the scope, history, and principles of forensic entomology and wildlife forensics.
2. Identify and study forensically important insects, their life cycles and succession patterns.
3. Analyze entomological evidence to estimate PMI.
4. Examine wildlife crimes and identify protected species.
5. Apply DNA and forensic techniques in wildlife investigations.
6. Understand and apply wildlife conservation laws and regulations.

Credits: 4

Hours: 60

Unit 1: Introduction to Forensic Entomology

15 Hours

Introduction, History and Scope of Forensic Entomology, Anatomy and Taxonomy of Forensically Important Insects (Diptera), Life cycles of Necrophagous Insects, Insect Succession (in Buried Bodies, Burnt Bodies, Decomposed Bodies above the Soil and in Water) & Factors that Affect Insect Succession, Factors affecting Insect Colonization (temperature, humidity, environment)

Unit 2: Significance of Forensic Entomology

15 Hours

Collection, Preservation, and Documentation of Entomological Evidence, Role of Insects in Estimating Post-Mortem Interval (PMI)/Time Since Infestation From Invertebrate Development Rates. Rearing, staging, and Measuring Larvae for PMI Estimation, Techniques for Sampling Insects From Crime Scenes and Autopsies, Use of Entomological Databases and Tools, Preparation and Analysis of Entomology Reports

Unit 3: Wild-life forensics

15 Hours

Definition, Scope and Advances in Wildlife Forensics, Wildlife Crime: Types, Patterns, and Global/National Trends, Identification of Protected Species (Flora And Fauna). Collection, Preservation, and Documentation of Wildlife Evidence, Different Methods of Poaching. Morphological Examination of Wildlife Parts and Products, Application of DNA Technologies used in Wildlife Forensics, Crime Scene Investigation in Wildlife Cases

Unit 4: Laws related to Wildlife Forensics

15 Hours
Importance of Wildlife Conservation, Conventional Methods of Species Identification, Classification of Species

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as per IUCN Red Data Book, Introduction to CITES and CBD, Wildlife (Protection) Act, 1972 of India, Threats to the Natural Resources and Wild Species Inhabiting Globally, Forest (Conservation) Act, 1980 and Environment Protection Act, 1986

Suggested Readings:

1. Byrd, J. H., & Tomberlin, J. K. (Eds.). (2020). *Forensic entomology: The utility of arthropods in legal investigations* (3rd ed.). CRC Press.
2. Ghosh, S., & Banerjee, D. (2024). *Biology of forensically important invertebrates*. Springer.
3. Linacre, A. (Ed.). (2009). *Forensic science in wildlife investigations*. CRC Press.
4. Underkoffler, S. C., & Adams, H. R. (Eds.). (2021). *Wildlife biodiversity conservation: Multidisciplinary and forensic approaches*. Springer Cham.
5. Elliott, J. E., Bishop, C. A., & Morrissey, C. A. (Eds.). (2011). *Wildlife ecotoxicology: Forensic approaches (Emerging Topics in Ecotoxicology, Vol. 3)*. Springer New York.

Pedagogy: Written Assignment/Presentation/Project/Term Papers/Seminar

Formative Assessment

S.No.	Assessment Occasion	Weightage in
1.	Class participation	05
2.	Quiz/PPT/ Assignment	10
	Mid semester test	15
Total		30

**M.Sc.Forensic Science
Discipline Elective Course (DEC)
Semester IV
Anti-Dope Forensics**

Credits: 4

Hours: 60

Course Title: Anti-Dope Forensics	Course Code:
Course Type: Discipline Elective Course-4B, L-T-P: 4-0-0	Course Credits: 4
Formative Assessment Marks: 30	Summative Assessment Marks: 70

Course Outcomes (COs): At the end of the course, the student should be able to:

1. Explain anti-doping fundamentals and effects of prohibited substances.
2. Describe anti-doping regulations and the role of NADA and WADA
3. Apply sample collection and preparation techniques for testing.
4. Analyze doping test results using GC-MS, LC-MS, and immunoassays.
5. Evaluate the effectiveness and ethical aspects of anti-doping programs.
6. Design integrated anti-doping strategies for fair sports practices.

