



INTEGRAL UNIVERSITY, LUCKNOW
INTEGRAL INSTITUTE OF ALLIED HEALTH SCIENCES & RESEARCH

DEPARTMENT OF PARAMEDICAL SCIENCES

**BACHELOR OF SCIENCE IN FORENSIC SCIENCE
(B.FS.)**

SYLLABUS

YEAR/ SEMESTER: III/V



Integral University, Lucknow
Department of Paramedical Sciences
Study and Evaluation Scheme

Program: B.Sc. FS

Semester-V

S. N.	Course code	Course Title	Type of Paper	Period Per hr/week/sem			Evaluation Scheme				Sub. Total	Credit	Total Credits
				L	T	P	CT	TA	Total	ESE			
THEORIES													
1	FS301	Forensic Toxicology	Core	3	1	0	40	20	60	40	100	3:1:0	4
2	FS302	Forensic Ballistics	Core	3	1	0	40	20	60	40	100	3:1:0	4
3	FS303	Digital & Cyber Forensics-II	Core	3	1	0	40	20	60	40	100	3:1:0	4
4	FS304	Research Methodology	Core	3	1	0	40	20	60	40	100	3:1:0	4
PRACTICAL													
1	FS305	Forensic Toxicology-Lab	Core	0	0	2	40	20	60	40	100	0:0:1	1
2	FS306	Forensic Ballistics-Lab	Core	0	0	2	40	20	60	40	100	0:0:1	1
3	FS307	Digital & Cyber Forensics-II-Lab	Core	0	0	2	40	20	60	40	100	0:0:1	1
4	FS308	Seminar	Core	0	4	0	50	50	100	00	100	0:0:4	4
Total				12	8	06	330	190	520	280	800	23	23

S. N.	Course code	Course Title	Type of Paper	Attributes						United Nation Sustainable Development Goal (SDGs)	
				Employability	Entrepreneurship	Skill Development	Gender Equality	Environment & Sustainability	Human Value		Professional Ethics
THEORIES											
1	FS301	Forensic Toxicology	Core	√	√	√			√	√	3,4
2	FS302	Forensic Ballistics	Core	√	√	√			√	√	3,4
3	FS303	Digital & Cyber Forensics-II	Core	√	√	√			√	√	3,4
4	FS304	Research Methodology	Core	√	√	√			√	√	3,4
PRACTICAL											
1	FS305	Forensic Toxicology-Lab	Core	√	√	√			√	√	3,4
2	FS306	Forensic Ballistics-Lab	Core	√	√	√			√	√	3,4
3	FS307	Digital & Cyber Forensics-II-Lab	Core	√	√	√			√	√	3,4
4	FS308	Seminar	Core	√	√	√			√	√	3,4

L: Lecture **T:** Tutorials **P:** Practical **CT:** Class Test **TA:** Teacher Assessment **ESE:** End Semester Examination,
AE= Ability enhancement, **DSE-** Discipline Specific Elective, **Sessional Total:** Class Test + Teacher Assessment **Subject Total:** Sessional Total + End Semester Examination (ESE)



Integral University, Lucknow

Effective from Session: 2023-24							
Course Code	FS301	Title of the Course	FORENSIC TOXICOLOGY	L	T	P	C
Year	III	Semester	V	3	1	0	4
Pre-Requisite	Nil	Co-requisite	Nil				
Course Objectives	Provide understanding about the different types of poisons & toxicological evidences, their forensic significances and importance of proper examination.						
Course Outcomes							
CO1	To develop the basic understanding and knowledge of historical perspective and background of toxicology and toxicological examination. Introduction and classification of drugs of abuse.						
CO2	Developing the understanding of classification, administration and action of poison and their identification techniques						
CO3	To discuss about the classification, nature, administration, symptoms, detection, Post mortem finding of organic and inorganic poisons.						
CO4	To discuss about the classification, nature, administration, symptoms, detection, Post mortem finding of Vegetable poison, Pesticides etc.						
CO5	To discuss about the different techniques and tests for the detection, extraction of poisons from biological matrices and medico-legal aspects of poisoning.						

Unit No.	Title of the Unit	Content of Unit	Contact Hrs.	Mapped CO
1	INTRODUCTION TO FORENSIC TOXICOLOGY	Introduction to Forensic Toxicology: Toxicology: Introduction, concept and history of forensic toxicology and its significance. Types of toxicity; LD 50, LC 50, Lethal dose, lethal period, Fatal period, and its forensic significance. Role of a forensic toxicologist. Collection and Preservation of toxicological exhibits in fatal and survival cases, medico-legal aspects	8	CO1
2	POISON & DRUG OF ABUSE	Poison & Drug Of Abuse: Definition, Classification and principles of Poison, Types of poisoning, Toxicokinetic and Toxicodynamic of poison. administration & action of poison, Introduction and importance of drug of abuse, drug of abuse in sports, narcotics drugs, psychotropic substances, designers' drugs. Drugs and Cosmetic Act, NDPS Act.	8	CO2
3	ORGANIC & INORGANIC POISON	Organic & Inorganic Poison- Metallic Poison: Barbiturate, Arsenic, Mercury, Lead, Cadmium, Mineral acids: H ₂ SO ₄ , HCL, HNO ₃ ; Alkaloids:Hydrated and carbonates of sodium, NaOH, KOH; Pesticides-Organophosphorus, Organochlorin Compound and Carbamates, pyrethroids and pyrethrin nature, classification, administration, symptoms, detection, Post mortem finding, and medicolegal aspect.	8	CO3
4	ANIMAL & VEGETABLE POISONS	Animal & Vegetable Poisons: Animal poisons: Snake, scorpions and Cantharides; Vegetable Poisons: Dhatura, Oleander, Madar, Abrus precatorius, Castor, Cannabis, Nux vomica, cyanide, etc. Nature, administration, symptoms, post-mortem findings, detection, and medico-legal aspects.	8	CO4
5	TOXICOLOGY OF VOLATILE POISONS	Toxicology Of Volatile Poisons: Methyl alcohol, Chloroform, Ethyl alcohol, Acetone- Nature, administration, symptoms, post-mortem findings, detection and medico-legal aspects. Introduction & the definition of alcohol and illicit liquor, analysis of blood for alcohol, Proof spirit, absorption, Breath test instrument, field sobriety testing, analysis of alcohol in blood.	8	CO5

Reference Books:

1. Stolemen, Progress in Chemical Toxicology: Acad. Press, New York, 1963.
2. Clark, E.G.C., Isolation and identification of Drugs, Vol. I and Vol. II, Academic Press, 1986.
3. Connors., A test book of pharmaceuticals analysis, Inter science, New York, 1975.
4. Cravey, R.H., Baselt, R.C., Introduction to Forensic Toxicology, Biochemical publications, Davis C A, 1981.
5. Curry A.S., Analytical Methods in Human Toxicology, Part-II, 1986.
6. Modi, Jaising P., Textbook of Medical Jurisprudence & Toxicology, M.M. Tripathi Pub., 2001.
7. Mule, S.J. et al., Immunoassays for Drugs subjects to ab, CRC Press USA, 1974.
8. Sunshine, I., Guidelines for Analytical Toxicology Programs, Vol. I, CRC Press, USA, 1950.
9. Sunshine, I., Guidelines for Analytical Toxicology, CRC Press USA, 1975.
10. Sunshine, Methods of Analytical Toxicology, CRC Press USA, 1975.
11. Modi & K. Kannan, A text book of Medical Jurisprudence and Toxicology, Latest Edition.

