

ROYAL SCHOOL OF LIFE SCIENCES (RSLSC)

Department of Forensic Science

Course Structure & Syllabus (Based on National Education Policy 2020)

For Undergraduate Programme

B.Sc. (H) IN FORENSIC SCIENCE (4 Years Single Major)

WEF AY 2025-26

STRUCTURE OF THE SYLLABUS FOR 4 YEAR UG PROGRAMME

SCHOOL NAME - Royal School of Life Sciences

DEPARTMENT NAME - Department of Forensic Science

PROGRAMME NAME - B.Sc. (H) Forensic Science

	1 st SEMESTER					
COMPONENT	COURSE CODE	COURSE TITLE	LEVEL	CREDIT	L-T-P	
Major (Core)	FSC142M101	Introduction to Forensic Science	100	2	2-0-0	
Major (Core)	FSC142M112	Introduction to Forensic Science (Practical)	100	1	0-0-2	
Major (Core)	FSC142M103	Crime & Society	100	3	2-1-0	
Minor	FSC142N101	Basic Forensic Biology	100	3	3-0-0	
Interdisciplinary (IDC)	IKS992K101	Introduction to Indian Knowledge System - I	100	3	3-0-0	
Ability Enhancement course (AEC)	CEN982A101	Communicative English - I	100	1	1-0-0	
Ability Enhancement course (AEC)	BHS982A102	Behavioral Science - I	100	1	1-0-0	
Skill Enhancement Course (SEC)	FSC142S101	Forensic Photography and Documentation	100	3	2-1-0	
Value Added Course (VAC)	VAC - I	One Course from a Basket of Available Courses to be Selected	100	3		
MOOCs	MOOCs - I	*MOOCs/online courses will be identified by the department from the list of courses available on the MOOCs online platform/SWAYAM portal	100	3		
TOTAL CREDIT FOR 1 st SEMESTER 23						
2 nd SEMESTER						
COMPONENT	COMPONENTCOURSE CODECOURSE TITLELEVELCREDITL-T-P					

Major (Core)	FSC142M201	Criminal Law	100	3	2-1-0
Major (Core)	FSC142M202	Basics of Forensic Chemistry	100	2	2-0-0
Major (Core)	FSC142M213	Basics of Forensic Chemistry (Practical)	100	1	0-0-2
Minor	FSC142N201	Cyber Forensics	100	3	3-0-0
IDC	IKS992K201	Introduction to Indian Knowledge System - II	100	3	3-0-0
AEC	CEN982A201	Communicative English - II	100	1	1-0-0
AEC	BHS982A202	Behavioral Science - II	100	1	1-0-0
SEC	FSC142S201	Handwriting Identification and Recognition	100	2	2-0-0
SEC	FSC142S212	Handwriting Identification and Recognition (Practical)	100	1	0-0-2
VAC		One Course from a Basket of Available Courses to be Selected	100	3	
MOOCs	MOOCs - II	*MOOCs/online courses will be identified by the department from the list of courses available on the MOOCs online platform/SWAYAM portal	100	3	
TOTAL CREDIT	FOR 2 nd SEMESTE	R		23	
		3rd SEMESTER			
COMPONENT	COURSE CODE	COURSE TITLE	LEVEL	CREDIT	L-T-P
Major (Core)	FSC142M301	Forensic Dermatoglyphics	200	3	2-1-0
Major (Core)	FSC142M312	Forensic Dermatoglyphics (Practical)	200	1	0-0-2
Major (Core)	FSC142M303	Forensic Physics	200	3	2-1-0
Major (Core)	FSC142M314	Forensic Physics (Practical)	200	1	0-0-2
Minor	FSC142N301	Crime Scene Investigation	200	4	4-0-0

Fundamentals of

Forensic Science

IDC

FSC142I301

3-0-0

200

3

AEC	CEN982A301	Communicative English - III	200	1	1-0-0
AEC	BHS982A302	Behavioral Science - III	200	1	1-0-0
SEC	FSC142S301	Introduction to Digital	200	3	2-1-0
		Forensics			
MOOCs	MOOCs - III	*MOOCs/online courses	100	3	
		will be identified by the			
		department from the list			
		of courses available on			
		the MOOCs online			
		platform/SWAYAW			
TOTAL OPEDIT	FOD 3rd SEMESTEI			23	
IOTAL CREDIT	FOR 5 SEIVIESTEI	N		23	
		4 th SEMESTER			
	COUDSE				
COMPONENT	CODE	COURSE TITLE	LEVEL	CREDIT	L-T-P
Major (Core)	FSC142M401	Forensic Psychology	200	4	3-1-0
Major (Core)	FSC142M402	Analytical Methods-I	200	4	3-1-0
Major (Core)	FSC142M403	Forensic Anthropology	200	3	2-1-0
Maion (Cono)		Earangia Anthropology	200	1	0.0.1
Major (Core)	FSC142M414	and Odontology	200	1	0-0-1
		(Practical)			
Minor	FSC142N401	Technical Methods	200	3	3-0-0
Minor	ESC142N402	Accident Investigation-	200	3	3-0-0
	1501121(102	Motor Vehicles	200	5	500
AEC	CEN982A401	Communicative English	200	1	1-0-0
AEC	BHS982A402	Behavioral Science - IV	200	1	1-0-0
MOOCs	MOOCs - IV	*MOOCs/online courses	100	3	
		will be identified by the			
		department from the list			
		of courses available on			
		the MOOCs online			
		platform/SWAYAM			
TOTAL ODEDITI	EOD 4th SEMESTEI	portal portal		22	
IUIAL CREDII	FUR 4 SEMIESTEI	N		23	
		5 th SEMESTER			
COMPONENT	COURSE	COURSE TITLE	LEVEL	CREDIT	L-T-P
	CODE				
Major (Core)	FSC142M501	Forensic Toxicology	300	3	2-1-0
Major (Core)	FSC142M502	Forensic Biology	300	3	2-1-0

Major (Core)	FSC142M503	Questioned Document	300	3	2-1-0
Major (Core)	FSC142M514	Forensic Toxicology (Practical)	300	3	0-0-6
Minor	FSC142N501	Biometrics And Emerging Techniques	300	4	4-0-0
Internship	FSC142M525	Internship / Research Project	300	4	0-0-8
TOTAL CREDIT	20				
		6 th SEMESTER			
COMPONENT	COUDSE		TEVET	CDEDIT	TTD
COMPONENT	COURSE	COURSE IIILE	LEVEL	CREDII	L-1-P
Major (Core)	FSC142M601	Analytical Methods-II	300	4	3-1-0
Major (Core)	FSC142M602	Forensic Ballistics	300	3	2-1-0
Major (Core)	FSC142M603	Molecular Forensics	300	3	2-1-0
Major (Core)	FSC142M604	Forensic Medicine and Medical Jurisprudence	300	3	2-1-0
Major (Core)	FSC142M615	Molecular Forensics (Practical)	300	3	0-0-6
Minor	FSC142N601	Forensic Linguistics	300	4	4-0-0
TOTAL CREDIT	FOR 6 th SEMESTE	R		20	
		7th CEMIECTED			
	COUDCE			CDEDIE	
COMPONENT	COURSE CODE	COURSE TITLE	LEVEL	CREDIT	L-T-P
Major (Core)	FSC142M741	Forensic Entomology	400	4	2-1-2
Major (Core)	FSC142M742	Forensic Serology	400	4	2-1-2
Major (Core)	FSC142M703	Biometrics and Emerging Techniques	400	4	3-1-0
Major (Core)	FSC142M714	Forensic Entomology and Serology (Practical	400	4	0-0-8
Minor	FSC142N701	Forensic Data Analysis and Interpretation	400	4	4-0-0
TOTAL CREDIT	FOR 7 th SEMESTEI	R		20	
		8 th SEMESTER			
COMPONENT	COURSE CODE	COURSE TITLE	LEVEL	CREDIT	L-T-P
Major (Core)	FSC142M841	Advanced Tools and	400	4	2-1-2

Technique in Forensic

Research Methodology

Research Project

Dissertation

400

400

4

12

20

Science

FSC142N801

FSC142M822

TOTAL CREDIT FOR 8th SEMESTER

Minor

Project / Dissertation

4-0-0

0-0-24

Detailed Syllabus

Paper Sl. No.	Paper - 1	Scheme of Evaluation	T&P
Name of the Course	Introduction to Forensic Science	L-T-P-C	2-0-0-2
Type of Course	Major/Core	Credits Assigned	2
Paper Code	FSC142M101	Level of the Course	100

SEMESTER – I

Pre-requisite: Basic knowledge of biology, chemistry, physics (up to class 12), political science and history (up to class 10)

Course objective: To introduce and learn the basic concepts forensic science and its history, and to develop an idea about its organizational structure and functions and its components in India.

Course Outcome: After successful completion of the course, student will be able to				
Sl.No.	Course Outcome	Blooms Taxonomy Level		
CO1	define the concept of forensic science, learn the history, its scope, and applications.	BT1		
CO2	understand the various organizations of forensic laboratory and agencies involved in crime detection and investigation	BT2		
CO3	construct the knowledge of tools and technique related to forensic science.	BT3		
CO4	categorize the different components and its importance in knowing the subject	BT4		

Module	Course content	Lectures
I	Concepts in forensic science: Definition and scope of forensic science; Functions of Forensic Science; Evidence; classification of evidence: according to Indian Evidence Act, based on nature of evidence, class and individual evidence; Principles of forensic science; Frye Rule; Daubert Standards; Terminologies in forensic science: First responder, chain of custody, mahazaar, FIR and its types.	11
п	History and development of Forensic Science: Historical aspects of forensic science; Definitions and concepts in forensic science; Branches of Forensic Science, History and development of police Administration in India.	11

Module	Course content	Lectures
ш	Organizational set up of Forensic Science Laboratories in India: Hierarchical set up of Central Forensic Science Laboratories, State Forensic Science Laboratories, Fingerprint Bureaus, National Crime Records Bureau, Police & Detective Training Schools, Bureau of Police Research & Development, Directorate of Forensic Science and Mobile Crime Laboratories. Scene of Crime: Definition of scene of crime, Types of scenes of crime- Indoor, Outdoor and mobile; Protection and Preservation of scene of crime - Videography, Photography, Sketching; Types of sketching, Searching methods and its types.	11
IV	Quality Assurance and Ethics in Forensic Science: Importance of quality assurance in forensic science; Laboratory accreditation and standards (e.g., ISO 17025), Ethical principles and codes of conduct in the forensic field ,. Overview of ethics in forensic science, Ethical considerations in testifying as an expert witness	11
	Total	44

National Credit Hours for the course: 30 x 2 = 60 NCH

Distribution of Credits					
Lecture/ TutorialPracticumExperiential Learning					
44	0	16 Laboratory Visit, Field Trips, Group Work, Discussions, Presentations and Quiz			

Suggested Readings:

Textbooks:

1. Introduction to Forensic Sciences (2nd Edition). CRC Press. James, S. H., Nordby, J. J., Bell, S. (2014).

2. Forensic Science in Crime Investigation. Asia Law House. S Nath, R. C. (2013). Forensic Science and Crime Investigation: Abhijeet Publications.

Reference Books:

1. Saferstein, R. (2017). Criminalistics: An Introduction to Forensic Science. Pearson.

Paper Sl. No.	Paper - 2	Scheme of Evaluation	T&P
Name of the Course	Introduction to Forensic Science (P)	L-T-P-C	0-0-2-1
Type of Course	Major/Core	Credits Assigned	1
Paper Code	FSC142M112	Level of the Course	100

SEMESTER – I

Pre-requisite: Basic knowledge of biology, chemistry, physics (up to class 12), political science and history (up to class 10)

Course objective: To introduce and learn the basic concepts forensic science and its history, and to develop an idea about its organizational structure and functions and its components in India.

Course	Course Outcome: After successful completion of the course, student will be able to				
Sl.No.	Course Outcome	Blooms Taxonomy Level			
CO1	define the concept of forensic science, learn the history, its scope, and applications.	BT1			
CO2	understand the various organizations of forensic laboratory and agencies involved in crime detection and investigation	BT2			
CO3	construct the knowledge of tools and technique related to forensic science.	BT3			
CO4	categorize the different components and its importance in knowing the subject	BT4			

Module	List Of Practical	Hours
No.		
Ι	1. How to write an FIR and types of FIR.	3
	2. The use if searching methods for crime scene (outdoor and indoor	4
	SOC)	
II	3. Outdoor Crime scene Investigation (Accident)	4
	4. Indoor Crime scene Investigation (Murder)	4
III	5. Sketching and its types	3
	6. Collection, packing, labeling and forwarding of evidence.	3
IV	7. Introduction to Lab and Safety Protocols in Forensic Science	4
	Laboratory	5
	8. Preliminary Examination of unknown samples.	
	Total	30

Paper Sl. No.	Paper - 3	Scheme of Evaluation	Theory
Name of the Course	Crime and Society	L-T-P-C	2-1-0-3
Type of Course	Major/Core	Credits Assigned	3
Paper Code	FSC142M103	Level of the Course	100

SEMESTER – I

Course objective: The goal of the course is to help the students adopt the forensic professionalism philosophy. Students will learn about the importance of ethical issues in improving the criminal justice system. The ethical rules for researchers will help to raise the standard of study.