Credits: 4

Hours: 60

Unit 1: Introduction to Anti-Dope Forensics 15 Hours

Overview of Doping and Its Impact on Sports Integrity, Classification of Sports under Anti-Doping norms, Common Dope Drugs: Stimulants, Anabolic Steroids, Growth Hormones, Diuretics, Synthetic Oxygen Carriers, Insulin, And Gene Doping, Therapeutic Use Exemptions and Emerging Trends in Medicines and Technologies, Pharmacodynamics and Pharmacokinetics of Dope Drugs, Protecting Athlete Health and Maintaining Clean Sports Practices, Role of Healthcare Providers in Anti-Doping at Sporting Events

Unit 2: Testing & Analysis

15

Hours

Dope Testing Protocols for Humans and Animals, Role of Body fluids (blood, urine, saliva, sweat) in Drug

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Analysis, Guidelines for Dope Testing and Laboratory Accreditation, Effective Testing Programs and International Standards, National and International Anti-Doping Laws, Regulatory Agencies: NADA (National Anti-Doping Agency) and WADA (World Anti-Doping Agency)

Unit 3: Analytical Techniques in Anti-Dope Testing

15 Hours

Advanced Analytical Methods: GC-MS, LC-MS, and Immunoassays, Sample Preparation Techniques for Biological Specimens, Identification and Quantification of Doping Substances, Sensitivity and Specificity in Analytical Detection, Quality Assurance and Reporting in Anti-Doping Laboratories

Unit 4: Ethical and Future Perspectives in Anti-Doping

15 Hours

Ethical Considerations in Doping Control and Athlete Rights, Legal Admissibility of Doping Evidence in Sports Tribunals, Role of Education in Preventing Doping Practices, Advancements in Gene Doping Detection and Forensic Technologies, Future Challenges in Anti-Doping Efforts and Maintaining Integrity In Sports

Suggested Readings:

1. World Anti-Doping Agency (WADA), *The World Anti-Doping Code*, Montreal, 2009 (accessed April 2011) <http://www.wada-ama.org>.
2. Baselt RC. *Disposition of Toxic Drugs and Chemicals in Man*. 11th ed. Seal Beach: Biomedical Publications; 2017.
3. *At-a-Glance - The Doping Control Process*. World Anti-Doping Agency. N.p., 04 July 2014. Web. 18 Apr. 2016.
4. Reardon, Claudia L., and Creado, Shane. "Drug Abuse in Athletes." *Substance Abuse and Rehabilitation* (2014): 95-105. Web. 29 Feb. 2016.
5. Karch SB. *Drug Abuse Handbook*. 2nd ed. Boca Raton: CRC Press; 2006.

Pedagogy: Written Assignment/Presentation/Project/Term Papers/Seminar

Formative Assessment

S.No.	Assessment Occasion	Weightage in
1.	Class participation	05
2.	Quiz/PPT/ Assignment	10
	Mid semester test	15
Total		30

**M.Sc. Forensic Science
Discipline Elective Course (DEC)
Semester IV
Incident Response & Management**

Credits: 4

Hours: 60

Course Title: Incident Response & Management	Course Code:
Course Type: Discipline Elective Course- 4C, L-T-P: 4-0-0	Course Credits: 4
Formative Assessment Marks: 30	Summative Assessment Marks: 70

Course Outcomes (COs): At the end of the course, the student should be able to:

1. Explain key concepts of incident response and roles of response teams.
2. Apply standard procedures for incident identification, containment, eradication and recovery.
3. Analyze incident data and forensic evidence to determine cause and impact.
4. Evaluate incident severity, prioritization and cost to recommend response strategies.