e-Learning Source:

1. <https://youtu.be/wytDunVxNx0>
2. <https://epgp.inflibnet.ac.in/Home/ViewSubject?catid=eCJfy23Kjy3c0vICLa6VYg==#>
3. <https://youtu.be/aTiFVwV0vzg>

	Course Articulation Matrix: (Mapping of COs with POs and PSOs)																	
PO-PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO4	PSO5	PSO6	PSO7
CO1	3	3	3	2	3	2	3	3	3	2	3	2	3	3	2	3	3	3
CO2	3	3	2	3	3	2	3	3	3	2	3	3	2	3	2	3	3	3
CO3	3	2	3	3	3	3	2	3	3	3	2	2	3	2	3	3	2	3
CO4	3	3	2	3	2	3	3	3	2	3	3	2	2	3	3	3	3	3
CO5	2	3	2	3	3	3	3	2	3	3	2	3	3	2	3	3	3	2

1- Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation Attributes & SDGs									
Course Code	Course Title	Attributes							SDGs No.
FS301	FORENSIC TOXICOLOGY	Employability	Entrepreneurship	Skill Development	Gender Equality	Environment & Sustainability	Human Value	Professional Ethics	
		√	√	√			√	√	3,4



Integral University, Lucknow

Effective from Session: 2023-24

Course Code	FS302	Title of the Course	FORENSIC BALLISTICS	L	T	P	C
Year	III	Semester	V	3	1	0	4
Pre-Requisite		Co-requisite	Nil				
Course Objectives	To develop an understanding about the firearms and ammunition as well as their forensic examination.						

Course Outcomes

CO1	To develop the deep understanding and knowledge of historical perspective and background of firearms and their development. Components and types of firearms.
CO2	Developing the understanding of history and classification of ammunition, constructional features of different types of cartridges, types of primers and priming composition, propellants and their compositions, various types of bullet and compositional aspects.
CO3	To discuss about the various aspects of Internal and External Ballistics in detail.
CO4	To develop the deep understanding about the terminal ballistics in brief and its importance in criminal investigation.
CO5	To discuss about the principles of identification of firearms and determination of range of fire.

Unit No.	Title of the Unit	Content of Unit	Contact Hrs.	Mapped CO
1	HISTORY AND BACKGROUND OF FIREARMS	History And Background Of Firearms: History and development of firearms, Classification of firearms, weapon types, and their operations, proof marks. Rifling, the purpose & types of rifling, trigger and firing mechanism, improvised country-made/imitative firearm, and their constructional features.	8	CO1
2	AMMUNITION	Ammunition: Definition, History, and Classification, constructional features of different types of cartridges, types of primers & propellants, and their compositions. Various types of bullet and compositional aspects.	8	CO2
3	INTERNAL AND EXTERNAL BALLISTICS	Internal and External Ballistics: Internal ballistics – Definition, Combustion of propellants, lock time, ignition time, barrel time, factors affecting the internal ballistics. Lock time, ignition time, barrel time, erosion, corrosion, and gas cutting. External Ballistics: vacuum trajectory, effect of air resistance on trajectory, base drag, yaw, shape of projectile and stability, ricochet, trajectory computation, ballistics coefficient, Theory of recoil, barrel pressure measurement.	8	CO3
4	TERMINAL BALLISTICS	Terminal Ballistics: Injuries and the quantity of energy of projectiles, Shock wave, and cavitation effect, striking angle and nature of target, tumbling of bullet, effect of intermediate targets. Ricochet and wound ballistics, evaluation of injuries caused due to shot-gun, rifle, handguns and country made fire arms, postmortem and anti-mortem firearm injuries.	8	CO4
5	PRINCIPLES AND PRACTICE OF IDENTIFICATION	Principles and Practice of Identification: Firearms, ammunition and their components, different types of marks produced during firing process on cartridge- firing pin marks, breech face marks, chamber marks, extractor and ejector marks, number /direction of land and grooves, striation marks on land and grooves. Determination of range of fire- burning, scorching, blackening, tattooing and metal fouling, shot dispersion and GSR distribution..	8	CO5

Reference Books:

- Sharma, B.R.; Firearms in Criminal Investigation & Trials, 4th Ed, Universal Law Publishing Co Pvt Ltd, New Delhi, 2011
- Hogg, I.V; "The Cartridge guide – A Small arms Ammunition Identification Manual", The Stackpole publishing Co., Harrisburg, Pa, 1982
- Hatcher, Jury and Weller; "Firearms Investigation, Identification and Evidence", Stackpole Books, Harrisburg, Pa, 1997.
- Jauhari M; "Identification of Firearms, Ammunition, & Firearms Injuries", BPR&D, New Delhi.
- Schooeble, A.J. and Exline, L.D; Current methods in Forensic Gunshot Residue Analysis, CRC Press, New York, 2000.
- W.G. Eckert and R.K. Wright in Introduction to Forensic Sciences, 2nd Edition, W.G. Eckert (ED.), CRC Press, Boca Raton (1997).
- Forensic Ballistics in Criminal Justice by K. Kumar.
- Ballistics in court by Brian J. Heard.

e-Learning Source:

- <https://epgp.inflibnet.ac.in/Home/ViewSubject?catid=eCJfy23Kjy3c0vICLa6VYg==#>
- <https://youtu.be/Yu8d-Ct53wc>
- <https://youtu.be/K5PMnGO-8AY>

Course Articulation Matrix: (Mapping of COs with POs and PSOs)

PO-PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	2	3	2	2	3	2	3	3	3	2	3	2	3	3	2	3	2	2
CO2	2	3	2	3	3	2	3	2	3	2	3	3	2	3	2	3	3	2
CO3	3	2	3	3	2	2	3	2	3	3	2	2	3	2	2	2	2	3
CO4	3	3	2	3	2	3	3	3	2	3	3	2	2	3	3	3	3	3
CO5	3	3	2	3	2	3	3	2	3	3	2	3	3	2	3	3	3	3

1- Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation

Attributes & SDGs

Course Code	Course Title	Attributes							SDGs No.
FS302	FORENSIC BALLISTICS	Employability	Entrepreneurship	Skill Development	Gender Equality	Environment & Sustainability	Human Value	Professional Ethics	3,4
		√	√	√			√	√	



Integral University, Lucknow

Effective from Session: 2023-24							
Course Code	FS303	Title of the Course	DIGITAL & CYBER FORENSICS-II	L	T	P	C
Year	II	Semester	III	3	1	0	4
Pre-Requisite	Nil	Co-requisite	Nil				
Course Objectives	Able to understand the importance of cyber forensics in corporate and electronic world with emphasis on forensic auditing and IT Act.						