Course	Course Outcome : After successful completion of the course, student will be able to			
Sl.No.	Course Outcome	Blooms Taxonomy		
		Level		
CO1	define the importance of criminology and penology for crime	BT1		
	detection.			
CO2	understand the usage of the acts and laws pertaining to	BT2		
	forensic science.			
CO3	apply knowledge about theoretical perspectives on crime.	BT3		
CO4	will be able to understand the relationship of crime and	BT4		
	society.			

Module	Course content	Lecture
Ι	 Introduction to Sociology of crime: Definition and characteristics of crime in modern society, Causes of crime (social, economic, political, cultural, biological, atmospheric, geographical and other). Classification of crime and offences. Types of crime and its causes: Property crimes, public order crimes, violent crimes, cyber crimes, juvenile delinquency, Society-Criminal interaction and various types of crimes in India. 	15
п	Basics of Criminology: Theories of criminal behavior-classical, positivist, sociological. Criminal anthropology. Criminal profiling. Understanding modus operandi. Investigative strategy. Role of media.	15
Ш	Crime: Hate crimes, organized crimes and public disorder, domestic violence and workplace violence; Sexual offence, Dowry and Dowry Death, White collar crimes, Juvenile delinquency. Social change and crime. Psychological Disorders and Criminality. Situational crime	15

IV	Criminal Justice System: Broad components of criminal justice system. Policing styles and principles. Police's power of investigation. Filing of criminal charges. Community policing. Policing a heterogeneous society. Correctional measures and rehabilitation of offenders. Human rights and criminal justice system in India; Punishment and its types, Prison and its types.	15
Total		60

National Credit Hours for the course: 30 x 3 = 90 NCH

Distribution of Credits			
Lecture/ TutorialPracticumExperiential Learning			
60	0	30 Laboratory Visit, Field Trips, Group Work, Discussions, Presentations and Quiz Doing case studies, assignments, quiz and brain storming sessions	

Text Books:

1. Banshi Dhar Dwivedi; 'A - Z Criminology' Centrum Press, New Delhi, 2009

2. Chokalingam.K; Criminology (Tamil) Parvathi Printers, Chennai.

3. Amodh K.Kanth; Juvenile Justice: The Indian Context and Prayas Experiment 'Kumarappa Rockless Award Lecuture, Annyak Conference of the Indian Society of Criminology', Chennai-2002.

SEMESTER – I

Paper Sl. No.	Paper - 4	Scheme of Evaluation	Theory
Name of the Course	Basic Forensic Biology	L-T-P-C	3-0-0-3
Type of Course	Minor	Credits Assigned	3
Paper Code	FSC142N101	Level of the Course	100

Course objective: The objective of this subject is to enable the students to develop the knowledge of basics of biology and its application.

Course Outcome : After successful completion of the course, student will be able to			
Sl.No.	Course Outcome	Blooms	
		Taxonomy Level	
CO1	define the basics of biology and its uses in forensic	BT1	
	science		
CO2	explain the differences between plant, animal and	BT2	
	microbes		
CO3	experiment with various specimens and study them in	BT3	
	detail.		
CO4	analyze and apply the concept of genetics and	BT4	
	inheritance in different living organisms		

Module	Course content	Lecture
Ι	Plant and Animal Biology: Cell: Organelles and their Functions, Difference between Eukaryotic and Prokaryotic Cell, Difference between Plant and Animal Cell. Cell Division: Definition, Meiosis and Mitosis.Plants: Algae, Bryophyta, Pteridophyta and Gymnospermae; Animals: Non-chordates, chordates; Forensic aspects of Botany: Palynology and Limnology;	15
П	Human Biology: Elementary tissues of the body: epithelial, muscular; Definition and formation of skin. Layers of skin (over all anatomy), glands associated with skin; Organization of Organs and systems in the human body: Digestive, Circulatory, Respiratory, Excretory, skeletal.	15
Ш	Microbiology: Microbes; Bacteria: Classification; gram staining; diseases and prevention; Antibiotics; Virus: Classification; diseases and prevention; Fungi: Classification; diseases and prevention; Parasites: Classification; diseases and prevention; Beneficial microbes; Forensic aspects of Microbiology; Biological warfare.	15
IV	Genetics and Inheritance: Heredity and variation; Mendelian inheritance; Chromosomes and genes; Karyotyping: Banding techniques; DNA and RNA. Mt DNA: structure, types, Mutations-Polymorphism Significance in Forensic.	15
Total		60

National Credit Hours for the course: 30 x 3 = 90 NCH

Distribution of Credits			
Lecture/ Tutorial	Practicum	Experiential Learning	
60	0	30 Laboratory Visit, Field Trips, Group Work, Discussions, Presentations and Quiz	

Text Books:

1. Agarwal (2018). Modern textbook of Botany, Universal Publication. Ananthanarayanan (2017).

2. A textbook of Microbiology, The Orient Blackswan. Gennard, D. (2013).

3. Forensic entomology: an introduction. Wiley. Gunn. A (2006).

4. Essentials of Forensic Biology, Chichester: John Wiley & Sons, Ltd. Gunn, A. (2011).

4. Essential forensic biology. John Wiley & Sons. Pelczar. M, (2001). Microbiology, McGraw Hill Education.

Reference Books:

1. Saferstein, R (2004). Forensic Science Handbook; Vol; III; New Jersey; Prentice Hall.

2. Talwar. G. P (2002). Textbook of Biochemistry and Human Biology, Prentice Hall India Learning Private Limited.

3. Verma. P. S (2004). Cell Biology Genetics Molecular Biology Evolution and Ecology, S Chand.

Paper Sl. No.	Paper - 5	Scheme of Evaluation	T&P
Name of the Course	Forensic Photography and Documentation	L-T-P-C	2-0-2-3
Type of Course	Skill Enhancement Course	Credits Assigned	3
Paper Code	FSC142S101	Level of the Course	100

SEMESTER – I

Course objective: The objective of the course is to guide the students to enhance their hand skills with different photography techniques and documents.

Course Outcome : After successful completion of the course, student will be able to			
Sl.No.	Course Outcome	Blooms Taxonomy Level	
CO1	remember the basics of hand rendering techniques	BT1	
CO2	explain key terminologies technically used in the field of	BT2	
	photography.		
CO3	apply different techniques through different situation/ cases	BT3	
CO4	analyze different types of photographing techniques	BT4	

Module	Course content	Lectu
		re
Ι	Optics: Refraction and reflection, Total internal reflection, Lens	15
	combination, Interference, Polarization(introduction, Brewster's law,	
	polarizer and analyzer), Diffraction and its types.	
	Fiber optics(structure, classification, and application)	
Π	Introduction to camera and photography: Historical development of	15
	photography, significance and objective of utilizing photography in	
	law Enforcement and Crime Investigation. Types of Subject	
	Brightness. Basic terms, principles and concepts of photography.	
	Types of camera and components of camera with use.	
III	Sketching and photographing methods: Crime scene Photography,	15
	General Direction, over-all view, mid-range view, close-up view	
	photography. Crime Scene Sketching. Photographs admissible in court.	
IV	Document Photography: Basic Principles and techniques of black &	15
	white and color photograph. Specialized photography- UV, IR,	
	transmitted light and side light photography, contact Photography,	
	Microphotography, Photomicrography. Digital watermarking and	
	digital imaging	
	Total	60

National Credit Hours for the course: 30 x 3 = 90 NCH

Distribution of Credits			
Lecture/ TutorialPracticumExperiential Learning			
60	00	30 Laboratory Visit, Field Trips, Group Work, Discussions, Presentations and Quiz	

Suggested Readings:

- 1) FORENSIC PHOTOGRAPHY PRACTITIONER'S GUIDE: A PRACTITIONER'S GUIDE
- Weiss, S. (2022). Handbook of Forensic Photography (1st ed.). CRC Press. https://doi.org/10.4324/9781003047964

SEMESTER – II

Paper Sl. No.	Paper - 1	Scheme of	Theory
_	_	Evaluation	Theory
Name of the Course	Criminal Law	L-T-P-C	3-0-0-3
Type of Course	Major/Core	Credits Assigned	3
Paper Code	FSC142M201	Level of the Course	100

Prerequisite: Basic knowledge of biology of class XII.

Course objective: To provide the students with the knowledge of important laws pertaining to forensic science and the criminal justice system.

Course Outcome : After successful completion of the course, student will be able to			
Sl.No.	Course Outcome	Blooms Taxonomy	
		Level	
CO1	remember the constitution and Indian acts	BT1	
CO2	understand laws related to forensic science	BT2	
CO3	apply these laws while practicing in the field/labs	BT3	
CO4	appraise the provisions of the Indian Penal Code with respect to the offences.	BT4	

Modules	Course content	Lecture
I	Law to Combat Crime I: Classification – civil, criminal cases. Essential elements of crime; Constitution and hierarchy of criminal courts. Definitions of- IPC, CrPC, IEA. Criminal Procedure Code(CrPC) Cognizable and non-cognizable offences. Bailable and non-bailable offences. Sentences which the court of Chief Judicial Magistrate may pass. Summary trials – Section 260(2). Judgements in abridged forms – Section 355.	15
П	Law to Combat Crime II: Indian Penal Code pertaining to offences against persons (life) – Sections 121A, 299, 300, 302, 304A, 304B, 307, 309, 319, 320, 324, 326, 351, 354, 359, 362. Sections 375 & 377 and their amendments. Indian Penal Code(IPC) pertaining to offence against property Sections – 378, 383, 390, 391, 405, 415, 420, 441, 463, 489A, 497, 499, 503, 511. Indian Evidence Act – Evidence and rules of relevancy in brief. Expert witness. Cross examination and re- examination of witnesses. Article 32, 45, 46, 47, 57, 58, 60, 73, 135,	15

	136, 137, 138, 141. Section 293 in the code of criminal procedure. Witness and its types.	
Ш	Constitution of India : Preamble, Fundamental Rights, Directive Principles of State Policy. – Articles 14, 15, 20, 21, 22, 51A. FIR, Panchnama, Inquest(Police and magistrate), Dying declaration, Dying deposition, Sub-poena(summons).	15
IV	Acts Pertaining to Socio-economic and Environmental Crimes: Narcotic, Drugs and Psychotropic Substances Act. Essential Commodity Act. Drugs and Cosmetics Act. Explosive Substances Act. Arms Act. Dowry Prohibition Act. Prevention of Food Adulteration Act. Prevention of Corruption Act. Wildlife Protection Act. I.T. Act. Environment Protection Act. Untouchability Offences Act	15
	Total	60

National Credit Hours for the course: 30 x 3 = 90 NCH

Distribution of Credits			
Lecture/ TutorialPracticumExperiential Learning			
60	0	30 Laboratory Visit, Field Trips, Group Work, Discussions, Presentations and Quiz	

Text Books:

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).

Reference Books:

1. 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).

Paper Sl. No.	Paper - 2	Scheme of	Theory
		Evaluation	Theory
Name of the Course	Basics of Forensic Chemistry	L-T-P-C	2-0-0-2
Type of Course	Major/Core	Credits Assigned	2
Paper Code	FSC142M202	Level of the Course	100

SEMESTER – II

Course objective: To introduce the students to the basic concepts of chemistry and forensic chemistry.

Course Outcome : After successful completion of the course, student will be able to			
Sl.No.	Sl.No. Course Outcome		
		Level	
CO1	remember the use of chemicals and chemistry.	BT1	
CO2	understand the use of chemistry in examination of	BT2	
	various evidences		
CO3	examining. the different petroleum products and	BT3	
	explosive Substances		
CO4	distinguishing the concept of alcoholic and non-	BT4	
	alcoholic beverages in solving various crimes/cases		

Modules	Course content	Lecture
Ι	Structure of atom : Quantum and wave mechanical approaches to the structure of atom, Periodic classification and Properties : (a)Mendeleev, Modern, Extended and long form. (b) Periodic properties: Atomic and ionic radii, crystal co-ordination no., Radius ratio, factors influencing magnitude of ionic radii. Periodic variations of atomic and ionic radii. Ionization energy, electron affinity and electro-negativity. : Structure of Organic Molecules : Electronic theory of bonding. Wave mechanical model of Atom and Chemical bonding. Atomic Orbital theory, Nature and types of Covalent bond. Hybridization. Electro negativity Polarity Resonance. Hydrogen bonding.	11
Π	 Petroleum and Petroleum Products: Introduction to Petroleum Products, Properties, Distillation and fractionation of petroleum. Commercial uses of different petroleum fractions. Analysis of petroleum products. Analysis of traces of petroleum products in forensic exhibits. Comparison of petroleum products. Adulteration of petroleum products. Phenolphthalein in trap case: Chemistry and Forensic examination of Phenolphthalein used in Bribe trap cases, and related legal issues. 	11
Ш	Analysis of beverages: Classification of beverages, Fermented and Distilled methods, Analysis of Beverages: Alcoholic and non-alcoholic beverages and their composition, Characteristics of Beer, wines and Whisky, Congeners in alcoholic beverages, Analysis of alcoholic beverages as per BIS and PFA Act. Distinction between licit and illicit liquors.	11
IV	Fire and Arson: Light and Flame, Chemistry of Fire, Combustion reaction, Fire Triangle, Fire Tetrahedron; Backdraft, Thermochemistry of Fire, Heat Capacity and Phase changes, Accelerants & types of accelerants, Combustible and Flammable liquids, Flash point, Fire point, Ignition point, Auto Ignition point, vapour density, vapour pressure, Fire extinguisher. Conditions for fire, Fire scene patterns. Location of point of ignition. Recognition of type of fire. Searching the fire scene.	11

Arson: Legal Definition, Arson motives, Degrees of Arson, Collection and preservation of arson evidence. Analysis of fire debris and ignitable liquid residue. Post-flashover burning. Scientific investigation and evaluation of clue materials. Information from smoke staining.	
Total	44

National Credit Hours for the course: 30 x 3 = 90 NCH

Distribution of Credits			
Lecture/ TutorialPracticumExperiential Learning			
60	0	30 Laboratory Visit, Experimenting, Group Work, Discussions, Presentations and Quiz	

Suggested Readings

- 1. Modi's (1988) Medical Jurisprudence & Toxicology, M. M. Trirathi Press Ltd. Allahabad,.
- 2. Saferstein, R (1982) Forensic Science Hand Book, Vol I, II and III, Pretince Hall, NI.
- 3. Saferstein, R (2000) Criminalistics.
- 4. DFS -Working Procedure Manual- Chemistry, Explosives
- 5. DFS Manuals of Forensic Chemistry and Narcotics.