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5. *Develop an effective incident response plan with proper reporting and documentation.*
6. *Ensure ethical and legal compliance using cyber laws and international incident response standards.*

Credits: 4

Hours: 60

Unit 1: Introduction to Incident Response 15 Hours
 Computer Security Incident, Key Concepts of Information Security, Incident Management, Purpose of Incident Management, Need and Goals of Incident Response, Incident Response Plan, Signs / Indicators of an Incident, Incident Categories, Incident Prioritization, Incident Response, Incident Handling, Estimating Cost of an Incident, Incident Reporting, Incident Response Team, Incident Response Team Members Roles and Responsibilities

Unit 2: Management of Incident Response 15 Hours
 Steps of Incident Response / Handling: Identification, Incident Recording, Initial Response, Communicating the Incident, Containment, Formulating a Response Strategy, Classification, Investigation, Data Collection, Forensic Analysis, Evidence Protection, Notifying External Agencies, Eradication, Systems Recovery, Documentation, Damage and Cost Assessment, Lessons Learned, Review and Update the Response Policies

Unit 3: Goals of Incident Response 15 Hours
 Goals of Incident Response, Incident Response Plan, Incident Identification, Incident Prioritization, Incident Handling, Estimating Cost of an Incident, Incident Reporting, Incident Reporting Organizations, Vulnerability Resources

Unit 4: Ethical Aspects of Incident Response 15 Hours
 Incident Response Standards and Guidelines (NIST, ISO/IEC, SANS), Legal Aspects of Incident Response, National and International Cyber Laws, Digital Evidence and Chain of Custody Requirements, Compliance with Data Protection and Privacy Regulations, Ethical Issues in Incident Response, Professional Responsibilities and Reporting Obligations, Collaboration with Law Enforcement and CERTs/CSIRTs

Suggested Readings:

1. *Luttgens J, Pepe M, Mandia K. Incident Response & Computer Forensics. 3rd ed. New York: McGraw-Hill; 2014.*
2. *Andress J. The Basics of Cyber Threat Intelligence. Cambridge: Syngress; 2020.*
3. *EC-Council. Computer Forensics: Investigator's Guide to Laws and Regulations. Boston: Cengage Learning; 2010.*
4. *National Institute of Standards and Technology. Computer Security Incident Handling Guide. NIST SP 800-61 Rev.2. Gaithersburg (MD): NIST; 2012.*
5. *Alberts C, Dorofee A. Managing Information Security Risks: The OCTAVE Approach. Boston: Addison-Wesley; 2002.*

Pedagogy: Written Assignment/Presentation/Project/Term Papers/Seminar

Formative Assessment

S.No.	Assessment Occasion		Weightage in
1.	Internal Assessment	Class participation	05
2.		Quiz/PPT/ Assignment	10
		Mid semester test	15
Total			30

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M.Sc. Forensic Science
Employability, Entrepreneurship Skill Course (EEC)
Semester IV

Quality Management in Forensic Science

Credits: 2

Hours: 30

Course Title: Quality Management in Forensic Science	Course Code:
Course Type: EEC-1A, L-T-P: 2-0-0	Course Credits: 2
Formative Assessment Marks: 30	Summative Assessment Marks: 70

Course Outcomes (COs): At the end of the course, the student should be able to:

1. Explain the need for quality in forensic labs and roles of accreditation bodies.
2. Describe key components of forensic Quality Management Systems.
3. Apply Total Quality Management and internal audit procedures in forensic labs.
4. Analyze management and technical requirements of accreditation standards.
5. Evaluate corrective and preventive actions for non-conforming work.
6. Create quality documentation and improvement plans compliant with ISO standards.

Credits: 2

Hours: 30

Unit 1: Introduction to Quality management Systems 10 Hours

Need of maintaining quality of Forensic laboratories, National Accreditation Board for Testing and Calibration Laboratories (NABL), International Laboratory Accreditation Co-operation (ILAC), Asia Pacific Laboratory Accreditation Co-operation (APLAC). American Society of Crime Laboratory Directors (ASCLD), International Organization for Standardization (ISO), Bureau of Indian Standards (BIS)