Course Outcomes: After the successful course completion, learners will develop following attributes:

CO1	To develop the understanding and knowledge about the Data and Evidence Recovery, Data Recovery Tools, Data Recovery Procedures and Ethic.
CO2	Developing the understanding of various aspects of Forensics Auditing, Principles of Forensic Accounting and Fraud Examination and Roles of the Forensic Accountant.
CO3	To discuss about the Investigation of Theft Acts, Investigation of Concealment and Conversion Investigation Methods.
CO4	To develop the deep understanding about the EDI, E-Business, E-Banking, Online payment modes, Mobile Banking Ecommerce, Internet and intranets.
CO5	Scope and Objectives of IT Act 2000. Recognition and Verification of Digital Signature, and Emerging trends in Information Technology law.

Unit No.	Title of the Unit	Content of Unit	Contact Hrs.	Mapped CO
1	FORENSIC TOOLS & DATA RECOVERY	Forensic Tools & Data Recovery: Introduction to Forensic Tools, Usage of Slack space, tools for Disk Imaging, ", Introduction & Importance of Data and Evidence Recovery, Data Recovery Tools and technology, Recovery Procedures, Mobile Forensic- identification, collection and preservation of mobile evidences, Blue-Tooth, File Transfer Protocol (FTP), Complete time line analysis of computer files based on file creation, file modification and file access, Recover Swap Files/Temporary Files/Cache Files.	8	CO1
2	FORENSICS AUDITING & FRAUD	Forensics Auditing & Fraud -Introduction and Principles of Forensic Auditing and Fraud Examination and their Investigation procedure; Nature of Fraud, Types, Fraud Prevention and Detection, Recognizing the Symptoms of Fraud, Role of the Forensic Accountant and Forensic Auditor.	8	CO2
3	INVESTIGATING THEFT ACTS	Investigating Theft Acts; Investigating Concealment, Conversion Investigation Methods; Private Sources of Information, Inquiry Methods and Honesty Testing, Financial Statement Fraud; Revenue-and Inventory-Related Financial Statement Frauds; Liability, Asset, and Inadequate Disclosure Frauds; Fraud Against Organizations, Consumer Fraud; Identification of Theft, Investment Scams, Money Laundering; Bankruptcy	8	CO3
4	ELECTRONIC WORLD AND NETWORKING	Electronic World and Networking – Concepts of Electronic Communication, PCs and Networking, E-mail, Internet and intranets, Internet band width. Introduction to Electronic Data Interchange, E-Banking, Online/Digital payment modes, Mobile Banking, Secure transaction, Unified Payment Interface (UPI), Immediate Payment System (IMPS).	8	CO4
5	INFORMATION TECHNOLOGY LAW	Information technology law: Why Do We Need Cyber laws, IT Act 2000: Scope, Objectives, E- Governance, Amendment in IT Act, Creation, Recognition and Verification of Digital Signature, Digital Signature and Penalties under IT Act 2000, Certifying Authority and Controller, Emerging trends in Information Technology law.	8	CO5

Reference Books:

1. File System Forensic Analysis by Brian Carrier, Publisher: Addison-Wesley Professional, 1st Edition (2005).
2. Cyberlaw Crimes (ITAct2000&ComputerCrimeAnalysis) by Barkha & Ram Mohan, Publisher: Asian Law House, Hyderabad.
3. Firewalls and Internet Security: Repelling the Wily Hacker, Second Edition (2003) Addison.
4. E-Commerce: The Cutting Edge of Business by Kamlesh K. Bajaj & Debjani Nag, TataMcGrawHill2nd Edition,2005
5. Cyber Law and E. Commerce by David Baumer, JC Poindexter, TMG Cyber law Simplified Vivek Sood, TMG

e-Learning Source:

1. <https://youtu.be/EkZSfGGROZQ>
2. <https://epgp.inflibnet.ac.in/Home/ViewSubject?catid=eCJfy23Kjy3c0vICLa6VYg==#>
3. <https://youtu.be/vErX76YoHVs>

Course Articulation Matrix: (Mapping of COs with POs and PSOs)																	
PO-PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	3	3	2	3	2	3	3	3	2	3	2	3	3	2	3	2
CO2	3	3	2	3	3	2	3	2	3	2	3	3	2	3	3	3	3
CO3	3	2	3	3	2	2	3	2	3	3	2	2	3	3	3	2	2
CO4	2	3	2	3	2	3	2	2	2	3	3	2	2	3	2	2	3
CO5	3	3	2	3	2	3	3	2	3	3	2	3	3	2	3	3	3

1- Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation

Attributes & SDGs

Course Code	Course Title	Attributes							SDGs No.
FS303	DIGITAL & CYBER FORENSICS-II	Employability	Entrepreneurship	Skill Development	Gender Equality	Environment & Sustainability	Human Value	Professional Ethics	3,4
		√	√	√			√	√	



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Effective from Session: 2023-24

Effective from Session: 2023-24							
Course Code	FS304	Title of the Course	RESEARCH METHODOLOGY	L	T	P	C
Year	III	Semester	V	3	1	0	4
Pre-Requisite	Nil	Co-requisite	Nil				
Course Objectives	The primary objective of this course is to develop a research orientation among the scholars and to acquaint them with the fundamentals of research methods. Specifically, the course aims at introducing them to the basic concepts used in research and to scientific social research methods and their approach. It includes discussions on sampling techniques, research designs and techniques of analysis.						

Course Outcomes	
CO1	To develop the basic introduction and process of research along with ethical issues in conducting research.
CO2	Developing the understanding of Research modeling and Data collection methods.
CO3	To discuss about the Application of Statistical tool and their dimensions in good research.
CO4	To develop a basic understanding about the data analysis techniques and hypothesis testing.
CO5	To develop the basic knowledge and skill of report writing and APA formatting of research among the students.

Unit No.	Title of the Unit	Content of Unit	Contact Hrs.	Mapped CO
1	INTRODUCTION	Introduction -Definitions, Meanings and characteristics. Types of research; Research process and steps in conducting research; Applications of Research. Ethical issues in conducting research.	8	CO1
2	RESEARCH MODELING	Research Modeling - Concept of variable and Types of variable, Types of Data, Data collection methods- Survey method, Observation method; Scaling techniques; types of sampling technique, steps in sampling, advantage and limitations of sampling.	8	CO2
3	APPLICATION OF STATISTICAL TOOLS	Application of Statistical tools -Measures of Central tendency – Mean, Median, Mode; Standard Deviation, Statistical tools (SAS, S-PLUS), Introduction of Probability Theories and Concepts.	8	CO3
4	DATA ANALYSIS TECHNIQUES	Data Analysis Techniques — Quantitative and qualitative Approach;Introduction to Hypothesis (Null Hypothesis, Alternative Hypothesis), Type I and Type II error, Hypothesis Testing- Parametric tests (Z-test, t-test- F-test, ANNOVA) and Non-parametric Tests (Chi-Square Test).	8	CO4
5	REPORT WRITING	Report Writing -Report generation, report writing Introduction- Title page, Abstract, Introduction, Methodology, Results, Discussion, References, and Appendices, Format and Style of referencing (APA, MLA).	8	CO5

Reference Books:

1. Mausner & Bahn: Epidemiology-An Introductory text, 2ndEd., (1985) W.B. Saunders Co.
2. Richard F. Morton & J. Richard Hebd: A study guide to Epidemiology and Biostatistics, 2nd Ed. (2012), University Park Press, Baltimore.
3. B.K. Mahajan, Methods in Biostatistics, Jaypee.
4. Hicks: Research methodology, Churchill Livingstone.
5. Introduction to research methods by Bora Pajo.
6. Research methodology by Ranjit Kumar.