SEMESTER – II

Paper Sl. No.	Paper - 3	Scheme of Evaluation	T&P
Name of the Course	Basics of Forensic Chemistry (P)	L-T-P-C	0-0-2-1
Type of Course	Major/Core	Credits Assigned	1
Paper Code	FSC142M213	Level of the Course	100

Course objective: To introduce the students to the basic concepts of chemistry and forensic chemistry.

Course Outcome : After successful completion of the course, student will be able to			
Sl.No.	Course Outcome	Blooms Taxonomy Level	
CO1	remembe r the use of chemicals and chemistry.	BT1	
CO2	understand the use of chemistry in examination of various evidences	BT2	
CO3	examining . the different petroleum products and explosive Substances	BT3	
CO4	distinguishing the concept of alcoholic and non-	BT4	

alcoholic beverages in solving various crimes/cases	
areonone beverages in solving various ennies/eases	

Module	List Of Practical	Hours
No.		
Ι	1. To study the boiling and melting points of different petroleum	4
	products.	4
	2. To identify the dyes present in Petroleum products using TLC.	
Π	3. Characterization and analysis of adulteration of Petroleum products.	4
	4. Identifying the bribe and trap cases with help of phenolphthalein	4
Ш	5. Learning the chemistry of fire	4
IV	6. Examination of ethanol.	5
	7. Examination of methanol.	5
	Total	30

SEMESTER – II

Paper Sl. No.	Paper - 4	Scheme of	ፐ ይ D
		Evaluation	Iar
Name of the Course	Cyber Forensics	L-T-P-C	2-1-0-3
Type of Course	Minor	Credits Assigned	3
Paper Code	FSC142N201	Level of the Course	100

Course objective: To enable learner to understand, explore and acquire a critical understanding about Cyber Law. To develop competencies for dealing with frauds and deceptions (Confidence Tricks, Scams) and other Cyber Crimes e.g., Child Pornography etc. that are taking place via the internet.

Course Outcome : After successful completion of the course, student will be able to			
Sl.No.	Sl.No. Course Outcome		
		Level	
CO1	remember the basics of computer science in	BT1	
	daily world		
CO2	understand the characteristics, properties,	BT2	
	potential of cyber space.		
CO3	develop the understanding of relationship	BT3	
	between forensic science and cyberspace and		
	illustrate the impact of it.		
CO4	analyze the in-depth knowledge of	BT4	
	Information Technology Act and Legal Frame		
	Work of Right To Privacy, Piracy, Data		
	Security and Data Protection		

Module	Course content	Lect
		ure
Ι	Introduction to the Course: The Development of Information and	15
	Communication Technology (ICT) and Social Change; Definition of	
	Cyber Crime and its Position in the Crime Typology; Key Concepts in	
	the Course, i.e. Information Technology, Information System,	
Π	Relation and Impact of the Development of ICT on the Emergence of	15
ш	Cyber Crime: Relation and Impact of the Development of e-Business	13
	and e-Commerce on the Emergence of Cyber Crime; Relation and	
	Impact of the Development of Hardware, Software, and Data	
	Resources on the Emergence of Cyber Crime; Relation and Impact of	
	the Development of Telecommunication, Network, and the Internet on	
	the Emergence of Cyber Crime	
III	Classification of computer crimes, computer virus and types, computer	15
	worms, Trojan Horse, trap door, super zapping, logic bomb, salami	
	Theories which Explain Cuber Crime: Computer Froud: Healting	
	Cyberpornography	
IV	Computer Forensics : Introduction Nature of digital evidence	15
1,	Sources of digital evidence. Retrieval and analysis of digital evidence.	10
	Computer security and its relationship to computer forensicsHate	
	Crimes and Cyberterrorism, Piracy, Cyberstalking, Privacy Violation,	
	and Identity Theft, Prevention of the Cyber Crime, Policing the Cyber	
	Crime,	
	Total	60

National Credit Hours for the course: 30 x 3 = 90 NCH

Distribution of Credits		
Lecture/ Tutorial	Practicum	Experiential Learning
60	00	30 Discussions, Presentations and Quiz

References:

1. Siegel, Larry J. (2016). Criminology: Theories, Patterns, and Typologies (12th Ed.). Cengage Learning.

- 2. Clough, Jonathan. (2010). Principles of Cybercrime. Cambridge University Press.
- 3. Yar, Majid. (2006). Cybercrime and Society. Sage Publications Ltd.

Paper Sl. No.	Paper - 5	Scheme of Evaluation	T&P
Name of the Course	Handwriting Identification And Recognition	L-T-P-C	2-0-0-2
Type of Course	Skill Enhancement Course	Credits Assigned	2
Paper Code	FSC142S201	Level of the Course	100

SEMESTER – II

Course objective: To impart the knowledge on the importance of examining questioned documents in crime cases, tools required for examination of questioned documents, the significance of comparing hand writing samples and understand the importance of detecting frauds and forgeries by analyzing questioned documents.

Course Outcome : After successful completion of the course, student will be able to			
Sl.No.	Course Outcome	Blooms	
		Taxonomy	
		Level	
CO1	learn the basic characteristics of handwriting recognition	BT1	
CO2	understand the characteristics, properties, physical and	BT2	
	visual potential of film and photography		
CO3	apply learnt concepts to their work and apply different BT3		
	steps followed in handwriting recognition		
CO4	analyze and apply the theoretical knowledge of	BT4	
	handwriting knowledge in questioned document		
	examination		

Module	Course content	Lecture
I	Handwriting identification: Basis of handwriting identification. Development of Individuality in Handwriting Comparison of Handwriting: Natural Variations, Characteristics of handwriting- scope and application. Class and individual characteristics. Arrangement, alignment, margin, slant, speed, pressure, spacing, line quality, embellishments, movement and pen lifts. Factors influencing handwriting- physical, mechanical, genetic and physiological.	15
П	 Handwriting Examination: Basis of handwriting comparison. Collection of handwriting samples. Forgery and its types and characteristics, identification and examination of forgeries, Counterfeiting. Examination of altered and erased documents. Tools used in handwriting examination. Decipherment of secret indented and charred documents: Preservation of documents, Examination of seal and other mechanical impressions, examination of sequence of intersecting of strokes. Standards for Comparison and Disguise etc. 	15

Ш	Handwriting Recognition: Basis of handwriting recognition. Off- line and on-line handwriting recognition. Steps involved in handwriting recognition- pre-processing, feature extraction and classification. Applications of handwriting recognition.	15
IV	Basic tools for examination of Documents: Application of Basic tools for the examination of Questioned document, Ultraviolet, Visible and Fluorescence Spectroscopy, Stereo-zoom Microscopy, Photomicrography, Microphotography. Video Spectral Comparator, Electrostatic Detection Apparatus.	15
	Total	60

National Credit Hours for the course: 30 x 3 = 90 NCH

Distribution of Credits		
Lecture/ Tutorial	Practicum	Experiential Learning
60	0	30 Discussions, Presentations and Quiz, Case Solving

TEXTBOOKS & REFERENCE BOOKS:

1. O. Hilton, Scientific Examination of Questioned Documents, CRC Press,

Boca Raton (1982).

2. A.A. Moenssens, J. Starrs, C.E. Henderson and F.E. Inbau, Scientific

Evidence in Civil and Criminal Cases, 4th Edition, Foundation Press, New York (1995).

3. Albert S. Osborn; Questioned Documents, 2nd Ed., Universal Law Pub., Delhi.

Paper Sl. No.	Paper - 6	Scheme of Evaluation	T&P
Name of the Course	Handwriting Identification And Recognition (P)	L-T-P-C	0-0-2-1
Type of Course	Skill Enhancement Course	Credits Assigned	1
Paper Code	FSC142S212	Level of the Course	100

Course objective: To impart the knowledge on the importance of examining questioned documents in crime cases, tools required for examination of questioned documents, the significance of comparing hand writing samples and understand the importance of detecting frauds and forgeries by analyzing questioned documents.

Course Out	Course Outcome : After successful completion of the course, student will be able to		
Sl.No.	Course Outcome	Blooms	
		Taxonomy	
		Level	
CO1	learn the basic characteristics of handwriting recognition	BT1	
CO2	understand the characteristics, properties, physical and	BT2	
	visual potential of film and photography		
CO3	apply learnt concepts to their work and apply different	BT3	
	steps followed in handwriting recognition		
CO4	analyze and apply the theoretical knowledge of	BT4	
	handwriting knowledge in questioned document examination		

Module	List Of Practical	Hours
No.		
Ι	1. Identification of Handwriting Individual Characteristics	3
	2. Comparison of handwritings.	3
	3. Study of natural variations and fundamental divergences in handwriting.	3
Π	4. Detection of Simulated forgery.	3
	5. Detection of traced forgery.	3
III	6. Decipherment of Secret handwriting	3
	7. Study of Disguise in handwriting.	3
IV	8. Case study 1	3
	9. Case study 2	3
	10. Case Study 3	3
	Total	30

SEMESTER – III

Paper Sl. No.	Paper - 1	Scheme of	T&D
		Evaluation	Iar
Name of the Course	Forensic Dermatoglyphics	L-T-P-C	3-0-0-3
Type of Course	Major/Core	Credits Assigned	3
Paper Code	FSC142M301	Level of the Course	200

Course objective: The objective of this course is to impart complete knowledge to students regarding the various aspects of Forensic dactyloscopy. The importance of development, collection, preservation fingerprints and as well as other impressions encountered at a crime scene.

Course Outcome : After successful completion of the course, student will be able to		
Sl.No.	Course Outcome	Blooms
		Taxonomy Level
CO1	define fingerprints and other prints.	BT1
CO2	understand the importance of collection and analysis of	BT2
	fingerprints and other prints.	
CO3	acquire knowledge of the development and collection	BT3
	methods of different variety of prints found at scene of	
	crime.	
CO4	analyse and compare the samples of different types of prints.	BT4

Modules	Course content	Lecture
		Hours
I	Basics of Fingerprinting : Introduction and with special reference to	15
	India. Biological basis of fingerprints. Formation of ridges.	
	Fundamental principles of fingerprinting, ridge counting, ridge	
	tracing, ridge characteristics.	
II	Fingerprint characteristics/ minutiae : Types of fingerprint pattern,	15
	characteristics/ minutiae of fingerprints, plain rolled fingerprints.	
	Classification of fingerprints- Henry's system, Secondary	
	classification, sub- secondary classification, final classification and	
	kev classification.	
III	Development of Fingerprints : sweat and its composition, types of	15
	fingerprints, development of fingerprints (physical and chemical).	
	Application of light sources in fingerprint detection. Preservation of	
	developed fingerprints. Modern methods of fingerprinting.	
	Automated Fingerprint Identification System.	
IV	Other prints/ impressions: Introduction to prints/ impressions.	15
	Importance of footprints. Gait pattern and gait pattern analysis.	
	Collection, tracing, lifting and casting of footprints, Palm prints, Lip	
	prints forensic examination of lip prints Ear prints and their	
	significance	
	Total	60

Distribution of Credits			
Lecture/ Tutorial	Practicum	Experiential Learning	
60	0	30 Laboratory Visit, Experimenting, Group Work, Discussions, Presentations and Quiz	

Notional Credit Hours for the course = 30 x 3 = 90

Suggested Readings

1.J.E. Cowger, Friction Ridge Skin, CRC Press, Boca Raton (1983).

2. D.A. Ashbaugh, Quantitative-Qualitative Friction Ridge Analysis, CRC Press, Boca

Raton (2000).

3. C. Champod, C. Lennard, P. Margot an M. Stoilovic, Fingerprints and other Ridge Skin

Impressions, CRC Press, Boca Raton (2004).

4. Lee and Gaensleen's, Advances in Fingerprint Technology, 3rd Edition, R.S.

Ramotowski (Ed.), CRC Press, Boca Raton (2013).

Paper Sl. No.	Paper - 2	Scheme of Evaluation	T&P
Name of the Course	Forensic Dermatoglyphics (P)	L-T-P-C	0-0-2-1
Type of Course	Major/Core	Credits Assigned	1
Paper Code	FSC142M312	Level of the Course	200

SEMESTER – III

Course objective: To introduce the students to the basic concepts of Forensic Dermatoglyphics and other prints importance.