Unit 2: Forensic Quality Management System

10 Hours

Definition of Quality, Quality Management System (based on People, Technical and Document), Quality Manual, Quality Manager, Total Quality, Quality Assurance, Quality Control, Quality Planning, Quality Audit: Internal Audits: Definition, Objectives, Organization of internal audits, Planning of Audit, Implementation of Internal Audits, Follow up of Corrective Action, Records and Reports of Internal Audits, Additional Unscheduled Audits

Unit 3: Management Requirements and Technical Requirements

10 Hours

Management Requirements: Organizational, Document Control, Subcontracting Of Tests and Calibrations Control of Non Conforming Testing / Calibration Work, Corrective and Preventive Actions, Management Review. Technical Requirements: Test and Calibration Methods and their Validation, Measurements, Standards and Reference Material, Traceability, Sampling, Proficiency Testing and Review Program.

Suggested Readings:

1. J A Siegel, P.J Saukko (2000) Encyclopedia of Forensic Sciences Vol. I, II and III, Acad. Press
2. NABL -, Guide for Internal audit and Management Review for Laboratories.
3. NABL-210, Assessor Guide Issue No.3, 1.5.2002.
4. DFSS: Manuals of Forensic Sciences.
5. Jain, R., & Pundir, C. S. (2022). Modern Analytical Techniques in Forensic Science. Springer.

Pedagogy: Written Assignment/Presentation/Project/Term Papers/Seminar

Formative Assessment

S.No.	Assessment Occasion	Weightage in
1.	Internal Assessment	Class participation
2.		Quiz/PPT/ Assignment
		05
		10

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	Mid semester test	15
	Total	30

M.Sc. Forensic Science
Employability, Entrepreneurship Skill Course (EEC)
Semester IV
Forensic Evidence Management & Report writing

Credits: 2

Hours: 30

Course Title: Forensic Evidence Management & Report writing	Course Code:
Course Type: EEC-1B, L-T-P: 2-0-0	Course Credits: 2
Formative Assessment Marks: 30	Summative Assessment Marks: 70

Course Outcomes (COs): At the end of the course, the student should be able to:

1. Explain forensic evidence management, documentation, and legal duties.
2. Apply scientific procedures for handling and storing forensic evidence.
3. Analyze workflows and documentation to maintain evidence integrity.
4. Evaluate reliability and admissibility of evidence based on handling.
5. Interpret findings and prepare scientifically valid reports.
6. Create clear, ethical, and court-admissible forensic reports.

Credits: 2

Hours: 30

Unit 1: Basics of Forensic Evidence Management

10Hours

Concept, Scope and Significance of Forensic Evidence Management in the Criminal Justice System. Classification of Evidence: Physical, Biological, Chemical, Digital and Trace Categories, Principles of Evidence Recognition, Relevance, Probative Value, and Legal Admissibility, Ethical Responsibilities of Forensic Professionals, Evidence Contamination Issues and Integrity Maintenance

Unit 2: Evidence Collection, Preservation and Documentation Protocols

10Hours

Methods for Efficient and Scientific Collection of Various Types Evidences, Packaging Techniques for Different Evidence Types, Environmental Considerations, Contamination Control and Preservation Strategies for Evidence Stability. Chain of Custody Systems, Evidence Transfer Protocols, Evidence Storage Facility Design and Documentation Formats Including Logs, Labels, Seals and Electronic Tracking, Field Documentation Practices Including Notes, Sketches, Photographs and Digital Recording

Unit 3: Forensic Report Writing and Interpretation

10Hours

Structure and Components of Forensic Reports, Standards for Scientific Report Writing and Justification of Findings, Interpretation of Complex Test Results, Formulation of Defensible Scientific Conclusions and Limitations Of Analyses, Legal Expectations for Forensic Reports, Expert Testimony Protocols, Courtroom Presentation Skills, Cross-Examination Handling and Ethical Considerations in Expert Communication

Suggested Readings:

1. Ogle RR. *Crime Scene Investigation and Reconstruction*. Upper Saddle River: Prentice Hall; 2004.
2. Saferstein R. *Criminalistics: An Introduction to Forensic Science*. 12th ed. Upper Saddle River: Pearson; 2018.
3. Gardner RM. *Practical Crime Scene Processing and Investigation*. 2nd ed. Boca Raton: CRC Press; 2012.
4. Fisher BAJ. *Techniques of Crime Scene Investigation*. 7th ed. Boca Raton: CRC Press; 2003.
5. Houck MM, Siegel JA. *Fundamentals of Forensic Science*. 3rd ed. London: Academic Press; 2015.