e-Learning Source:

1. <https://youtu.be/wBomUBY62a4>
2. <https://youtu.be/8L4Iupxljog>
3. <https://youtu.be/unsFK23vJjk>

Course Articulation Matrix: (Mapping of COs with POs and PSOs)																	
PO-PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	2	2	3	2	3	2	2	2	2	2	3	2	3	3	2	3	2
CO2	2	2	2	3	3	2	3	2	3	2	3	3	2	2	2	3	3
CO3	3	2	3	3	2	2	3	2	3	3	2	2	3	2	2	2	2
CO4	2	3	2	3	2	2	2	2	2	3	3	2	2	3	2	2	3
CO5	3	3	2	3	2	3	3	2	3	2	2	3	3	2	3	3	3

1- Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation

Attributes & SDGs

Course Code	Course Title	Attributes							SDGs No.
FS304	RESEARCH METHODOLOGY	Employability	Entrepreneurship	Skill Development	Gender Equality	Environment & Sustainability	Human Value	Professional Ethics	3,4
		√	√	√	√		√	√	



Integral University, Lucknow

Effective from Session: 2023-24

Effective from Session: 2023-24							
Course Code	FS305	Title of the Course	FORENSIC TOXICOLOGY-LAB	L	T	P	C
Year	III	Semester	V	0	0	2	1
Pre-Requisite	Nil	Co-requisite	Nil				
Course Objectives	To provide a detailed practical knowledge of forensic toxicology in criminal investigation.						

Course Outcomes

CO1	To perform the analysis of plant poison
CO2	To perform the identification of poisons by color test
CO3	To identify the different organic poisons
CO4	To extract the drugs and poisons using various methods
CO5	To separate drugs of abuse by thin layer chromatography

Unit No.	Title of the Unit	Content of Unit	Contact Hrs.	Mapped CO
1	INTRODUCTION TO FORENSIC TOXICOLOGY	1. Preparation of TLC plates 2. Instrumental analysis of toxic substances using UV-Vis spectrophotometer	4	CO1-5
2	POISON & DRUG OF ABUSE	3. To separate drugs of abuse by thin-layer chromatography	4	
3	ORGANIC & INORGANIC POISON	4. To identify metallic poisons (Arsenic, Mercury and Lead) 5. Analysis of corrosive poisons. (Hydrochloric acid, Sulphuric acid, Nitric acid) 6. To perform color tests for barbiturates.	4	
4	ANIMAL & VEGETABLE POISONS	7. Analysis of vegetable poisons. (Calotropis, Oleander, Nicotine)	4	
5	TOXICOLOGY OF VOLATILE POISONS	8. Analysis of alcohol and other volatile poisons. (Ethyl alcohol, Methyl alcohol, Chloroform, Acetone, Phenol)	4	

Reference Books:

1. Modi, Jaising P., Textbook of Medical Jurisprudence & Toxicology, M.M. Tripathi Pub., 2001.
2. Mule, S.J. et al., Immunoassays for Drugs subjects to ab, CRC Press USA, 1974.
3. Sunshine, I., Guidelines for Analytical Toxicology Programs, Vol. I, CRC Press, USA, 1950.
4. Clark, E.G.C., Isolation and identification of Drugs, Vol. I and Vol. II, Academic Press, 1986.

e-Learning Source:

1. <https://youtu.be/0ugmuJ0mS60>
2. <https://youtu.be/FP4QJ1M6Tlc>
3. <https://youtu.be/QtanM5-mD7M>

Course Articulation Matrix: (Mapping of COs with POs and PSOs)

PO-PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	3	3	2	3	2	3	3	3	2	3	2	3	3	2	3	3
CO2	3	3	2	3	3	2	3	3	3	2	3	3	2	3	2	3	3
CO3	3	2	3	3	3	3	2	3	3	3	2	2	3	2	3	3	2
CO4	3	3	2	3	2	3	3	3	2	3	3	2	2	3	3	3	3
CO5	2	3	2	3	3	3	3	2	3	3	2	3	3	2	3	3	3

2-

Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation

Attributes & SDGs

Course Code	Course Title	Attributes							SDGs No.
FS305	FORENSIC TOXICOLOGY-LAB	Employability	Entrepreneurship	Skill Development	Gender Equality	Environment & Sustainability	Human Value	Professional Ethics	3,4
		√	√	√			√	√	



Integral University, Lucknow

Effective from Session: 2023-24							
Course Code	FS306	Title of the Course	FORENSIC BALLISTICS-LAB	L	T	P	C
Year	III	Semester	V	0	0	2	1
Pre-Requisite	Nil	Co-requisite	Nil				
Course Objectives	To provide a detailed practical knowledge of forensic ballistics in criminal investigation.						

Course Outcomes: After the successful course completion, learners will develop following attributes:	
CO1	To understand different types of firearms and their working mechanism
CO2	To identify different types of marks of fired cartridge case
CO3	Range estimation of fired bullet
CO4	Discuss about the firearm injuries
CO5	To analyze the GSR found on crime scene

Unit No.	Title of the Unit	Content of Unit	Contact Hrs.	Mapped CO
1	HISTORY AND BACKGROUND OF FIREARMS	1. Demonstration of Firearms- Rifles, Handguns (standard & Country made), Shotgun	4	CO1-5
2	AMMUNITION	2. To identify gunshot residue.	4	
3	INTERNAL AND EXTERNAL BALLISTICS	3. To estimate the range of fired bullets	4	
4	TERMINAL BALLISTICS	4. To co-relate the striking angle of the bullet with the impact on the target. 5. To differentiate, with the aid of diagram, contact wounds, close range wounds and distant wounds.	4	
5	PRINCIPLES AND PRACTICE OF IDENTIFICATION	6. To study the comparison of fired bullets. 7. To study the fired cartridges cases for Individual and Class characteristics. 8. To study the comparison of fired cartridge cases.	4	

Reference Books:

- Sharma, B.R.; Firearms in Criminal Investigation & Trials, 4th Ed, Universal Law Publishing Co Pvt Ltd, New Delhi, 2011
- Hogg, I.V; "The Cartridge guide – A Small arms Ammunition Identification Manual", The Stackpole publishing Co., Harrisburg, Pa, 1982
- Hatcher, Jury and Weller; "Firearms Investigation, Identification and Evidence", Stackpole Books, Harrisburg, Pa, 1997.
- Jauhari M; "Identification of Firearms, Ammunition, & Firearms Injuries", BPR&D, New Delhi.

e-Learning Source:

- <https://youtu.be/JjiT4zrQnzw>
- <https://youtu.be/EjQrhDKDWfk>
- <https://epgp.inflibnet.ac.in/Home/ViewSubject?catid=eCJfy23Kjy3c0vICLa6VYg==#>

Course Articulation Matrix: (Mapping of COs with POs and PSOs)																	
PO-PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	2	3	2	2	3	2	3	3	3	2	3	2	3	3	2	3	2
CO2	2	3	2	3	3	2	3	2	3	2	3	3	2	3	2	3	3
CO3	3	2	3	3	2	2	3	2	3	3	2	2	3	2	2	2	2
CO4	3	3	2	3	2	3	3	3	2	3	3	2	2	3	3	3	3
CO5	3	3	2	3	2	3	3	2	3	3	2	3	3	2	3	3	3

2-

Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation

Attributes & SDGs

Course Code	Course Title	Attributes							SDGs No.
FS306	FORENSIC BALLISTICS-LAB	Employability	Entrepreneurship	Skill Development	Gender Equality	Environment & Sustainability	Human Value	Professional Ethics	3,4
		√	√	√	√		√	√	



Integral University, Lucknow

Effective from Session: 2023-24							
Course Code	FS307	Title of the Course	DIGITAL & CYBER FORENSICS-II-LAB	L	T	P	C
Year	III	Semester	V	0	0	2	1
Pre-Requisite	Nil	Co-requisite	Nil				
Course Objectives	To provide a detailed practical knowledge of digital & cyber forensic in criminal investigation.						