Course Outcome : After successful completion of the course, student will be able to			
Sl.No.	Course Outcome	Blooms	
		Taxonomy Level	
CO1	define types of fingerprints	BT1	
CO2	understand the importance of collection, preservation	BT2	
	of fingerprints.		
CO3	identify different types of fingerprints prints based on	BT3	

	class and individual characteristics.	
CO4	analyse fingerprints and other prints such lip prints,	BT4
	footprints and ear prints.	

Module	Course content	Lecture Hours
Ι	 To record plain and rolled fingerprints To conduct Primary classification of fingerprint. To conduct physical methods of fingerprint detection (powder method) 	7
Π	 To conduct chemical methods of fingerprint detection Comparison of fingerprints by class and individual characteristics To use different light sources for enhancing developed fingerprints 	8
Ш	 To prepare cast of foot prints To prepare cast of shoe print Development and lifting of latent fingerprints using fluorescent powder on colourful surface 	7
IV	10. Collection and comparison of palm prints.11. Comparison and identification of lip prints.12. Case study on fingerprint identification.	8
Total	·	30

Notional Credit Hours for the course = 30 x 1 = 30

Distribution of Credits			
Lecture/ TutorialPracticumExperiential Learning			
0	30	0 Laboratory Visit, Experimenting,Group Work, Discussions, Presentations and Quiz	

SEMESTER – III

Paper Sl. No.	Paper - 3	Scheme of Evaluation	T&P
Name of the Course	Forensic Physics	L-T-P-C	3-0-0-3
Type of Course	Major/Core	Credits Assigned	3
Paper Code	FSC142M303	Level of the Course	200

Course objective: The course aims to provide the students with knowledge of types of glass and their composition. It aims to impart forensic aspects of fibre examination and examination of tool marks. It will help the students to better understand the physical evidence, its importance and application of different examination for various evidence.

Course Outcome : After successful completion of the course, student will be able to			
Sl.No.	Course Outcome	Blooms	
		Level	
CO1	define concept of Forensic Physics and its importance in	BT1	
	forensic science.		
CO2	compare various glass sample and its importance in	BT2	
	forensic science.		
CO3	apply various techniques used in examination of physical	BT3	
	evidence		
CO4	categorize and classify various tool marks and patterns.	BT4	

Modul e	Course content	Lecture
I	Glass: Composition of glass and types of glasses-soda-lime, boro- silicate, safety glass, laminated, light sensitive, tampered / toughened, wire glass, coloured glass. Matching and comparison of glass. Forensic examinations of glass fractures, rib marks, hackle marks, cone fracture, wavy, backward fragmentation, concentric and radial fractures.	14
п	Paint evidence: collection, packaging and preservation. Analysis by destructive and nondestructive methods. Importance of paint evidence in hit and run cases. Fiber evidence – artificial and man- made fibres. Collection of fiber evidence. Identification and comparison of fibres.	16
ш	 Soil: its types and composition of soil, sample preparation, removal of contaminants, colour, molecular particle size distribution, turbidity test, pH, microscopic examination. Fibers: artificial and man- made fibres. Collection of fibre evidence. Identification and comparison of fibres. 	15
IV	Tool marks: Types of tool marks compression marks, striated marks, combination of compression and striated marks, repeated marks, class characteristics and individual characteristics, tracing and lifting of marks. Collection, preservation and matching of tool marks.	15
	Total	60

Notional Credit Hours for the course = 30 x 3 = 90

Distribution of Credits				
Lecture/ TutorialPracticumExperiential Learning				
60	0	30 Discussions, Presentations and Quiz, Case Solving		

TEXTBOOKS & REFERENCE BOOKS:

1. Caddy, B; Forensic Examination of Glass and Paint Analysis and Interpretation, CRC Press, New York, 2001.

2. Shaw, D; Physics in the Prevention and Detection of Crime, Contem Phys.Vol.17, 1976.

3. Saferstein, R; Forensic Science Handbook. Vol.I,II, (Ed.), Prentice Hall, New Jersey, 1988.

4. Working Procedure Manual; Physics BPR&D Publication, 2000.

5. Sharma, B.R; Forensic Science in Criminal Investigation and Trials(3rdEd.), Universal Law Publishing Co., New Delhi, 2001.

Paper Sl. No.	Paper - 4	Scheme of Evaluation	T&P
Name of the Course	Forensic Physics (P)	L-T-P-C	0-0-2-1
Type of Course	Major/Core	Credits Assigned	1
Paper Code	FSC142M314	Level of the Course	200

SEMESTER - III

Course objective: It will help the students to better understand the physical evidence, its importance and application of different examination for various evidence.

Course Outcome : After successful completion of the course, student will be able to			
Sl.No.	Sl.No. Course Outcome Blooms		
		Taxonomy Level	
CO1	define concept of Forensic Physics and its importance	BT1	
	in forensic science.		
CO2	compare various glass sample and its importance in	BT2	

	forensic science.	
CO3	apply various techniques used in examination of physical evidence	BT3
CO4	categorize and classify various tool marks and patterns.	BT4

Module	Course content	Lecture Hours
I	 General comparison of soil. Density gradient analysis of soil sample. Comparison of identity of small glass pieces by flotation method. 	07
п	 Determination of refractive index of glass. Restoration of erased identification mark. Comparison of strings/ threads/ ropes. 	08
Ш	 Physical and chemical analysis of paint samples. Comparison of tool marks. Comparison of paint chips under microscope. 	07
IV	10. Microscopic examination of various fibers.11. Physical matching of broken pieces of different object.12. Case study.	08
Total	·	30

Notional Credit Hours for the course = $30 \times 1 = 30$

Distribution of Credits			
Lecture/ TutorialPracticumExperiential Learning			
0	30	0 Laboratory Visit, Experimenting, Group Work, Discussions, Presentations and Quiz	

SEMESTER – III

Paper Sl. No.	Paper - 5	Scheme of	T&P
	Taper - 5	Scheme of	101

		Evaluation	
Name of the Course	Crime Scene Investigation	L-T-P-C	4-0-0-4
Type of Course	Minor	Credits Assigned	4
Paper Code	FSC142N301	Level of the Course	200

Course objective: To enable learner to understand, explore and acquire a critical understanding about the methods of securing, searching and documenting crime scenes. The art of collecting, packaging, and preserving different types of physical and trace evidence at crime scenes. The legal importance of chain of custody. The tools and techniques for analysis of different types of crime scene evidence.

Course Outcome : After successful completion of the course, student will be able to			
Sl.No.	Course Outcome	Blooms Taxonomy	
		Level	
CO1	define and classify the crime scene and	BT1	
	types.		
CO2	understand the principle/ laws of forensic	BT2	
	science.		
CO3	identify different types of evidences like	BT3	
	physical and trace evidence.		
CO4	analyse the nature, collection and	BT4	
	preservation of physical evidences		

Module	Course content	Lecture
Ι	Types of crime scenes: definition of crime scene, indoor and	23
	outdoor. Securing and isolating the crime scene. Crime scene	
	search methods. Safety measures at crime scenes. Legal	
	considerations at crime scenes. Documentation of crime scenes,	
	Duties of first responders at crime scenes	
II	Crime scene evidences: Classification of crime scene evidence,	22
	physical and trace evidence, Locard principle. Collection,	
	labelling, sealing of evidence. Hazardous evidence. Preservation	
	of evidence. Chain of custody. Reconstruction of crime scene.	
III	Physical evidences: Glass evidence, Matching of glass samples	22
	by mechanical fit and refractive index measurements, Paint	
	evidence, collection, packaging and preservation, Importance of	
	paint evidence in hit and run cases, Cloth evidence, comparison of	
	cloth samples.	
IV	Trace evidences- Fibre evidence, Identification and comparison	23
	of fibres. Soil evidence, collection and comparison of soil	
	samples. Hair evidence, Tool mark evidence. Classification of tool	
	marks. Forensic importance of tool marks.	
	Total	90

Notional Credit Hours for the course = 30 x 4 = 120

Distribution of Credits		
Lecture/ Tutorial	Practicum	Experiential Learning
90	0	30 Discussions, Presentations and Quiz, Case Solving

TEXTBOOKS & REFERENCE BOOKS:

1. Sharma, B.R.: Forensic Science in Criminal Investigation and Trials, Central Law Agency, Allahabad, 1974.

2. Saferstein: Forensic Science Handbook, Vol I, II & III, Prentice Hall Inc. USA.

3. Saferstein: Criminalistics, 1976, Prentice Hall Inc. USA.

4. Siegel, J. A., Saukko, P. J. And Knupfer, G.C., Encyclopedia of Forensic Sciences, Academic Publishers, London.

Paper Sl. No.	Paper - 6	Scheme of Evaluation	T&P
Name of the Course	Introduction to Digital Forensics	L-T-P-C	3-0-0-3
Type of Course	Skill Enhancement Course	Credits Assigned	3
Paper Code	FSC142S301	Level of the Course	200

SEMESTER – III

Course objective: After studying this paper, students will know the fundamental and forensic examinations of digital evidence. The legal and privacy issues of digital evidence, the tools of cyber forensics and the types of cybercrime.

Course Outcome : After successful completion of the course, student will be able to		
Sl.No.	Course Outcome	Blooms
		Level

CO1	learn the basic digital forensics.	BT1
CO2	understand the characteristics The cases which fall under	BT2
	the purview of digital crimes.	
CO3	apply learnt concepts to their work and apply different	BT3
	steps followed in handwriting recognition	
CO4	analyze and apply the theoretical knowledge of	BT4
	handwriting knowledge in questioned document	
	examination	

Modulo	Module Course content	
		Hours
I	Fundamentals and Concepts: Fundamentals of computers Hardware and accessories. Memory and processor. Methods of storing data. Operating system. Software. Introduction to network, LAN, WAN and MAN.	15
п	Digital Forensic I: Cyber Crime and digital evidence, types of cybercrimes, digital evidence, nature of digital Evidence, precautions while dealing with digital Evidence. Introduction to Cyber forensic, Cyber forensic investigation process.	16
ш	Computer Crimes: Definition and types of computer crimes. Distinction between computer crimes and conventional crimes. Reasons for commission of computer crimes. Breaching security and operation of digital systems. Computer virus, and computer worms – Trojan horse, trap door, super zapping, logic bombs. Types of computer crimes.	14
IV	Computer Forensics Investigations: Seizure of suspected computer. Preparation required prior to seizure. Protocol to be taken at the scene. Extraction of information from the hard disk. Treatment of exhibits.	15
	Total	60

Notional Credit Hours for the course = $30 \times 3 = 90$

Distribution of Credits			
Lecture/ TutorialPracticumExperiential Learning			
60	0	30 Discussions, Presentations and Quiz, Case Solving	

TEXTBOOKS & REFERENCE BOOKS:

1. R.K. Tiwari, P.K. Sastry and K.V. Ravikumar, Computer Crimes and Computer Forensics, Select Publishers, New Delhi (2003).

- 2. C.B. Leshin, Internet Investigations in Criminal Justice, Prentice Hall, New Jersey (1997).
- 3. R. Saferstein, Criminalistics, 8th Edition, Prentice Hall, New Jersey (2004).
- 4. E. Casey, Digital Evidence and Computer Crime, Academic Press, London (2000).

SEMESTER – IV

Paper Sl. No.	Paper - 1	Scheme of	Τ&D	
		Evaluation	IAF	
Name of the Course	Forensic Psychology	L-T-P-C	4-0-0-4	
Type of Course	Major/Core	Credits Assigned	4	
Paper Code	FSC142M401	Level of the Course	200	

Course objective: The objective of this course is to impart knowledge about forensic psychology and its applications. The legal aspects of forensic psychology, its significance of criminal profiling, and the importance of psychological assessment in gauging criminal behavior.

Course Outcome : After successful completion of the course, student will be able to		
Sl.No.	Course Outcome	Blooms
		Taxonomy
		Level
CO1	define psychology, nature, and its goals.	BT1
CO2	understand the importance of sensation, adaptation, gestalt	BT2
	principle.	
CO3	acquire knowledge of tools of deceptions.	BT3
CO4	analyse and compare the classification of psychiatric disorders	BT4

Modules	Course content	Lecture
Ι	Basics of forensic psychology: Define forensic psychology, nature,	22
	definition and its goals, History of Psychology, branches of	
	psychology, early schools of psychology, current psychological	
	perspective- biological, psychodynamic, benavioristic, numanistic,	
	methods in psychology- Naturalistic Observation. Experimental.	
	Case Studies and Survey. Careers, qualification and professional	
	specialties in psychology.	
П	Basic psychological process: Sensation- selection, sensory	23
	adaptation, analysis and coding. Perception- sensing, perceiving,	
	classifying, gestalt principles. Neurons -structure and function,	
	synapse, and neurotransmitters, Neuron and Nerves; Building the	
	Network, Central Nervous System and Peripheral Nervous System,	
	The Brain-structure and function, Glandular system.	
III	Psychological disorders: Classification of psychiatric disorders-	22
	Common Psychiatric Disorders- Schizophrenia, Bipolar Disorders,	
	Anxiety Disorders, Phobia, Personality Disorder, Attention Deficit	
	Hyperactive Disorder, Psychology of Serial murderers, terrorism	
IV	Detection and deception: Tools of detection- interviews, non-	23
	verbal detection, statement analysis, voice stress analyzer,	
	hypnosis. Polygraphy, its ethical and legal aspects. Narco analysis	
	and Brain Fingerprinting – principle and theory, ethical and legal	
	issues. Brain electrical oscillation signatures- principle, technique	

and legal aspects.	
Total	90

Notional Credit Hours for this course: 30 x 4 = 120

Distribution of Credits				
Lecture/ TutorialPracticumExperiential Learning				
90	0	30 Laboratory Visit, Experimenting, Group Work, Discussions, Presentations and Quiz		

Suggested Readings

1. 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).

