



SHRI DAVARA UNIVERSITY

**SHRI DAVARA UNIVERSITY
NAYA RAIPUR (C.G.)**



PROGRAMME CURRICULUM
FOR

**MASTER OF FORENSIC
SCIENCE SEMESTER-II
(EFFECTIVE FROM THE SESSION 2025-2027)**



SHRI DAVARA UNIVERSITY

**TWO- YEAR UNDERGRADUATE PROGRAMME
FACULTY OF FORENSIC SCIENCE (2025-2027)
COURSE STRUCTURE
SEMESTER - II**

S.NO	COURSE CODE	COURSE TITLE	TEACHING HOURS PER WEEK				EXAMINATION SCHEME				TOTAL MARKS
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							EX	IN	EX	IN	
DISCIPLINE SPECIFIC COURSE											
1.	MSFS201	Instrumentation and Techniques in Forensic Science	2	2	0	4	70	30	-	-	100
2.	MSFS202	Biochemistry and Analytical Techniques	2	0	1	4	70	30	-	-	100
3.	MSFS203	Forensic Botany And Entomology	2	1	1	4	70	30	-	-	100
4.	MSFS204	Ballistics	2	1	0	4	70	30	-	-	100
PRACTICAL LAB											
5.	MSFS205P	Instrumentation and Techniques in Forensic Science	0	0	2	2	35	15	-	-	50
6.	MSFS206P	Ballistics and Forensic Physics	0	0	2	2	35	15	-	-	50
7.	MSFS207P	Forensic Botany And Entomology	0	0	2	2	35	15	-	-	50
8.	MSFS208S	Seminar	0	0	2	2	50	-	-	-	50
Total Contact Hours per Week: 30			Total Credit:				24		Total Mark		600



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**TWO -YEAR POSTGRADUATE PROGRAMME
FACULTY OF FORENSIC SCIENCE (2025-2027)
COURSE STRUCTURE
SEMESTER - II**

PART-A: Introduction		
Program: (Certificate/Diploma/Degree Honors)	M.Sc. Forensic Science	Session: 2025-2027
Course Code	MSFS201	
Course Title	Instrumentation and Techniques in Forensic Science	
Course Type	Discipline Specific Course (DSC)	
Pre-requisite(if any)	As per programme	
Course Learning Outcomes (CLO)	<ul style="list-style-type: none"> ● To provide advanced knowledge of analytical instrumentation used in forensic laboratories. ● To develop expertise in interpretation of instrumental data. ● To understand validation, quality assurance, and accreditation standards. ● To integrate instrumental techniques with forensic casework applications. 	
Credit Value	4 Credits	Credit =60 Hours-learning & Observation
Total Marks	Max. Marks: =100	Min Passing Marks: 40
PART -B: Content of the Course		
Total No. of Teaching-learning Periods (01 Hr. per period) -60 Periods (60 Hours)		
Unit	Topics (Course contents)	
I	Advanced Analytical Instrumentation & Quality Assurance <ul style="list-style-type: none"> ● Principles of Instrumental Analysis:Calibration methods and internal standards, Limits of detection (LOD) and quantification (LOQ), Accuracy, precision ● Method Development and Validation: Linearity, selectivity, robustness, Validation protocols in forensic labs, ● Laboratory Accreditation & QA/QC: ISO/IEC 17025 standards, Proficiency testing, Chain of custody and documentation ● Instrument Maintenance & Troubleshooting: Preventive maintenance, Instrument performance checks 	15
II	Advanced Spectroscopic and Spectrometric Techniques <ul style="list-style-type: none"> ● Advanced Molecular Spectroscopy: UV-Vis and derivative spectroscopy, FT-IR and ATR techniques ● Raman spectroscopy and SERS: Atomic and Elemental Analysis, Flame & Graphite Furnace AAS, ICP-OES, ICP-MS ● Mass Spectrometry: Ionization techniques (EI, CI, ESI, MALDI), Mass analyzers (Quadrupole, TOF, Ion Trap), Tandem MS (MS/MS), Applications in toxicology, explosives, and drug analysis 	15