Course Outcomes	
CO1	To perform the data recovery
CO2	Creation of digital evidences
CO3	Identification of theft data.
CO4	To perform E-Mail investigation.
CO5	Verification of Digital Signature.

Unit No.	Title of the Unit	Content of Unit	Contact Hrs.	Mapped CO
1	FORENSIC TOOLS & DATA RECOVERY	1. Data Recovery integrated with forensic technology. 2. To acquire data from PCs/laptops/HDDs/USBs, pen drives, memory cards. 3. Demonstration of MATLAB software. 4. Working on Encase Software. 5. Imaging of discs using various tools. 6. Image processing using tools like, Photoshop, Corel Photo paint etc.	4	CO1-5
2	FORENSICS AUDITING & FRAUD	7. Case Study of Forensic Auditing.	4	
3	INVESTIGATING THEFT ACTS	8. To study the Investigation and Identification of Theft data.	4	
4	ELECTRONIC WORLD AND NETWORKING	9. Detail Analysis of E-mail, E-Mail Investigation, E-Mail Tracking, IP Tracking 10. Email Recovery.	4	
5	INFORMATION TECHNOLOGY LAW	11. Creation & verification of Digital Signature.	4	

Reference Books:

1. File System Forensic Analysis by Brian Carrier, Publisher: Addison-Wesley Professional, 1st Edition (2005).
2. Cyberlaw Crimes (ITAct2000&ComputerCrimeAnalysis) by Barkha & Ram Mohan, Publisher: Asian Law House, Hyderabad.
3. Firewalls and Internet Security: Repelling the Wily Hacker, Second Edition (2003) Addison.

e-Learning Source:

1. <https://youtu.be/EkZSfGGROZQ>
2. <https://epgp.inflibnet.ac.in/Home/ViewSubject?catid=eCJfy23Kjy3c0vICLa6VYg==#>
3. <https://youtu.be/vErX76YoHVg>

Course Articulation Matrix: (Mapping of COs with POs and PSOs)																	
PO-PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	3	3	2	3	2	3	3	3	2	3	2	3	3	2	3	2
CO2	3	3	2	3	3	2	3	2	3	2	3	3	2	3	3	3	3
CO3	3	2	3	3	2	2	3	2	3	3	2	2	3	3	3	2	2
CO4	2	3	2	3	2	3	2	2	2	3	3	2	2	3	2	2	3
CO5	3	3	2	3	2	3	3	2	3	3	2	3	3	2	3	3	3

1- Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation

Attributes & SDGs									
Course Code	Course Title	Attributes							SDGs No.
FS307	DIGITAL & CYBER FORENSICS-II-LAB	Employability	Entrepreneurship	Skill Development	Gender Equality	Environment & Sustainability	Human Value	Professional Ethics	
		√	√	√			√	√	3,4



Integral University, Lucknow

Effective from Session: 2023-24							
Course Code	FS308	Title of the Course	SEMINAR	L	T	P	C
Year	III	Semester	VI	0	4	0	4
Pre-Requisite	Nil	Co-requisite	Nil				
Course Objectives	This course will serve as a platform for students to enhance presentation skills.						

Course Outcomes	
CO1	The students will understand and interpret latest advancements through different technical papers, reports, Journals, Data sheets, books etc
CO2	The students will inculcate the skills for literature survey and will learn to manage resources effectively.
CO3	The students will be able to summarize the recent research and technologies in the form of review and will be able to deliver power point presentations on an assigned topic.
CO4	The students will be able to communicate his/her ideas with his peers as audience, which will enhance both oral and written communication skills.
CO5	The students will be able to create interest to pursue lifelong learning.

SEMINAR PRESENTATION ASSESSMENT FORM

Name of Student:		Session:	
Enrolment Number:		Date:	
Name of Subject:	Seminar	Subject code:	FS308
Topics:			

Criteria	Sub-Criteria	Max. Marks	Marks Obtained
Introduction (Max marks-10)	Use appropriate background information	04	
	Has clear statement of purpose	04	
	Shows a logical sequence	02	
Factual Content (Max marks- 20)	Includes accurate information	04	
	Shows up-to-date content	04	
	Presents relevant content	04	
	Shows in-depth and sufficient details	02	
	Addresses all important issues	02	
	Is selective	02	
	Use of proper English Grammar in the text	02	
Presentation Quality (Max marks-06)	Has a good design of presentation (appropriate font, type, size, color, matter per slide etc.)	04	
	Has a clear verbal expression and eye contact with audience	02	
Response to questions (Max marks-10)	Answers question(s) correctly	04	
	Has the ability to think on the spot	04	
	Shows an ability to defend content of presentation	02	
Time Management (Max. mark-04)	Completes the presentation within allocated time	04	
Total Marks		50	

Note: In case of Oral Presentation, each student will be assessed in a 20 minutes time (15 min for presentation & 5 min for discussion) out of 50 marks.

Comments/Suggestions:

(Name and signature of Incharge)

(Head, Paramedical)

EVALUATION OF SEMINAR

The evaluation for internal examination of 100 marks will be distributed:

Seminar Presentation=**50marks**.

Viva voce =**45 marks**

Attendance=**5 marks**

Course Articulation Matrix: (Mapping of COs with POs and PSOs)																	
PO-PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	2	3	3	2	3	2	3	1	2	1	-	-	3	2	3	3	2
CO2	3	3	3	3	2	2	3	2	1	3	-	-	2	2	3	2	3
CO3	3	3	3	3	2	2	3	2	1	3	-	-	3	2	2	2	3
CO4	3	3	3	3	2	2	3	2	1	3	-	-	2	3	2	2	3
CO5	3	3	3	3	2	2	3	2	1	3	-	-	3	2	3	3	2

1- Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation

Attributes & SDGs									
Course Code	Course Title	Attributes							SDGs No.
FS308	SEMINAR	Emplo yability	Entrepre neurship	Skill Development	Gender Equality	Environment & Sustainability	Human Value	Professional Ethics	
		√	√	√			√	√	



INTEGRAL UNIVERSITY, LUCKNOW
INTEGRAL INSTITUTE OF ALLIED HEALTH SCIENCES & RESEARCH

DEPARTMENT OF PARAMEDICAL SCIENCES

**BACHELOR OF SCIENCE IN FORENSIC SCIENCE
(B.FS.)**

SYLLABUS

YEAR/ SEMESTER: III/VI



Integral University, Lucknow
Department of Paramedical Sciences
Study and Evaluation Scheme