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)

SEMESTER – IV

Paper Sl. No.	Paper - 2	Scheme of Evaluation	T&P
Name of the Course	Analytical Methods-I	L-T-P-C	4-0-0-4
Type of Course	Major/Core	Credits Assigned	4
Paper Code	FSC142M402	Level of the Course	200

Course objective: The objective of this course is to impart knowledge about various tools and techniques used in forensic science.

Course Outcome : After successful completion of the course, student will be able to				
Sl.No.	Course Outcome	Blooms Taxonomy Level		
CO1	define the importance of microscope in the field of forensic science.	BT1		
CO2	understand the working principle of spectrophotometer.	BT2		
CO3	acquire knowledge about various chromatographic techniques.	BT3		
CO4	analysis using the x-ray based techniques in forensic science. and compare the classification of psychiatric disorders	BT4		

Modules	Course content	Lecture
Ι	Microscopy: Microscope - History, Components of Microscope,	22
	Types of Microscope: Single Lens (Simple) Microscope,	
	Compound Microscope, Light Microscope.	
п	Spectroscopy : Spectrophotometer - Principle, Instrumentation, Beer-Lambert's Law, Applications, UV-Visible Spectroscopy, Applications, Infrared Spectroscopy, Applications, Limitations.	23
Ш	Chromatography: Chromatography - History, Principle, Components, Types of Chromatography: Paper Chromatography, Column Chromatography, Thin-Layer Chromatography.	22
IV	X-Ray and X-Ray based Techniques: X-Rays, X-Ray Diffraction (XRD) Analysis, Principle, Instrumentation, Working, Applications, Advantages and Disadvantages.	23
	Total	90

Notional Credit Hours for this course: 30 x 4 = 120

Distribution of Credits			
Lecture/ TutorialPracticumExperiential Learning			
90	0	30 Laboratory Visit, Experimenting, Group Work, Discussions, Presentations and Quiz	

Suggested Readings

1. D.A. Skoog, D.M. West and F.J. Holler, Fundamentals of Analytical Chemistry, 6th Edition, Saunders College Publishing, Fort Worth (1992).

2. W. Kemp, Organic Spectroscopy, 3rd Edition, Macmillan, Hampshire (1991).

3. J.W. Robinson, Undergraduate Instrumental Analysis, 5th Edition, Marcel Dekker, Inc., New York (1995).

4. D.R. Redsicker, The Practical Methodology of Forensic Photography, 2nd Edition, CRC Press, Boca Raton (2000).

Paper Sl. No.	Paper - 3	Scheme of Evaluation	T&P
Name of the Course	Forensic Anthropology and Odontology	L-T-P-C	3-0-0-3
Type of Course	Major/Core	Credits Assigned	3
Paper Code	FSC142M403	Level of the Course	200

SEMESTER - IV

Course objective: To impart the knowledge on the importance of examining human skeleton and non- human skeleton in crime cases, basic concept of stature identification, gender detection and odontological studies and its importance in bite mark identification.

Course Outcome : After successful completion of the course, student will be able to			
Sl.No.	Course Outcome	Blooms	
		Taxonomy	
		Level	
CO1	learn the basic characteristics of handwriting recognition	BT1	
CO2	understand the characteristics, properties, physical and	BT2	
	visual potential of film and photography		
CO3	apply learnt concepts to their work and apply different	BT3	
	steps followed in handwriting recognition		
CO4	analyze and apply the theoretical knowledge of	BT4	
	handwriting knowledge in questioned document		
	examination		

Module	Course content	
moutie		Hours
I	Forensic Anthropology: Definition, scope and objectives, nature, formation, and identification of human bones. Determination of age, sex, stature from skeletal material, Anatomy of different bones.	15
П	Somatoscopy: Introduction, Observation of various regions of body, scar marks and occupational marks, forensic significance in personal identification. Somatometry: Introduction, forensic significance in personal identification .Measurements of head, face, nose, cheek, ear, hand and foot, body weight, height.	15
ш	Facial reconstruction: Photographic Super Imposition, Video-Superimposition, Roentgen graphic Superimposition. Use of somatoscopic and craniometric methods in reconstruction.	15

IV	Forensic Odontology: Development and scope, role in mass disaster. Structural variation in teeth, types of teeth- functions, determination of age from teeth: eruption sequence, Gustafson's method, dental anomalies, their significance in personal identification.	15
	Total	60

Notional Credit Hours for this course: 30 x 3 = 90

Distribution of Credits				
Lecture/ TutorialPracticumExperiential Learning				
60	0	30 Discussions, Presentations and Quiz, Case Solving		

TEXTBOOKS & REFERENCE BOOKS:

1. Beals, R.L. and Hoijer, H. An Introduction to Anthropology. Macmillan, New York, 1965.

2. Biswas, G. (2021) Review of Forensic Medicine and Toxicology. Jaypee Brothers Medical Publishers.

3. Clement, J. G. and Ranson, D. L. (Eds.) Craniofacial Identification in Forensic Medicine, Oxford University Press, New York, 1998.

4. Comas, J. A Manual of Physical Anthropology. Charles C. Thomas, Springfield, 1960.

5. Cummins, H. and Midlo, C. Finger Prints, Palms and Soles: An Introduction to Dermatoglyphics. Blackiston Co., Philadelphia, 1944.

6. El-Najjar, M. Y. and McWilliams, K. R. Forensic Anthropology. Charles C. Thomas, 1978.

Paper Sl. No.	Paper - 4	Scheme of Evaluation	T&P
Name of the Course	Forensic Anthropology and Odontology (P)	L-T-P-C	0-0-2-1
Type of Course	Major	Credits Assigned	1
Paper Code	FSC142M414	Level of the Course	200

SEMESTER - IV

Course objective: To impart the knowledge on the importance of forensic anthropology in identification of persons, its different techniques of facial reconstruction and their forensic importance, and significance of somatoscopy and somatometry.

Course Outcome : After successful completion of the course, student will be able to			
Sl.No.	Course Outcome	Blooms	
		Taxonomy Level	
CO1	recall the basic concept of human skeleton.	BT1	
CO2	understand the concept of age determination.	BT2	
CO3	apply various methods and techniques in determining of various	BT3	
	age, sex, and gender.		
CO4	compare the human and non- human skeleton.	BT4	

Detailed syllabus:

Practical would be based on the theory syllabus and would broadly include the following:

Module	Course content	Lecture Hours
Ι	 Osteology: Human skeleton axial and appendicular skeleton. Determination of sex from skull and pelvis. Determination of age from skull sutures. 	7
п	4. Determination of age from dentition.5. To perform osteometric measurements on long bones and estimation of statures.6. To perform craniometric measurements on skull.	8
Ш	7. To perform somatometric measurement on living subject.8. To investigate the difference between animal and human bones.9. Demonstration of bone and dental pathology.	8
IV	10. Somatoscopy: Morphological observations of different body characters.11. Human and non-human bone case study.12. To conduct portrait parley using photo fit identification kit.	7
Total		30

Notional Credit Hours for this course: 30 x 1 = 30

Distribution of Credits		
Lecture/ Tutorial	Practicum	Experiential Learning
0	30	0 Discussions, Presentations and Quiz, Case Solving

SEMESTER – IV

Paper Sl. No.	Paper - 5	Scheme of Evaluation	T&P
Name of the Course	Technological Methods	L-T-P-C	3-0-0-3
Type of Course	Minor	Credits Assigned	3
Paper Code	FSC142N401	Level of the Course	200

Course objective: The objective of this course is to know about the principles and applications of various tools and techniques used in forensic science.

Course Outcome : After successful completion of the course, student will be able to			
Sl.No.	Course Outcome	Blooms Taxonomy	
		Level	
CO1	define the role that a microscope plays in the	BT1	
	discipline of forensic science.		
CO2	understand the working principle of different	BT2	
	spectroscopy techniques		
CO3	apply various chromatography techniques in forensic	BT3	
	science.		
CO4	analysis of the samples using the x-ray based	BT4	
	techniques in forensic science.		

Modules	Course content	Lecture
Ι	Microscopy: Microscope - History, Components of Microscope, Single Lens (Simple) Microscope, Compound Microscope, Fluorescence Microscope, Stereo Microscope, Comparison Microscope, Light Microscope.	15
Π	Spectroscopy : Spectrophotometer - Principle, Instrumentation, Beer- Lambert's Law, Applications, UV-Visible Spectroscopy, Applications, Infrared Spectroscopy, Applications, Limitations.	

Ш	Chromatography: Chromatography - History, Principle, Components, Paper Chromatography, Column Chromatography, Thin-Layer Chromatography.	15
IV	X-Ray and X-Ray based Techniques: X-Rays, X-Ray Diffraction (XRD) Analysis, Principle, Instrumentation, Working, Applications, Advantages and Disadvantages.	15
	Total	60

Notional Credit Hours for this course: 30 x 3 = 90

Distribution of Credits		
Lecture/ Tutorial	Practicum	Experiential Learning
60	0	30 Laboratory Visit, Experimenting, Group Work, Discussions, Presentations and Quiz

Suggested Readings

1. D.A. Skoog, D.M. West and F.J. Holler, Fundamentals of Analytical Chemistry, 6th Edition, Saunders College Publishing, Fort Worth (1992).

2. W. Kemp, Organic Spectroscopy, 3rd Edition, Macmillan, Hampshire (1991).

3. J.W. Robinson, Undergraduate Instrumental Analysis, 5th Edition, Marcel Dekker, Inc., New York (1995).

4. D.R. Redsicker, The Practical Methodology of Forensic Photography, 2nd Edition, CRC Press, Boca Raton (2000).

Paper Sl. No.	Paper - 6	Scheme of Evaluation	T&P
Name of the Course	Accident Investigation- Motor Vehicles	L-T-P-C	3-0-0-3
Type of Course	Minor	Credits Assigned	3
Paper Code	FSC142N402	Level of the Course	200

SEMESTER - IV

Course objective: The objective of this course is to study the significance of photographs in accident cases, the importance of physical and trace evidences, and the outcome of accidental analysis.

Course Outcome : After successful completion of the course, student will be able to		
Sl.No.	Course Outcome	Blooms
		Taxonomy Level

CO1	define the types of accidental injuries.	BT1
CO2	understand the importance of tire marks and skid marks BT2	
	in accident cases.	
CO3	acquire knowledge about Pre- and post-crash	BT3
	movements.	
CO4	analysis of tachograph charts.	BT4

Modules	Course content	Lecture
		Hours
Ι	Road Accidents: Importance of accident scene, Forensic	15
	information sources, Eyewitness - its importance, assessment of	
	vehicle damage, Visibility conditions, accident site photographs.	
Π	Surface Markings : Tire marks, skid marks, scuff marks etc, and	15
	their importance, abandoned vehicles, Importance of air bags in	
	vehicle accidents, Maintenance of vehicles, speed estimation,	
	Railway accidents and its analysis.	
III	Analysis of accidents: Pre- and post-crash movements, Collision	16
	model, Occupants's kinematics, Types of accidental injuries,	
	Biomechanics of injuries, investigations of Hit and run cases.	
	analysis trace evidence found at accident sites	
	analysis trace evidence found at accident sites.	
IV	Tachographs: tachograph dataits_forensicsignificance	14
	Tachographs. tachograph data - its forensic significance,	
	racinograph charts and analysis, Accuracy of speed record, Effects of	
	tire slipping, Route tracing, Falsification signals.	
	Total	60
	i Utai	UU

Notional Credit Hours for this course: 30 x 3 = 90

Distribution of Credits			
Lecture/ TutorialPracticumExperiential Learning			
60	0	30 Laboratory Visit, Experimenting, Group Work, Discussions, Presentations and Quiz	

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).

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).

SEMESTER -	V
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Paper Sl. No.	Paper - 1	Scheme of Evaluation	L&T
Name of the Course	Forensic Toxicology	L-T-P-C	2-1-0-3
Type of Course	Major	Credits Assigned	3
Paper Code	FSC142M501	Level of the Course	300

Course objective: This course aims to integrate theoretical foundations of forensic toxicology (history, legal frameworks, crime scene protocols) with advanced analytical techniques (GC-MS, HPLC, extraction methods) and regulatory standards (GHS, GLP) to equip students with skills in toxicant detection, sample handling, and mechanistic analysis. Students will apply this knowledge to assess toxicity risks, interpret dose-response relationships, and manage poisoning cases, ensuring compliance with legal and ethical guidelines in criminal investigations and public health contexts.

Course Outcome : After successful completion of the course, student will be able to			
Sl.No. Course Outcome		Blooms Taxonomy Loval	
		DT1	
COI	define the fundamental principles of forensic toxicology.	BII	
CO2	explain the procedures for toxicological sample	BT2	
	collection and extraction methods.		
CO3	apply dose-response parameters and regulatory	BT3	
	frameworks to study the toxicants.		
CO4	analyze molecular mechanisms and toxico-	BT4	
	kinetic/dynamic processes to differentiate toxicity		
	pathways of xenobiotics.		