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III	Advanced Separation Techniques <ul style="list-style-type: none"> ● Advanced Chromatography: GC with advanced detectors (FID, ECD, NPD), Headspace GC for arson analysis, HPLC and UHPLC ● Hyphenated Techniques:GC–MS, LC–MS/MS, ICP–MS, Applications in forensic toxicology and environmental forensics ● Capillary Electrophoresis: Principle and instrumentation, DNA profiling applications 	15
IV	Specialized Forensic Instrumentation & Emerging Technologies <ul style="list-style-type: none"> ● Microscopy and Imaging: Comparison microscope, Polarized light microscopy, Scanning Electron Microscopy (SEM-EDS), Applications in GSR and trace evidence ● X-ray Techniques: XRD, XRF ● Questioned Document Instruments: Video Spectral Comparator (VSC), ESDA ● Digital and Automated Systems: Automated fingerprint identification systems, Portable forensic instruments, Artificial intelligence in forensic analysis 	15

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PART-C: Learning Resources

Text Books, Reference Books and Others

Text Books Recommended-

1. Forensic Science Handbook – Richard Saferstein (Ed.)
2. Principles of Instrumental Analysis – Skoog, West, Holler & Crouch
3. Quantitative Chemical Analysis – Daniel C. Harris
4. Scientific Working Group for the Analysis of Seized Drugs (SWGDRUG) Recommendations
5. ISO/IEC 17025 – General Requirements for the Competence of Testing and Calibration Laboratories

PART -D: Assessment and Evaluation

Suggested Continuous Evaluation Methods: Maximum Marks: 100 Marks

Continuous Internal Assessment (CIA): 30 Marks

Marks End Semester Exam (ESE): 70 Marks

Continuous Internal Assessment (CIA): 30 (By Course Teacher)	Internal Test/Quiz:20+20 Assignment/ Semenar-10 Total Marks-30	Better marks out of the two Tot Quiz + obtained marks in Assignment shall be considered against 15 Marks
End Semester Exam (ESE):70	Three sections (A,B &C) Section A : Objective (10*1=10 Marks) Section B: Short answer type (5*4=20 Marks) Section C : Descriptive answer type qts 1 out of 2 from each- (4*10=40 Marks)	

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**TWO -YEAR POSTGRADUATE PROGRAMME
FACULTY OF FORENSIC SCIENCE (2025-2027)
COURSE STRUCTURE
SEMESTER - II**

PART-A: Introduction		
Program: (Certificate/Diploma/Degree Honors)	M.Sc. Forensic Science	Session: 2025-2027
Course Code	MSFS202	
Course Title	Biochemistry and Analytical Techniques	
Course Type	Discipline Specific Course (DSC)	
Pre-requisite(if any)	As per programme	
Course Learning Outcomes (CLO)	<ul style="list-style-type: none"> ● To provide advanced understanding of biochemical principles relevant to forensic science. ● To develop expertise in analytical and bioanalytical techniques used in forensic investigations. ● To interpret biochemical evidence in criminal casework. ● To integrate molecular, clinical, and analytical approaches in forensic applications. 	
Credit Value	4 Credits	Credit =60 Hours-learning & Observation
Total Marks	Max. Marks: =100	Min Passing Marks: 40
PART -B: Content of the Course		
Total No. of Teaching-learning Periods (01 Hr. per period) -60 Periods (60 Hours)		
Unit	Topics (Course contents)	
I	General Principles of Biological / Biochemical Analysis: - <ul style="list-style-type: none"> ● Concept of pH and buffers (biological importance in blood, saliva, etc.) ● Physiological solutions (normal saline, osmotic balance in cells) ● Biological variation (age, sex, environment and its forensic impact.) ● Structure of cell and its organelles (only essential functions) ● Cell and tissue culture (forensic applications like DNA study) 	15
II	<ul style="list-style-type: none"> ● Carbohydrates: Types (mono-, di-, polysaccharides), Role in body and forensic relevance (energy markers, decomposition) ● Proteins: Structure (primary to quaternary); Functions (enzymes, antibodies), Forensic importance (blood proteins, species identification) ● Lipids: Types (fats, phospholipids, steroids), Biological role, Forensic significance (adipocere formation, decomposition changes) ● Nucleic Acids: DNA & RNA structure, Difference between DNA and RNA, Importance in forensic identification. 	15