Program: B.Sc. FS

Semester-VI

S. N.	Course code	Course Title	Type of Paper	Period Per hr/week/sem			Evaluation Scheme				Sub. Total	Credit	Total Credits
				L	T	P	CT	TA	Total	ESE			
THEORIES													
1	FS309	Questioned Document Examination	Core	3	1	0	40	20	60	40	100	3:1:0	4
2	FS310	Explosives	Core	2	1	0	40	20	60	40	100	3:1:0	3
3	FS311	Fingerprints & Impressions	Core	3	1	0	40	20	60	40	100	3:1:0	4
4	FS312	Instrumental and Analytical Technique	Core	3	1	0	40	20	60	40	100	2:1:0	4
PRACTICAL													
1	FS313	Questioned Document Examination-Lab	Core	0	0	2	40	20	60	40	100	0:0:1	1
2	FS314	Fingerprints & Impressions-Lab	Core	0	0	2	40	20	60	40	100	0:0:1	1
3	FS315	Project Work/Dissertation	Core	0	0	20	40	20	60	40	100	0:0:10	10
Total				11	04	24	280	140	420	280	700	27	27

S. N.	Course code	Course Title	Type of Paper	Attributes							United Nation Sustainable Development Goal (SDGs)
				Employability	Entrepreneurship	Skill Development	Gender Equality	Environment & Sustainability	Human Value	Professional Ethics	
THEORIES											
1	FS309	Questioned DocumentExamination	Core	√	√	√			√	√	3,4
2	FS310	Explosives	Core	√	√	√			√	√	3,4
3	FS311	Fingerprints & Impressions	Core	√	√	√			√	√	3,4
4	FS312	Instrumental and Analytical Technique	Core	√	√	√			√	√	3,4
PRACTICAL											
1	FS313	Questioned DocumentExamination-Lab	Core	√	√	√			√	√	3,4
2	FS314	Fingerprints & Impressions-Lab	Core	√	√	√			√	√	3,4
3	FS315	Project Work/Dissertation	Core	√	√	√			√	√	3,4

L: Lecture **T:** Tutorials **P:** Practical **CT:** Class Test **TA:** Teacher Assessment **ESE:** End Semester Examination,
AE= Ability enhancement, **DSE-** Discipline Specific Elective, **Sessional Total:** Class Test + Teacher Assessment **Subject Total:** Sessional Total + End Semester Examination (ESE)



Integral University, Lucknow

Effective from Session: 2023-24							
Course Code	FS309	Title of the Course	QUESTIONED DOCUMENT EXAMINATION	L	T	P	C
Year	III	Semester	VI	3	1	0	4
Pre-Requisite	Nil	Co-requisite	Nil				
Course Objectives	To develop the skills of forensic examination of questioned documents and forgeries.						

Course Outcomes	
CO1	To develop the understanding and knowledge about basics concepts of questioned documents examination, preliminary examination of questioned documents and basic tools needed for forensic examination of documents.
CO2	Developing the understanding to estimate the age of the documents and study of typescripts and typewriters.
CO3	To discuss about the basic principles of handwriting identification and development of handwriting.
CO4	To develop the understanding about the forgeries and their types.
CO5	To discuss about the analysis of charred documents and their examination, examination of counterfeit Indian currency notes, passports, visas and stamp papers.

Unit No.	Title of the Unit	Content of Unit	Contact Hrs.	Mapped CO
1	INTRODUCTION TO QUESTIONED DOCUMENTS	Introduction to Questioned Documents – General Definitions (Handwriting, signature, Expert), Definition under IEA/IPC & laws related to Forensic document field, types of questioned documents, Importance of Questioned Document, Handling, care, preservation, marking and digital photography of Questioned Documents, microphotography, photomicrography, Preliminary examination of questioned documents, Basic & Advanced instruments for Document examination	8	CO1
2	ANALYSIS OF QUESTIONED DOCUMENTS	Introduction, Manufacturing of paper, Composition of Ink, Types of Ink, Method of analysis of Ink, Introduction, determination of age of questioned document, Different types of printers and scientific examination of printed Documents.	8	CO2
3	HANDWRITING ANALYSIS	Introduction to Handwriting Analysis - Principles of Handwriting, Study of Class and individual characteristics of handwriting. Natural variations, fundamental divergences in identification of handwritings, Comparison of handwriting, Merits and demerits of exemplar and non-exemplar samples during comparison of handwriting. Introduction to Standard, Types and Collection of Standards for comparison of handwriting. Importance of Standards in Handwriting Examination.	8	CO3
4	FORGERIES	Forgeries – Introduction, Different types of Forgeries (Freehand and Traced), Identification of free hand and Traced Forgery, Disguise Handwriting & their traits for determination of authorship, Examination of alterations in documents, including erasures, additions, over-writings, and obliterations. Study of indented and invisible writings.	8	CO4
5	CHARRED DOCUMENTS AND AUTHORSHIP EXAMINATION OF DOCUMENTS	Introduction to charred document, Analysis of Charred documents, Security features of Indian currency note Examination of counterfeit- Indian currency notes, passports, Visas and stamp papers. Examination of Anonymous letters for Determination of its authorship, Role of Forensic Linguistics and Stylistics in Identification of Anonymous & Disguise writing.	8	CO5

Reference Books:

1. Albert, S. Osborn, Questioned Documents, Second Ed., Universal Law Publishing, Delhi, 1998.
2. Charles, C. Thomas, I.S.Q.D. Identification System for Questioned Documents, Billy Prior Bates, Springfield, Illinois, USA, 1971
3. Hard less, H.R., Disputed Documents, handwriting and thumbs – print identification: profusely illustrated, Low Book Co., Allahabad, 1988.
4. Kurtz, Sheila, Graphotypes a new plant on handwriting analysis, Crown Publishers Inc., USA, 1983.
5. Wilson, R., Harrison, Suspect Documents – Their Scientific Examination; Universal Law Publishing, Delhi, 1997.
6. Harralson, H.H. and Miller, L.S. Huber and Hedrick's Handwriting Identification-Facts and Fundamentals 2nd ed. CRC Press: (2017).
7. Ellen, D., Day, S. and Davies, C. Scientific Examination of Documents-Methods and Techniques 4th ed. CRC Press: (2018).

e-Learning Source:

- 1 <https://epgp.inflibnet.ac.in/Home/ViewSubject?catid=eCJfy23Kjy3c0vICLa6VYg==#>
- 2 https://youtu.be/Is6t1EP_3eg
- 3 <https://youtu.be/64gSr30GdyY>

PO-PSO CO	Course Articulation Matrix: (Mapping of COs with POs and PSOs)																
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	3	3	2	3	3	3	2	3	3	3	2	3	3	2	3	2
CO2	3	3	2	3	3	2	3	3	3	3	3	3	2	3	2	3	3
CO3	3	2	3	3	3	3	3	3	3	3	2	2	3	3	3	3	3
CO4	2	3	3	3	3	3	2	3	3	3	3	2	2	3	2	2	3
CO5	3	3	2	3	2	3	3	2	3	2	2	3	3	2	3	3	3

1- Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation

Attributes & SDGs									
Course Code	Course Title	Attributes							SDGs No.
FS309	QUESTIONED DOCUMENT EXAMINATION	Employability	Entrepreneurship	Skill Development	Gender Equality	Environment & Sustainability	Human Value	Professional Ethics	
		√	√	√			√	√	3,4



Integral University, Lucknow

Effective from Session: 2023-24							
Course Code	FS310	Title of the Course	EXPLOSIVES	L	T	P	C
Year	III	Semester	VI	2	1	0	3
Pre-Requisite	Nil	Co-requisite	Nil				
Course Objectives	To develop the understanding and skills to analyze the explosion crime scene.						