Modules	Course content	Lecture
		Hours
Ι	Forensic Toxicology Fundamentals: History, Scope, and Significance of forensic toxicology, Legal Aspects: Medico-legal implications, laws related to poisons, nodal agencies, stakeholders, Crime Scene Protocols: Poison-related scenes, drug paraphernalia,	15
	poisoning management, Roles & Responsibilities: Forensic toxicologists' duties, expert witness testimony, Reporting: Formats for autopsy and laboratory reports.	
Π	Toxicological Sample Handling, Extraction, and Analysis: Sample Collection & Preservation: Biological/non-biological samples, matrices, viscera types, preservatives, containers, shelf-life, Guidelines (national/international), PPE, safety measures, Extraction Methods: Liquid-liquid extraction, acid/base/neutral/volatile/non- volatile/plant poison isolation, Detection & Analysis: Chemical tests, instrumental methods (e.g., GC-MS, HPLC), decomposed material analysis, Challenges in toxicological examination.	15

III	Regulatory Frameworks in Toxicology: Toxicants and types (chemical, biological, physical), Dose Terminology: LD50, threshold dose, therapeutic index, Sources of poisoning, Exposure variables: Duration, frequency, routes, Regulatory Systems: Toxicity testing models (in vitro, in vivo, computational), Laws and regulations (national: EPA, FDA; international: WHO, ICH), Regulatory bodies: US EPA, EU-ECHA, CDSCO, Risk Assessment: Hazard vs. risk, GHS, Quality Standards: Good Laboratory Practice (GLP).	15
IV	Toxic Mechanisms & Xenobiotic Effects: Mechanisms of Toxicity: Dose-Response Relationships, Factors affecting toxicity, Molecular mechanisms, Toxico-Kinetics/Dynamics: Absorption, distribution, metabolism, excretion (ADME), Detoxification: Biotransformation, bioaccumulation, Antidotal therapies, Specific Toxicants & Effects: Drugs: Mechanisms, organ-specific toxicity, Pesticides: Organophosphate/Carbamate neurotoxicity, Heavy Metals, Metabolic acidosis, hepatotoxicity, Plant/Animal Toxins: Aconite, snake venom, Xenobiotic Symptoms/Treatment: Case-based management.	12
	Total	60

Notional Credit Hours for this course: $30 \times 3 = 90$

Distribution of Credits			
Lecture/ Tutorial	Practicum	Experiential Learning	
60	0	30 Laboratory Visit, Experimenting, Group Work, Discussions, Presentations and Quiz	

Suggested Readings:

- 1. Curry: Analytical Methods in Human Toxicology, Part II, 1986.
- 2. Gupta, P.K. Fundamentals of Toxicology: Essential Concepts and Applications. India, Elsevier Science, 2016.
- 3. Casarett & Doll Toxicology: The Basic Science of poisons.
- 4. Clark, E.G.C.: Isolation and identification of Drugs, 1966
- 5. Curry, A.S.: Poison Detection in Human Organs, 1976
- 6. Curry, A.S.: Advances in Forensic Chemical Toxicology, 1972
- 7. Holfmann, F.G.: Handbook of Drug and Alcohol Abuse.

Paper Sl. No.	Paper - 2	Scheme of Evaluation	L&T
Name of the Course	Forensic Biology	L-T-P-C	2-1-0-3
Type of Course	Major	Credits Assigned	3
Paper Code	FSC142M502	Level of the Course	300

SEMESTER - V

Course objective: This course aims to provide students with a comprehensive understanding of forensic biology, emphasizing the identification, collection, and analysis of biological evidence (e.g., hair, pollen, diatoms, insects, blood, body fluids). It combines traditional techniques (serology, blood grouping, entomology) with advanced spectroscopic methods (FTIR, Raman) to address forensic challenges such as species determination, post-mortem interval estimation, and crime scene reconstruction, while integrating case studies and legal protocols for real-world application.

Course Outcome : After successful completion of the course, student will be able to			
Sl.No.	Course Outcome	Blooms Taxonomy Level	
CO1	recall the fundamental concepts of forensic biology.	BT1	
CO2	explain the principles of hair evidence analysis, forensic limnology, and entomology.	BT2	
CO3	apply serological techniques and genetic principles to analyze bloodstains, and determine their origin.	BT3	
CO4	analyze biological fluid evidence using presumptive/confirmatory tests and spectroscopic methods.	BT4	

Modules	Course content	Lecture
		Hours
Ι	Introduction to Forensic Biology: Brief History of Forensic Biology: Developments and Scope in the field of Forensic Biology, Branches of Forensic Biology Different types of biological Evidences and their significance in Forensic Science Collection, Preservation, Packing, Forwarding and Documentation of Biological Evidences, Types and identification of microbial organisms of forensic significance, case studies, Introduction to wood and its anatomy, Identification of endangered wood & its significances. Forensic Palynology: Introduction and history, structure of pollen, identification and comparison of pollen, forensic significance.	12
П	 Significance of hair evidence: Transfer, persistence and recovery of hair evidence. Structure of human hair. Comparison of hair samples. Morphology and biochemistry of human hair. Comparison of human and animal hair, case studies. Forensic Limnology: Introduction, Role of algae & fungi in Forensic Science, Identification of diatoms from biological matrices from soil & water, Diatoms testing, Legal aspects of Diatoms. Forensic Entomology: Introduction and History, Anatomy and Taxonomy of Forensically relevant Insects (Diptera), Estimating Post-mortem Interval/ Time, Forensically important Aquatic Insects, Insects as weapons and Threats to National Security, Collection of entomological evidence during death investigations. 	24

Ш	Forensic Serology: Blood and its composition, Haemoglobin and its variants, History and genetics of ABO and Rh blood grouping system and its significance in forensic investigation, Other forensically relevant blood group like MN, I, P, Kell, Duffy, Kidd, Lewis, Lutheran and Bombay blood group, Secretors and non- secretors, HLA antigens and its importance.	12
IV	Identification of Biological Fluids: Study of blood stain patterns, Composition, presumptive and confirmatory tests for blood, semen, saliva, urine, and other biological fluids, origin of species, Blood grouping of dried blood stains, semen, saliva stains, Recent developments in detection of various body fluids by spectroscopic techniques (FTIR and Raman). Polymorphic enzymes and their forensic significance.	12
	Total	60

Notional Credit Hours for this course: 30 x 3 = 90

Distribution of Credits			
Lecture/ Tutorial	Practicum	Experiential Learning	
60	0	30 Laboratory Visit, Experimenting, Group Work, Discussions, Presentations and Quiz	

Suggested Readings

1. MariaTeresa, Tersigni-Tarrant, Natalie R. Shirley; "Forensic Anthropology: An Introduction", CRC Press, Taylor & Francis Group, 2012.

2. AngiChristensen, N.Passalacqua,& E. Bartelink; "Forensic Anthropology: Current Methods and Practices", Academic Press, Elsevier, 2014.

3. Anil Mahajan & Surinder Nath; "Application areas of Anthropology", Reliance Publishing House, 1992.

4. Megan Brickley&Roxanna Ferllini; "Forensic Anthropology: Case Studies from Europe", Charles C. Thomas Publisher, Springfield, Illinois, USA, 2007.

5. The examination and Typing of Blood Stains in the crime laboratory – B J Culliford, U. S. Dept. of Justice, Washington D. C.

6. Blood Group Serology – Boorman KE, Dodd BE and LOncoln PJ, Chuchill Livingstone Inc. New York.

7. Laboratory Procedure Manual - Forensic Serology (2005), Directorate of Forensic Science, MHA, New Delhi.

Paper Sl. No.	Paper - 3	Scheme of	I &T
		Evaluation	Lai
Name of the Course	Questioned Document	L-T-P-C	2-1-0-3
Type of Course	Major	Credits Assigned	3
Paper Code	FSC142M503	Level of the Course	300

SEMESTER – V

Course objective: This course aims to equip students with expertise in analyzing questioned documents using scientific methodologies (e.g., spectroscopy, microscopy) and handwriting analysis techniques to detect alterations, determine document authenticity, and identify counterfeits (currency, passports). It emphasizes practical skills in tampering detection, mechanical impression analysis, and legal protocols for forensic investigations and courtroom testimony.

Course Outcome : After successful completion of the course, student will be able to			
Sl.No.	Course Outcome	Blooms Taxonomy Level	
CO1	recall foundational concepts of questioned document examination.	BT1	
CO2	explain the principles of handwriting individuality, exemplar/non-exemplar sample limitations, and analytical methods.	BT2	
CO3	apply forensic techniques to identify document tampering, recover indented/invisible writings, and authenticate materials in real-case scenarios.	BT3	
CO4	analyze security features in counterfeit currency, passports, and high-risk documents .	BT4	

Modules	Course content	Lecture
		Hours
Ι	Questioned Document Examination: Definition and types of	15
	questioned documents, Preliminary examination procedures, Basic	
	tools for forensic document examination: Ultraviolet, Visible,	
	Infrared, and Fluorescence Spectroscopy, Photomicrography,	
	Microphotography, Visible Spectral Comparator, Electrostatic	
	Detection Apparatus.	
П	Handwriting Analysis & Age Determination: Development of	15
	individuality in handwriting: natural variations, fundamental	
	divergences, Class and individual characteristics in handwriting,	
	Comparison of handwriting: determination of stroke sequence,	
	exemplar vs. non-exemplar samples (merits/demerits), Standards for	
	handwriting comparison, Determining the age and relative age of	
	documents.	

Ш	Document Alterations & Tampering Detection: Alterations in documents: erasures, additions, over-writing, obliterations, Detection of indented and invisible writings, Examination of charred documents, Comparison of paper, ink, printed/typed/xeroxed documents.	15
IV	Counterfeit & Mechanical Impression Analysis: Examination of counterfeit Indian currency notes, passports, visas, stamps, credit cards, seals, Analysis of mechanical impressions (e.g., stamp pads, seals), Techniques for identifying forged security features in official documents, Protocols for verifying authenticity in high-risk documents.	15
	Total	60

Notional Credit Hours for this course: 30 x 3 = 90

Distribution of Credits				
Lecture/ Tutorial	Practicum	Experiential Learning		
60	0	30 Laboratory Visit, Experimenting, Group Work, Discussions, Presentations and Quiz		

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.

7. Kurtz Sheila: Graphotypes a new plant on handwriting, analysis, Crown Publishers Inc., USA.

8. Lerinson Jay; Questioned Documents, Acad Press, London.

Paper Sl. No.	Paper - 4	Scheme of Evaluation	Practical
Name of the Course	Forensic Toxicology (Practical)	L-T-P-C	0-0-6-3
Type of Course	Major	Credits Assigned	3
Paper Code	FSC142M514	Level of the Course	300

SEMESTER – V

Course objective: This course aims to develop expertise in the extraction (wet/dry digestion, microwave), analysis (color tests, TLC, UV-Vis, GC-MS, HPLC, ICP-MS), and quantification of toxicants (heavy metals, pesticides, plant poisons, drugs, alcohol derivatives) through hands-on proficiency in analytical methodologies. Students will master calibration techniques, advanced instrumentation (HS-GC, ICP-MS), and forensic protocols to identify adulterants, toxins, and illicit substances, ensuring compliance with regulatory and investigative standards.

Course Outcome : After successful completion of the course, student will be able to			
Sl.No.	Course Outcome	Blooms	
		Taxonomy Level	
CO1	identify the principles and procedural steps for	BT1	
	extracting heavy metals and isolating volatile/non-		
	volatile poisons.		
CO2	explain the principles of color tests and thin-layer	BT2	
	chromatography for detecting plant poisons and		
	pesticides, and describe the role of UV-Vis		
	spectroscopy in drug analysis.		
CO3	apply UV-Vis spectroscopy to plot calibration curves	BT3	
	and quantify analyte concentrations.		
CO4	analyze alcohol derivatives using head-space GC to	BT4	
	differentiate volatile compounds in forensic samples.		

Modules	Course content	Lecture
		Hours
Ι	1. Extraction of heavy metals using wet digestion and dry digestion.	15
	2. Extraction of volatile and non-volatile poisons	
	3. Analysis of heavy metals using colour tests (reinsch test).	
Π	4. Colour test and TLC of various plant poisons and pesticides	15
	5. Analysis of drug using UV-Vis spectroscopy.	
	6. Preparation of standard and working solutions.	
III	7. Plotting of calibration curve and quantification using UV-Vis	15
	Spectroscopy	
	8. Analysis of organochlorine, Organophosphorus, Carbamates and	
	Pyrethroids by colour tests, TLC, GC-MS methods.	
	9. Identification of common plant poisons Oleander, Dhatura,	
	Calotropis and Ricin.	

IV	 Analysis of alcohol and derivatives by head-space gas chromatography (HS-GC). Extraction and Analysis of heavy metals by microwave extraction and ICP-MS. Analysis of non-volatile drugs by HPLC. 	15
	Total	60

Notional Credit Hours for this course: 30 x 3 = 90

Distribution of Credits				
Lecture/ Tutorial	Practicum	Experiential Learning		
0	60	30 Laboratory Visit, Experimenting, Group Work, Discussions, Presentations and Quiz		

Suggested Readings:

- 1. Laboratory Procedure Manual- Forensic Toxicology, DFS, MHA, New Delhi.
- 2. Gupta, P.K. Fundamentals of Toxicology: Essential Concepts and Applications. India, Elsevier Science, 2016.
- 3. Casarett & Doll Toxicology: The Basic Science of poisons.
- 4. Clark, E.G.C.: Isolation and identification of Drugs, 1966.
- 5. Curry, A.S.: Advances in Forensic Chemical Toxicology, 1972.