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III	<p style="text-align: center;">Molecular Biology</p> <ul style="list-style-type: none"> ● (a) DNA Replication: Basic steps (initiation, elongation, termination), Importance in DNA profiling ● (b) Transcription: DNA → RNA process ● (c) Translation: RNA → Protein ● Gene Regulation & Mutations: What is gene regulation (on/off concept), Types of mutations (point, insertion, deletion), Forensic relevance (genetic variation, identification errors) 	15
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IV	<ul style="list-style-type: none"> ● Enzymes in Forensic Science: Definition and properties, Enzyme kinetics, Enzyme inhibition (poisons, toxins relevance), Regulation of enzymes, Isoenzymes (e.g., LDH, CK – tissue identification), Enzyme polymorphism (used in forensic individualization) ● Epigenetics in Forensic Science: Concept, DNA methylation and its role, Applications: Age estimation, Tissue identification, Lifestyle clues (smoking, environment) 	15
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PART-C: Learning Resources

Text Books, Reference Books and Others

Text Books Recommended-

1. Lehninger Principles of Biochemistry – David L. Nelson & Michael M. Cox
2. Harper's Illustrated Biochemistry – Robert K. Murray et al.
3. Molecular Biology of the Gene – James D. Watson et al.
4. Biochemistry – Donald Voet & Judith Voet

PART -D: Assessment and Evaluation

Suggested Continuous Evaluation Methods: Maximum Marks: 100 Marks

Continuous Internal Assessment (CIA): 30 Marks

Marks End Semester Exam (ESE): 70 Marks

Continuous Internal Assessment (CIA): 30 (By Course Teacher)	Internal Test/Quiz:20+20 Assignment/ Semenar-10 Total Marks-30	Better marks out of the two Tot Quiz + obtained marks in Assignment shall be considered against 15 Marks
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End Semester Exam (ESE):70	Three sections (A,B &C) Section A : Objective (10*1=10 Marks) Section B: Short answer type (5*4=20 Marks) Section C : Descriptive answer type qts 1 out of 2frm each- (4*10=40 Marks)
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TWO -YEAR POSTGRADUATE PROGRAMME FACULTY OF FORENSIC SCIENCE (2025-2027) COURSE STRUCTURE SEMESTER - II

PART-A: Introduction		
Program: (Certificate/Diploma/Degree Honors)	M.Sc. Forensic Science	Session: 2025-2027
Course Code	MSFS203	
Course Title	Forensic Botany And Entomology	
Course Type	Discipline Specific Course (DSC)	
Pre-requisite(if any)	As per programme	
Course Learning Outcomes (CLO)	<ol style="list-style-type: none"> 1. Identify and compare botanical evidence (wood, seeds, leaves, diatoms) for forensic purposes. 2. Explain the role of diatoms and planktons in drowning investigations and apply isolation techniques. 3. Recognize, document, and evaluate biological and botanical evidence and DNA sources at crime scenes. 4. Analyze entomological evidence, insect succession, and life cycles to estimate postmortem interval (PMI). 	
Credit Value	4 Credits	Credit =60 Hours-learning & Observation
Total Marks	Max. Marks: =100	Min Passing Marks: 40
PART -B: Content of the Course		
Total No. of Teaching-learning Periods (01 Hr. per period) -60 Periods (60 Hours)		
Unit	Topics (Course contents)	
I	Forensic Botany:- Various types of wood, timber varieties, seeds and leaves – their identification and matching, Diatoms – Types morphology, methods of isolation from different tissue and forensic importance of planktons- especially diatom, forensic significance drowning.	15
II	The use of biological and botanical evidence in criminal investigation. Introduction, physical evidence & crime scene sources of biological & botanical evidences, documentation of biological & botanical evidences. Evidence recognition. Sources of DNA.	15
III	Forensic Entomology: General Entomology significance of terrestrial and aquatic insects in forensic investigations and their role in crime detection. Insect’s succession and its relationship to determine time since. Impact of ecological factors on insect’s developments.	15
IV	The life cycles of flies & beetles, Life stages of fly & beetles, the influence of the environment on specific insect species. Succession of insect species on the corpse and its role in post mortem estimation.	15



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PART-C: Learning Resources

Text Books, Reference Books and Others
Text Books Recommended-

1. Forensic Biology – Richard Li
2. Forensic Science Handbook – Richard Saferstein (Ed.)
3. Forensic Diatomology and Drowning – Yadav et al
4. Forensic Entomology – David Gennard
5. Forensic Plant Science – H. Coyle (Ed.)