Course Outcomes	
CO1	To develop the basic understanding about the explosives, their composition and characteristics.
CO2	Developing the understanding about the explosion, its types and protocols for crime scene processing in case of explosion.
CO3	To discuss about the importance of reconstruction of sequence of events and assessment of scene of explosion.
CO4	To develop the understanding about the examination of explosives and explosion residues in the laboratory using various chemical and instrumental techniques.
CO5	To discuss about the legal provisions of explosive act.

Unit No.	Title of the Unit	Content of Unit	Contact Hrs.	Mapped CO
1	INTRODUCTION TO EXPLOSIVES	Introduction to Explosives: Definition of explosives and their physical and chemical properties, Classification of explosives: Primary explosives: lead azide, lead styphnate, mercury fulminate, tetrazene. Secondary explosives: TNT, RDX, PETN, HMX, Dynamite, Tetrayl, Gelatines, powders, ANFO, emulsion slurries, explosive high explosive mixtures.	6	CO1
2	EXPLOSIONS ANALYSIS	Explosions Analysis: Explosion, type of explosion, process and effects, types of hazard, effect of blast wave on structures, human etc. evaluation, and assessment of the scene of the explosion., specific approach to scene of explosion, post-blast residue collection, preservation and packing.	6	CO2
3	DETONATORS AND FUSES	Detonators and Fuses: Introduction, plain and electric detonators, non- electric detonators, delay detonators, detonating and safety fuse, visco fuse, Igniter Safety Fuse Electric, Flying Fish Fuse, spolette, quick, black and slow match.	6	CO3
4	EXAMINATION OF EXPLOSION	Examination of Explosion: Systematic examination of specific high & low explosives and explosion residues in the laboratory using chemical examination, Chromatographic techniques: TLC, HPLC, Vapor detection method: adsorption and concentration of explosive vapors, X-ray imaging.	6	CO4
5	EXPLOSIVES & LAW	Explosives & Law: Explosives Act 1884, (Definition, Powers of Central Govt. and Licensing Authority, Offences, and Penalties) and Section 286 of IPC, 1860, (Negligent conduct with respect to explosive substance), Explosive Substances Act 1908, (Definition, Offences, and Penalties). Explosives (Amendments) Rules 2018. Pyrotechnics, IEDs	6	CO5

Reference Books:																	
1. S. Ballou, M. Houck, J.A. Siegel, C.A. Crouse, J.J. Lentini and S. Palenik in Forensic Science, D.H. Ubelaker (Ed.), Wiley-Blackwell, Chichester (2013).																	
2. R. Saferstein, Criminalistics, 8th Edition, Prentice Hall, New Jersey (2004).																	
3. Explosives DFS Manual, 2005																	
4. Forensic Laboratory Handbook procedure and practice, Ashraf Mozayani, 2011																	
5. Lab Manual Criminalistics An introduction to Forensic Science, Richard Saferstein (2007) Ninth Edition.																	
6. J.D. DeHaan, Kirk's Fire Investigation, 3rd Edition, Prentice Hall, New Jersey (1991).																	
e-Learning Source:																	
1. https://youtu.be/JVl0yR4GdUo																	
2. https://youtu.be/xgKOuLb8LyM																	
3. https://epgp.inflibnet.ac.in/Home/ViewSubject?catid=eCJfy23Kjy3c0vICLa6VYg==#																	

PO-PSO CO	Course Articulation Matrix: (Mapping of COs with POs and PSOs)																
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	2	3	2	3	2	2	2	3	3	3	2	3	3	2	3	2
CO2	2	3	2	3	3	2	3	2	2	3	3	3	2	3	2	3	3
CO3	3	2	3	3	3	3	3	2	2	3	2	2	3	3	3	2	2
CO4	2	3	3	2	2	3	2	3	3	3	3	2	2	3	2	2	3
CO5	3	2	3	3	2	3	3	2	3	2	2	3	3	2	3	2	3

1- Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation

Attributes & SDGs									
Course Code	Course Title	Attributes							SDGs No.
FS310	EXPLOSIVES	Employability	Entrepreneurship	Skill Development	Gender Equality	Environment & Sustainability	Human Value	Professional Ethics	
		√	√	√			√	√	



Integral University, Lucknow

Effective from Session: 2023-24

Course Code	FS311	Title of the Course	FINGERPRINT & IMPRESSIONS	L	T	P	C
Year	III	Semester	VI	3	1	0	4
Pre-Requisite	Nil	Co-requisite	Nil				
Course Objectives	To develop a deep understanding and knowledge about the fingerprints and their comparison.						

Course Outcomes

CO1	To develop the deep understanding about the history of fingerprint and its importance, formation and classification of fingerprints.
CO2	Developing the understanding about the search and collection of fingerprints, different methods of development of fingerprints.
CO3	To discuss about the various aspects of lifting, preservation, examination & comparison of fingerprints.
CO4	To discuss in detail about the fingerprint Enhancement techniques on different surfaces and digital imaging of fingerprints.
CO5	To develop the understanding about collection and evaluation of lip prints, ear prints, shoe prints etc for forensic case work.

Unit No.	Title of the Unit	Content of Unit	Contact Hrs.	Mapped CO
1	INTRODUCTION TO FINGERPRINTS	Introduction to Fingerprints: Introduction definition, scope, History and development of Fingerprint Science, formation of ridges, different type of ridge characteristics, classification of fingerprints – Henry system of classification, Single digital classification. Basic fingerprint equipment.	8	CO1
2	FINGERPRINTS EXAMINATIONS	Fingerprints Examinations: Search and collection of Fingerprint, chance fingerprints, latent & visible fingerprints, plastic fingerprints, photography of fingerprint, ridge tracing, and ridge counting, Development of latent fingerprints, conventional methods of development of fingerprints – fluorescent method, magnetic power method, fuming method, chemical method etc.	8	CO2
3	FINGERPRINT COMPARISON	Fingerprint Comparison: Collection, preservation a of finger prints from living and dead persons, comparison of fingerprints, and basis of comparison, class characteristics, and individual characteristics, various type of ridge characteristic, unusual fingerprints.	8	CO3
4	FINGERPRINTS ENHANCEMENTS TECHNIQUES	Fingerprints Enhancements Techniques: Fingerprint enhancement techniques: by optical, chemical techniques, detection of fingerprints on porous surfaces, non-porous surfaces and their enhancements. Digital imaging of fingerprints: Introduction and application. AFIS.	8	CO4
5	OTHER IMPRESSIONS	Other Impressions: Introduction, natural location collection, preservation, evaluation and application, Lip prints, Ear prints, Footprints, Bite marks, Shoe prints, Tire marks/skid marks. Methods of taking controlled samples for forensic comparison.	8	CO5