$\boldsymbol{SEMESTER}-\boldsymbol{V}$

Paper Sl. No.	Paper - 5	Scheme of Evaluation	L&T
Name of the course	Biometrics and Emerging Techniques	L-T-P-C	4-0-0-4
Type of Course	Minor	Credits Assigned	4
Paper Code	FSC142N501	Level of the course	300

Course Objective: This course provides a comprehensive understanding of biometric technologies, their applications, and security aspects. It covers the fundamentals of biometrics, key processes such as verification, identification, and biometric matching, as well as performance measures and classification into physiological and behavioural biometrics. Emerging biometric techniques, including novel physiological and behavioural traits, are also explored. Additionally, the course examines biometric system security, addressing vulnerabilities, adversary attacks, and protective measures to enhance biometric template security.

Course Outcome: After successful completion the course, the student will be able to			
Sl. No.	Course Outcome	Blooms Taxonomy Level	
CO1	define the fundamentals and modules of a biometric system	BT1	
CO2	explain and compare the different types of biometric systems.	BT2	
CO3	apply emerging biometric traits in new biometric systems	BT3	
CO4	classify different biometric module attacks and its security measures	BT4	

Module	Course Content	Lecture
Ι	Introduction: Biometric fundamentals, Biometric technologies, Biometrics vs traditional techniques, Characteristics of a good biometric system, Benefits of biometrics	
	Key biometric modules: verification, identification and biometric matching, Performance measures in biometric systems – rates and errors, Classification of biometric system: physiological and behavioural biometrics.	22
Π	Physiological biometric systems: Fingerprint Recognition, Iris Recognition, Retina scanning, Face recognition, Hand geometry, palm vein recognition.	23
ш	Emerging physiological biometrics: Nail bed identification, blood pulse identification, Body salinity identification.	22
	Emerging behavioural biometrics: brain wave pattern, Touch Dynamics, Mouse Movement Analysis, Eye Movement Tracking.	
IV	Biometric system security: overview, vulnerabilities in biometric system, Adversary attacks: Insider Attacks, Infrastructure attacks, Attacks on user Interface: Impersonation, Obfuscation, Spoofing, biometric template security, encoded biometric schemes, advantages and limits of biometric system security.	23
	Total	90

Notional Credit Hours for this course: 30 x 4 = 120

	Distribution of credits				
	Lecture/ Practicum Experiential Learning Tutorial				
90		0	30 Laboratory visit, field trips, group work, discussions, presentations, and quiz.		

Suggested Readings:

- 1. Nanavati, S., Thieme, M., & Nanavati, R.: Biometrics, Wiley India Pvt. Ltd., 2002.
- 2. Reid, P.: Biometrics for Network Security, New Delhi, 2004.
- 3. Vacca, J.R.: Biometric Technologies and Verification Systems, Butterworth-Heinemann, Oxford, 2007.
- 4. Jain, Anil K.: Handbook of Biometrics.
- 5. Kittler, Josef & Nixon, Mark S.: Audio and Video-Based Biometric Person Authentication, Springer, 2003.
- 6. Bolle, R.M., Connell, J.H., Pankanti, S., Ratha, N.K., & Senior, A.W.: Guide to Biometrics, Springer Publications, 2004.
- 7. Sudha, Indira S.: Biometrics & Fingerprint Analysis.

Paper Sl. No.	Paper - 1	Scheme of Evaluation	L&T
Name of the Course	Analytical Methods - II	L-T-P-C	3-1-0-4
Type of Course	Major	Credits Assigned	4
Paper Code	FSC142M601	Level of the Course	300

 $\label{eq:semester} \textbf{SEMESTER} - \textbf{VI}$

Course objective: This course aims to provide students with a comprehensive understanding of advanced forensic instrumentation techniques, including spectroscopy, chromatography, and microscopy. It aims to develop practical skills for operating and interpreting data from sophisticated instruments like GC-MS, LC-MS, SEM, and FTIR, while introducing emerging technologies such as portable instruments, microfluidics, and nanotechnology. The course also focuses on enhancing students' problem-solving abilities to analyze forensic evidence and apply these techniques effectively in real-world investigations.

Course Outcome : After successful completion of the course, student will be able to				
Sl.No.	Course Outcome	Blooms Taxonomy		
		Level		
CO1	recall the fundamental principles, instrumentation, and	BT1		
	applications of advanced spectroscopic techniques in			
	forensic science.			
CO2	explain the working principles, instrumentation, and	BT2		
	forensic applications of hyphenated techniques such as			
	GC-MS, LC-MS, and ICP-MS, and compare their			
	advantages and limitations.			
CO3	apply bioinformatics tools and software to analyze STR	BT3		
	profiles and interpret forensic DNA data.			
CO4	analyze the role of forensic DNA phenotyping in	BT4		
	predicting physical traits and its ethical implications.			

Modules	Course content	Lecture
Ι	Advanced Spectroscopy Techniques: Fluorescence Spectroscopy: Principles, fluorescence, phosphorescence, instrumentation, applications, Raman Spectroscopy, Raman scattering, instrumentation, applications, FTIR Spectroscopy: Principle, IR absorption, instrumentation interferometers, applications, Atomic Absorption Spectroscopy (AAS): Principles, forensic applications: toxic metal analysis, GSR analysis.	22
П	Hyphenated Techniques: GC-MS: Principles, Instrumentation: Columns, ionization methods (EI, CI), mass analyzers, Applications: Forensic toxicology, drugs, arson (volatile compounds), LC-MS: Principles, Instrumentation: Pumps, columns, ionization, Applications: Complex mixtures, drugs/metabolites, non-volatile compounds, ICP-MS: Principles/Applications: Trace metal analysis, Comparison: GC-MS vs. LC-MS: Volatility vs. Polarity.	23
Ш	Electron Microscopy and Imaging: SEM: Principles; Instrumentation: Electron guns, detectors, vacuum systems;	22

	Applications: Analysis of gunshot residue, hair, fibers, and other trace evidence; TEM: Principles; Instrumentation: Electron beams, lenses, detectors; Applications: Nanomaterial analysis and biological evidence; AFM: Principles, applications in surface analysis; Digital Imaging: Techniques for crime scene reconstruction; Applications.	
IV	Emerging Forensic Instrumentation: Portable Forensic Instruments: Handheld Raman spectrometers, XRF analyzers; Applications: On-site drug analysis, explosive detection, and material identification; Microfluidic devices: Principles; Applications: Forensic DNA analysis, drug detection, and rapid testing; Spectroscopic Imaging Techniques: Hyperspectral imaging and its applications in forensic science.	23
Total		

Notional Credit Hours for this course: 30 x 4 = 120

Distribution of Credits				
Lecture/ TutorialPracticumExperiential Learning				
90	0	30 Laboratory Visit, Experimenting, Group Work, Discussions, Presentations and Quiz		

Suggested Readings

- 1. "Principles of Instrumental Analysis" by Douglas A. Skoog (2017).
- 2. "Forensic Science: Fundamentals and Investigations" by Anthony J. Bertino (2015).
- 3."Instrumental Methods of Analysis" by Willard, Merritt, and Dean (7th Edition, 1988).
- 4."Forensic Chemistry" by Suzanne Bell (2nd Edition, 2018).
- 5."Modern Spectroscopy" by J. Michael Hollas (4th Edition, 2003).
- 6. "Chromatographic Methods" by A. Braithwaite and F. J. Smith (5th Edition, 1996).

Paper Sl. No.	Paper - 2	Scheme of Evaluation	L&T
Name of the Course	Forensic Ballistics	L-T-P-C	2-1-0-3
Type of Course	Major	Credits Assigned	3
Paper Code	FSC142M602	Level of the Course	300

SEMESTER – VI

Course objective: This course aims to provide a comprehensive understanding of firearms mechanics (classification, assembly, ballistics) and ammunition design, integrating theoretical principles (trajectory dynamics, pressure/recoil analysis) with practical skills in forensic firearm identification, GSR analysis, and toolmark comparison. Students will apply this knowledge to

analyze ballistic evidence, reconstruct shooting incidents, and adhere to legal protocols for criminal investigations and courtroom testimony.

Course Outcome : After successful completion of the course, student will be able to				
Sl.No.	Sl.No. Course Outcome			
		Level		
CO1	recall the classifications, historical evolution, and	BT1		
	functional assembly principles of firearms.			
CO2	explain the constructional components, classification	BT2		
	criteria, and functional mechanisms of ammunition.			
CO3	apply principles of internal, external, and terminal	BT3		
	ballistics to compute trajectories.			
CO4	analyze class and individual characteristics on	BT4		
	firearms/ammunition and gunshot residue evidence.			

Modules	Course content	Lecture
Ι	Firearms Fundamentals & Classification: Firearms characteristics, classification of firearms: rifled firearms, small arms, shotguns, improvised/country-made firearms, History and background of firearms, Functional assembly & operating principles, standard vs. non-standard firearms, Identification of origin, improvised/imitative firearms.	15
Π	Ammunition Construction & Safety: Ammunition constructional parts and classifications based on features: ignition type, purpose, design, caliber/gauge, Functional assembly of ammunition types, cartridge-firing mechanism: ignition sequence, pressue dynamics, ejection mechanisms, Safety protocols for handling firearms and ammunition.	15
Ш	Ballistics Theory & Dynamics: Types of ballistics: internal, external, terminal, Trajectory formation, computation: vacuum/earth trajectory, air resistance effects, Projectile-target interactions: bullet shape, velocity, angle, intermediate targets, range, Challenges in ballistics: heat, pressure, recoil, barrel fouling, vibration.	15
IV	Forensic Firearm Analysis & Evidence: Firearm/ammunition identification: class/individual characteristics (striations, breech marks), Gunshot residue (GSR): composition, collection, chemical/instrumental analysis, shooter identification, Forensic techniques: linkage of cartridge cases/projectiles to firearms, Case studies involving firearms evidence.	15
	Total	60

Notional Credit Hours for this course: 30 x 3 = 90

Distribution of Credits				
Lecture/	Practicum	Experiential Learning		

Tutorial		
60	0	30 Laboratory Visit, Experimenting, Group Work, Discussions, Presentations and Quiz

Suggested Readings

1. J. Howard Mathews; Charles C. Thomas, Firearms Identification, Vols 1, 2, & 3; Springfield, Illinois.

2. Hatcher, Jury And Weller, Firearms Investigation, Identification And Evidence; Stackpole Books, Harrisburg, P. A.

3. Vincent Di Maio, Gunshot Wounds; CRC Press, Washington, DC.

4. Brain J. Heard., Hand Book Of Firearms And Ballistics; John Willey, England.

5. TA, Warlow., Firearms, The Law And Forensic Ballistics; Taylor And Francis, Landon.

6. Karl G. Sellier et al., Wound Ballistics And The Scientific Background; Elsevier, London.

7. M. Johari, Identification Of Firearms, Ammunition And Firearms Injuries; BPR&D, New Delhi.

SEMESTER - VI

Paper Sl. No.	Paper - 3	Scheme of Evaluation	L&T
Name of the Course	Molecular Forensics	L-T-P-C	2-1-0-3
Type of Course	Major	Credits Assigned	3
Paper Code	FSC142M603	Level of the Course	300

Course objective: This course aims to equip students with a robust understanding of molecular biology principles (DNA replication, PCR, sequencing) and recombinant DNA technology, integrating advanced forensic applications (STR profiling, mtDNA analysis, NGS) and bioinformatics tools (BLAST, CODIS). Students will develop skills to design, analyze, and interpret DNA data for human identification, kinship testing, and criminal investigations, bridging laboratory techniques with computational approaches for forensic case resolution.

Course Outcome : After successful completion of the course, student will be able to			
Sl.No.	Course Outcome	Blooms	
		Taxonomy Level	
CO1	recall the fundamental concepts of molecular biology.	BT1	
CO2	explain the mechanisms of transcription and translation in prokaryotes and eukaryotes.	BT2	
CO3	apply modern DNA forensic techniques to interpret DNA mixtures, calculate paternity/sibship indices, and	BT3	

	utilize genealogical databases for human identification.	
CO4	analyze forensic biological data using bioinformatics	BT4
	tools and database systems.	