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Formative Assessment

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		Mid semester test	15
Total			30

M.Sc. Forensic Science
Employability, Entrepreneurship Skill Course(EEC)
Semester IV
Network & Mobile Forensics

Credits: 2

Hours: 30

Course Title: Network & Mobile Forensics	Course Code:
Course Type: EEC-1C, L-T-P: 2-0-0	Course Credits: 2
Formative Assessment Marks: 30	Summative Assessment Marks: 70

Course Outcomes (COs): At the end of the course, the student should be able to:

1. Define basic concepts of network, cloud, and mobile forensics and related technologies.
2. Explain methods of evidence collection, preservation, and analysis from networks and mobile devices.
3. Use forensic tools to acquire and analyze data from logs, mobile devices, and cloud sources.
4. Analyze digital artifacts to trace activities, detect attacks, and reconstruct events,
5. Evaluate evidence integrity and suitability of different acquisition techniques.
6. Develop a basic forensic investigation plan using appropriate tools and procedures.

Credits: 2

Hours: 30

Unit 1: Network Forensics

10Hours

Common Network Attacks, Searching, Collection, and Preservation of Network Evidence, Monitoring Computer Networks, User Activities, and Extracting Evidence from Log Files, Log Management Systems, Use of Log Capturing and Analysis Tools; Collection and analysis Of Router, Firewall, and IDS Logs. CCTV Evidences, Forensic Analysis of Online Browsing Activities and Associated Artifacts, Cloud Forensics

Unit 2: Network Technologies

10Hours

Basics of Networking - Server, Client, Routers, Shared Printers and Other Peripherals, Network Interface Card. Network Devices, Network Topologies; Introduction to OSI Model and TCP/IP Model; HTTP, World Wide Web, Web Browsers, Web Servers, Domain Names, URL and DNS; IP Addressing: Types and Classes; Types of Networks – LAN, MAN, WAN and PAN; Routers and Routing Protocols; Basics of Wi-Fi; Basics of Cloud Computing

Unit 3: Mobile Device Forensics

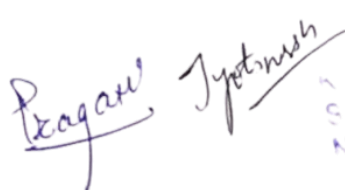
10Hours

Mobile Technologies: ATM, WAP, AMPS, TDMA, CDMA, GSM, SIM Functions, IMEI, Bluetooth, Mobile Payment Gateways, Mobile OS (Android, iOS, Windows). Basics of rooting/JailBreaking, Types of Mobile Evidence, Stages of Mobile Forensic Investigation, Data Acquisition Methods, Extraction from Damaged Devices, Tracking Mobile Phone Location, Analysis of SMS, Call Logs, Contacts, Media Files, Recordings, and App Data.

Suggested Readings:

1. Sagar Rahalkar, "Network Vulnerability Assessment: Identify security loopholes in your network's infrastructure", Packt Publishing, Birmingham, 2018.



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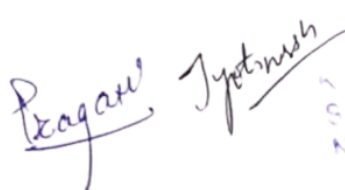
2. Georgia Weidman, "Penetration Testing: A Hands-on Introduction to Hacking", No Starch Press Inc., USA, 2014.
3. Rafay Baloch, "Ethical Hacking and Penetration Testing Guide", CRC Press, Taylor and Francis, USA, 2015.
4. Patrick Engebreston, "The Basics of Hacking and Penetration Testing", Syngress Press, Elsevier, 2011.

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Formative Assessment

S.No.	Assessment Occasion		Weightage in
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