PART -D: Assessment and Evaluation

Suggested Continuous Evaluation Methods: Maximum Marks: 100 Marks

Continuous Internal Assessment (CIA): 30 Marks

Marks End Semester Exam (ESE): 70 Marks

**Continuous Internal Assessment (CIA):
30 (By Course Teacher)**

**Internal Test/Quiz:20+20
Assignment/ Semenar-10
Total Marks-30**

**Better marks out of the two
Tot Quiz + obtained marks in
Assignment shall be
considered against 15 Marks**

**End Semester
Exam (ESE):70**

Three sections (A,B &C)

Section A : Objective

(10*1=10 Marks)

Section B: Short answer type

(5*4=20 Marks)

**Section C : Descriptive answer type qts 1 out of 2 from each- (4*10=40
Marks)**

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TWO -YEAR POSTGRADUATE PROGRAMME FACULTY OF FORENSIC SCIENCE (2025-2027) COURSE STRUCTURE SEMESTER - II

PART-A: Introduction		
Program: (Certificate/Diploma/Degree Honors)	M.Sc. Forensic Science	Session: 2025-2027
Course Code	MSFS204	
Course Title	Ballistics	
Course Type	Discipline Specific Course (DSC)	
Pre-requisite(if any)	As per programme	
Course Learning Outcomes (CLO)	<ol style="list-style-type: none"> 1. Explain firearm types, components, firing mechanisms, rifling, recoil, and identification including improvised weapons. 2. Describe ammunition components, primers, propellants, bullets, and their performance characteristics. 3. Apply principles of internal and external ballistics to analyze projectile motion and trajectory. 4. Interpret terminal ballistic effects for forensic reconstruction of shooting incidents. 	
Credit Value	4 Credits	Credit =60 Hours-learning & Observation
Total Marks	Max. Marks: =100	Min Passing Marks: 40
PART -B: Content of the Course		
Total No. of Teaching-learning Periods (01 Hr. per period) -60 Periods (60 Hours)		
Unit	Topics (Course contents)	
I	History and background of firearms:- Classification and characteristics, various component of small arms, smooth bore and class characteristics, purpose of rifling, types of rifling and methods to produce rifling to produce rifling, trigger and firing mechanism, cartridge-firing mechanism, projectile velocity determination, theory of recoil, methods for measurement of recoil, techniques of dismantling / assembling of firearm, identification of origin, improvised / country-made / imitative firearm and their constructional features.	15
II	Ammunition: Introduction, classification and constructional features of different types of cartridges, types of primers and priming composition, propellants and their compositions, velocity and pressure characteristics under different conditions, various types of bullet and compositional aspects	15
III	Internal and External Ballistics:- Definition, ignition of propellants, shape and size of propellants, manner of burning, various factors affecting the internal ballistics: erosion, corrosion and gas cutting, equation of motion of projectile, principal problems of exterior ballistics, vacuum trajectory, effect of air resistance on trajectory, base drag, yaw, shape of projectile and stability, trajectory computation, ballistics coefficient and limiting velocity	15



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IV	Terminal Ballistics:- Effect of projectile on hitting the target: function of bullet shape, striking velocity, striking angle and nature of target, tumbling of bullets, effect of instability of bullet, effect of intermediate targets, influence of range	15
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PART-C: Learning Resources

Text Books, Reference Books and Others

Text Books Recommended-

1. Firearm and Toolmark Identification in India – B.R. Sharma
2. Modi A Textbook of Medical Jurisprudence and Toxicology – K.S. Narayan Reddy & O.P. Murty
3. Firearms and Toolmark Examination and Identification – Brian J. Heard
4. Forensic Ballistics in Court – R. Mathews
5. Forensic Science Handbook Volume II – Richard Saferstein (Ed.)

PART -D: Assessment and Evaluation

Suggested Continuous Evaluation Methods: Maximum Marks: 100 Marks

Continuous Internal Assessment (CIA): 30 Marks

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