Modules	Course content	Lecture
I	Molecular Biology: Organization of genome in prokaryotes and eukaryotes, Chemical structure of DNA and RNA, DNA replication: Enzymes and accessory proteins, Mechanism of DNA replication in prokaryotes and eukaryotes, Procedure for collection and preservation of biological sample for DNA analysis, Techniques of DNA isolation and its quantitation, Polymerase Chain Reaction and its variants in PCR and primer designing, DNA separation and detection techniques, Methods of DNA sequencing.	<u>15</u>
Π	Central Dogma and rDNA Technology: Transcription: RNA polymerases, features of prokaryotic and eukaryotic promoters, Synthesis and processing of prokaryotic and eukaryotic transcripts. Transport of RNA, Translation: Structure and role of t-RNA in protein synthesis, genetic code and its deciphering, Introduction and concept of recombinant DNA technology, Cloning strategies: Genomic libraries, cDNA libraries, single gene cloning, Types of vectors, Plasmids, cosmids, lamda phage vectors, shuttle vectors, BACs, YACs, Methods of transferring recombinant DNA to host cells.	15
Ш	DNA Forensics: Modern techniques for DNA extraction and quantification, STR Profiling, Types of errors, DNA Mixtures – Current status of tools and guidelines, Paternity/maternity indices, Sibship indices, Mitochondrial DNA analysis for human and related databases, Advanced Y-STR and X-STR analysis and its significance in establishing paternal relationships, Identity, Phenotypic and ancestry informative markers, Genealogy and its applications in forensic genetics, Next Generation Sequencing and Genome analysis.	15
IV	Forensic Bioinformatics: Biological Data: The form of biological information, Primer designing for forensically important markers, Various databases for lineage and mtDNA markers, Databases – Format and Annotation, common sequence file formats, annotated sequence databases, Data – Access, Retrieval and Submission; Data retrieval tools, Sequence Similarity Searches: Local v/s global, Distance metrics, Similarity and homology, Scoring matrices, FASTA, BLAST, variants of BLAST, Multiple Sequence Alignment, Database management tools in DNA Forensics: CODIS and DNAxs.	15
	Total	60

Distribution of Credits			
Lecture/ TutorialPracticumExperiential Learning			
60	0	30 Laboratory Visit, Experimenting, Group Work, Discussions, Presentations and Quiz	

Suggested Readings

1. Forensic DNA Typing, Second Edition: Biology, Technology, and Genetics of STR Markers 2nd Edition (2005) - John M. Butler, Academic Press, ISBN:0121479528.

2. Advanced Topics in Forensic DNA Typing: Methodology (2011), John M. Butler, Academic Press, ISBN: 978-0123745132.

3. Advanced Topics in Forensic DNA Typing: Interpretation, (2014) - John Butler, Academic Press, ISBN:19780124052130.

4. Forensic DNA Analysis Technological Development and Innovative Applications, 1st ed. (2021) - Elena Pilli and Andrea Berti, Apple Academic Press, Inc., ISBN 9781771889056.

5. Forensic DNA Profiling - A Practical Guide to Assigning Likelihood Ratios, 1st ed. (2020) - Jo-Anne Bright and Michael D. Coble, CRC Press, ISBN: 9780367029029.

6. An Introduction to Forensic Genetics, 2ndEdition (2010) - William Goodwin, Adrian Linacre and SibteHadi, Wiley-Blackwell, ISBN: 978-0470710197.

7. Forensic Genetics in the Governance of Crime, 1st ed. (2019) - Helena Machado and Rafaela Granja, Palgrave Macmillan, ISBN 978-981-15-2429-5.

8. High-Throughput Next Generation Sequencing – Methods and applications, 1st ed. (2011), Young Min Kwon and Steven C. Ricke, Humana Press, ISBN: 9781617790881.

9. Next Generation DNA Led Technologies, 1st ed. (2016), Sharada Avadhanam et. al., Springer, ISBN: 978-981-287-669-0.

10. Next Generation Sequencing – Methods and Protocols, 1st ed. (2018) - Steven R. Head et. al., Humana Press, ISBN: 978-1-4939-7514-3.

Paper Sl. No.	Paper - 4	Scheme of Evaluation	Practical
Name of the Course	Molecular Forensics (Practical)	L-T-P-C	0-0-6-3
Type of Course	Major	Credits Assigned	3
Paper Code	FSC142M603	Level of the Course	300

SEMESTER – VI

Course objective: To provide hands-on experience in fundamental and advanced techniques in molecular biology and forensic science. Students will learn to extract DNA from biological samples such as blood and saliva, measure its concentration and purity, and amplify specific regions using PCR. The course also covers DNA fragment separation, microscopic examination, blood typing, bloodstain pattern analysis, serological tests, STR analysis, complex DNA mixture interpretation, geographic ancestry prediction, and environmental DNA (eDNA) detection for species identification.

Course Outcome : After successful completion of the course, student will be able to			
Sl.No.	Course Outcome	Blooms Taxonomy Level	
CO1	recall the fundamental steps and principles involved in extracting DNA from biological samples.	BT1	
CO2	explain the principles and procedures involved in microscopic examination of biological samples, blood typing, bloodstain pattern analysis, and serological tests for body fluids	BT2	
CO3	 apply bioinformatics tools and software to analyze Short Tandem Repeats (STRs) and interpret complex DNA mixtures, demonstrating the ability to use these tools for forensic identification and genetic profiling. 	BT3	
CO4	analyze data from Ancestry-Informative Marker (AIM) Analysis to predict geographic ancestry and evaluate environmental DNA (eDNA) results to detect species presence.	BT4	

Modules	Course content	Lecture
		Hours
Ι	1. Extraction of DNA from biological samples: blood and saliva.	15
	2. Measurement of the concentration and purity of extracted DNA.	
	3. Amplification of specific regions of DNA using PCR.	
	4. Separation and visualization of DNA fragments based on size.	
П	5. Microscopic Examination of Biological Samples	15
	6. Blood Typing	
	7. Bloodstain Pattern Analysis	
	8. Serological Tests for Body Fluid (Blood)	
III	9. Analysis of Short Tandem Repeats (STRs) using	15
	bioinformatics tools.	
	10. Analysis of complex DNA mixtures using software tools.	
IV	11. Prediction of geographic ancestry using Ancestry-Informative	15
	Marker (AIM) Analysis.	
	12. Detection of species presence in environmental samples	
	using eDNA.	
	Total	60

Notional Credit Hours for this course: 30 x 3 = 90

Distribution of Credits		
Lecture/ Tutorial	Practicum	Experiential Learning

Suggested Readings

- **1.** "Forensic Biology: Identification and DNA Analysis of Biological Evidence" by Richard Li (2008)
- **2.** "Forensic Science: An Introduction to Scientific and Investigative Techniques" by Stuart H. James *et al.* (2005)
- **3.** "Introduction to Forensic DNA Analysis" by Norah Rudin & Keith Inman (2001)
- **4.** "Forensic DNA Typing: Biology, Technology, and Genetics of STR Markers" by John M. Butler (2005)
- **5.** "Forensic Serology: Principles and Practice" by Jane Moira Taupin (2016)
- 6. "Molecular Cloning: A Laboratory Manual" by Sambrook and Russell (2001)
- **7.** "Forensic DNA Typing: Biology, Technology, and Genetics of STR Markers" by John M. Butler (2005)
- **8.** "Principles of Population Genetics" by Hartl and Clark (2007)
- **9.** "Environmental DNA: For Biodiversity Research and Monitoring" by Taberlet et al. (2018)
- 10. "Forensic Science: Fundamentals and Investigations" by Bertino and Bertino (2015)
- 11. "Bioinformatics and Functional Genomics" by Jonathan Pevsner (2015)
- 12. "Serology and Bloodstain Pattern Analysis in Forensic Science" by James et al. (2012)

Paper Sl. No.	Paper - 5	Scheme of Evaluation	L&T
Name of the Course	Forensic Medicine and Medical Jurisprudence	L-T-P-C	2-1-0-3
Type of Course	Major	Credits Assigned	3
Paper Code	FSC142M605	Level of the Course	300

SEMESTER - VI

Course objective: This course aims to equip students with foundational knowledge and practical skills in forensic medicine, crime scene management, and death investigation. It focuses on mastering protocols for evidence collection, suspect interrogation, post-mortem analysis (e.g., time-of-death estimation, asphyxia cases), and specialized investigations (violence, abuse, thermal/mechanical injuries), ensuring adherence to legal standards and ethical practices for effective criminal justice outcomes.

Course Outcome : After successful completion of the course, student will be able to			
Sl.No.	Course Outcome	Blooms	
		Taxonomy Level	
CO1	recall foundational principles of forensic medicine.	BT1	
CO2	explain the investigative protocols for suspect	BT2	
	interrogation, evidence management, and crime scene		

	documentation.	
CO3	apply techniques for exhumation, suicide assessment, and post-mortem analysis to determine cause/mode of death.	BT3
CO4	analyze mechanical injuries, thermal/electrocution fatalities, and patterns of violence.	BT4

Modules	Course content	Lecture
I	Forensic Medicine & Initial Crime Scene Response: Fundamental aspects, scope, and objectives of forensic medicine, Need for forensic medicine, Approaching the crime scene of death: inquest procedures, recording dying declarations, Identifying witnesses/suspects, interviewing onlookers, and segregating potential witnesses.	<u>15</u>
Π	Investigative Protocols & Evidence Management: Suspect in custody: initial interrogation, evidence search, Miranda rights, Crime scene assessment: forensic team coordination, command post/logbook management, crowd/media control, Documentation: note-taking, death scene documentation, evidence processing, injury evaluation, Tools and forms: canvass form, indexing death investigations.	15
Ш	Death Investigation & Post-Mortem Analysis: Buried body cases: search/exhumation methods, Suicide cases: injury analysis, psychological state assessment, suicide notes, Death definitions, types, causes, modes, and post-mortem changes (e.g., rigor mortis, livor mortis), Time since death estimation, molecular/systemic death, Objectives of medico-legal autopsy, Asphyxia-related deaths: hanging, strangulation, drowning.	15
IV	Specialized Forensic Investigations (Violence, Injury, and Abuse): Mechanical injuries: classification, ante/post-mortem distinction, aging, self-inflicted wounds, Violence against women/children: injury patterns, child abuse, human trafficking protocols, Thermal deaths (burns/hypothermia), electrocution, Sexual offences: victim/accused investigation protocols.	15
	Total	60

Notional Credit Hours for this course: 30 x 3 = 90

Distribution of Credits			
Lecture/ Tutorial	Practicum	Experiential Learning	
60	0	30 Laboratory Visit, Experimenting, Group Work, Discussions, Presentations and Quiz	

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. Saukkoand G.C. Knupfer (Eds.), Academic Press, London (2000).

5. V. J. Geberth, Practical Homicide Investigation, CRC Press, Boca Raton (2006).

6. T. Beveland R. M. Gardner, Bloodstain Pattern Analysis, 3rdEdition, CRC Press, Boca Raton (2008).

SEMESTER - VI

Paper Sl. No.	Paper - 6	Scheme of Evaluation	T&P
Name of the Course	Forensic Linguistics	L-T-P-C	3-1-0-4
Type of Course	Minor	Credits Assigned	4
Paper Code	FSC142N601	Level of the Course	300

Course objective: To introduce students to the foundational principles and applications of forensic linguistics, focusing on language analysis in legal contexts. Students will learn about authorship attribution, discourse analysis, forensic phonetics, and the interpretation of legal texts. By the end of the course, students will be equipped with the skills to analyze language evidence and understand its role in legal and forensic investigations.

Course Outcome: After successful completion of the course, student will be able to		
Sl.No.	Course Outcome	Blooms Taxonomy Level
CO1	identify the primary areas of application for forensic linguistics in legal contexts.	BT1
CO2	explain the characteristics of legal language, including its complexity, formality, and use of jargon.	BT2
CO3	apply knowledge of authorship attribution to analyze real-world cases involving disputed texts.	BT3
CO4	analyze speech samples to identify unique phonetic features for speaker identification.	BT4

Module	Course content	Lectures

1	(legal language, authorship analysis, forensic phonetics);	22
	forensic linguistics; Responsibilities of a forensic linguist.	
П	Language and the Law: Characteristics of legal language (complexity, formality, jargon); Ambiguity and interpretation in statutes, contracts, and wills; Courtroom interaction: Power dynamics, questioning techniques, and witness testimony; Police interviews and interrogations: Language strategies and coercion; Plain Language Movement; Language Rights in Legal Contexts.	23
ш	Authorship Attribution and Stylistics: Introduction to stylistics: Lexical, syntactic, and semantic features; Authorship attribution: Quantitative vs. qualitative methods; Tools and software for stylistic analysis; Introduction to tools like AntConc, WordSmith, and LIWC; Challenges and limitations in authorship attribution; Forensic Linguistics in Digital Communication.	22
IV	Forensic Phonetics and Discourse Analysis: Basics of speech production and acoustics; Speaker identification and voice line-ups; Discourse Analysis in Forensic Contexts; Analyzing written and spoken texts for clues; Detecting deception, coercion, and manipulation; Forensic Applications of Discourse Analysis: Analyzing threatening letters, ransom notes, and confessions; Identifying linguistic markers of deception; Ethical Considerations.	23
	Total	90

Notional Credit Hours for the course: 30 x 4 = 120 NCH

Distribution of Credits			
Lecture/ Tutorial	Practicum	Experiential Learning	
90	0	30 Laboratory Visit, Field Trips, Group Work, Discussions, Presentations and Quiz	

Suggested Readings:

1. Coulthard, M., & Johnson, A. (2007). An Introduction to Forensic Linguistics: Language in Evidence. Routledge.

2. Gibbons, J. (2003). Forensic Linguistics: An Introduction to Language in the Justice System. Blackwell Publishing.

3. Olsson, J. (2008). Forensic Linguistics. Bloomsbury Academic.

4. Shuy, R. W. (2006). Linguistics in the Courtroom: A Practical Guide. Oxford University Press.

5. Tiersma, P. M. (1999). Legal Language. University of Chicago Press.