Reference Books:

1.	Henry, E.R., Classification and Uses of Finger Prints, George Routledge and Sons Ltd
2.	Nath, S., Fingerprint Identification, Shiv Shakti Book Traders, New Delhi, 2010.
3.	James, S. H. and Nordby, J. J. (Eds), Forensic Science - An Introduction to Scientific and Investigation Techniques, CRC Press, London, 2003
4.	Sudha, S.I., Biometrics and Fingerprint Analysis, Selective and Scientific Books, New Delhi, 2012

e-Learning Source:

1.	https://epgp.inflibnet.ac.in/Home/ViewSubject?catid=eCJfy23Kjy3c0vICLa6VYg==#
2.	https://youtu.be/Thk-M4kuJzs

Course Articulation Matrix: (Mapping of COs with POs and PSOs)

PO-PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	2	3	2	3	2	2	3	3	3	3	2	3	3	2	3	2
CO2	2	3	2	3	3	2	3	2	2	3	3	3	2	3	2	3	3
CO3	3	3	2	2	3	3	3	2	2	3	2	2	2	2	3	3	3
CO4	2	3	3	2	2	3	2	3	3	3	3	2	2	3	3	2	2
CO5	3	2	3	3	2	3	3	2	3	3	3	3	3	2	3	2	3

1- Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation

Attributes & SDGs

Course Code	Course Title	Attributes							SDGs No.
FS311	FINGERPRINT & IMPRESSIONS	Employability	Entrepreneurship	Skill Development	Gender Equality	Environment & Sustainability	Human Value	Professional Ethics	3,4
		√	√	√			√	√	



Integral University, Lucknow

Effective from Session: 2023-24

Course Code	FS312	Title of the Course	INSTRUMENTAL AND ANALYTICAL TECHNIQUE	L	T	P	C
Year	III	Semester	VI	3	1	0	4
Pre-Requisite	Nil	Co-requisite	Nil				
Course Objectives	To develop the understanding about the different instrumental techniques used in the field of forensic sciences						

Course Outcomes

CO1	Discuss about the general introduction and classification of instrumental method.
CO2	Developing the basic understanding and theory of spectrophotometry & colorimetry along with the application in the field of forensic science.
CO3	To discuss about the basic understanding, theory and instrumentation of emission spectroscopy along with the application in the field of forensic science.
CO4	To develop the understanding about the basic principles and advantages of different types of microscopes used in the field of forensic science.
CO5	To discuss about the Centrifugation Techniques and Electrophoretic Technique.

Unit No.	Title of the Unit	Content of Unit	Contact Hrs.	Mapped CO
1	INTRODUCTION TO INSTRUMENTAL METHODS OF CHEMICAL ANALYSIS	Introduction to Instrumental Methods of Chemical Analysis: General introduction, classification of instrumental method, Introduction of spectroscopy, Types of spectroscopy, introduction, and properties of electromagnetic radiation, Electromagnetic radiation and its interaction with matter origin of spectrum. Difference between atomic and molecular spectra.	8	CO1
2	UV-VISIBLE SPECTROSCOPY, IR SPECTROMETRY & COLORIMETRY	UV-Visible Spectroscopy, IR Spectrometry & Colorimetry: Introduction, principles, theory, instrumentation and application of Spectroscopy & amp. colorimetry, Lambert Beer's Law, Types of band shift.	8	CO2
3	EMISSION SPECTROSCOPY	Emission Spectroscopy: Introduction, theory, instrumentation, spectrograph, application, of emission spectroscopy, advantages and disadvantages of emission spectroscopy.	8	CO3
4	MICROSCOPY	Microscopy: Introduction, basic principle, Instrumentation, and application of the following Microscopes: 1. Compound Microscope 2. Stereoscopic Microscopic 3. Phase contrast Microscope 4. Comparison Microscope 5. Polarizing Microscope 6. Fluorescent Microscope	8	CO4
5	CENTRIFUGATION TECHNIQUE	Centrifugation Techniques: Introduction and application of Centrifugation, various types of centrifuges, Density gradient centrifugation, Preparative centrifugation, , Ultra- centrifuge-Refrigerated Centrifuges .Basic principles and uses of sedimentation process . Electrophoretic Technique: -Theory, principles, Working and Factors affecting electrophoresis techniques. Types of Electrophoresis: 1. Zone Electrophoresis: (Sodium dodecyl sulphate (SDS), Polyacrylamide gel electrophoresis (PAGE)), 2. Isoelectric focusing (IEF), 3. Iso-electrophoresis, 4. Dual Horizontal and Vertical electrophoresis. 5. Mini Submarine Electrophoresis	8	CO5

Reference Books:

1. Wilson And Walkers, Principles And Techniques Of Biochemistry And Molecular Biology 8th South Asia Edition 2018 by HOFMANN A, CAMBRIDGE UNIVERSITY PRESS
2. Chapman, J.R., Practical Organic Mass spectrometry, A Guide for Chemical and Biochemical Analysis, Wiley, New York, 1993.
3. Gchristian, Gray D and Fredric J. Feldman, Atomic Absorption Spectroscopy; Wiley-Interscience, London, 1970.
4. Stout G.H., & Jensten, L.H., X-ray Structure Determination – A practical Guide, 2nd Ed., Wiley, New York, 1989.
5. M. Silverstein, Baster, G.C. & Morsill, T. C., Spectrometric identification of Organic Compounds, 4thEdn., Wiley, New York, 1981

e-Learning Source:

1. <https://youtu.be/8OUo6Wi1oNA>
2. <https://www.youtube.com/live/Ry7wxRs54YY?feature=share>
3. <https://www.youtube.com/live/nahTaPM37uM?feature=share>

Course Articulation Matrix: (Mapping of COs with POs and PSOs)

PO-PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	2	3	2	3	2	2	3	3	3	3	2	3	3	2	3	2
CO2	2	3	2	3	3	2	3	2	2	3	3	3	2	3	2	3	3
CO3	3	3	2	2	3	3	3	2	2	3	2	2	2	2	3	3	3
CO4	2	3	3	2	2	3	2	3	3	3	3	2	2	3	3	3	2
CO5	3	2	3	3	2	3	3	2	3	3	3	3	3	2	3	2	3

1- Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation

Attributes & SDGs

Course Code	Course Title	Attributes							SDGs No.
FS312	INSTRUMENTAL AND ANALYTICAL TECHNIQUE	Employability	Entrepreneurship	Skill Development	Gender Equality	Environment & Sustainability	Human Value	Professional Ethics	
		√	√	√			√	√	3,4



Integral University, Lucknow

Effective from Session: 2023-24

Effective from Session: 2023-24							
Course Code	FS313	Title of the Course	QUESTIONED DOCUMENT EXAMINATION-LAB	L	T	P	C
Year	III	Semester	VI	0	0	2	1
Pre-Requisite	Nil	Co-requisite	Nil				
Course Objectives	To provide a detailed practical knowledge to analyze different types of forgeries and questioned documents.						

Course Outcomes

CO1	Students will be able to identify the class and individual characters of handwriting
CO2	Students will be able to study and analyze different types of forgeries
CO3	To decipher the secret writing
CO4	To study the counterfeit currency
CO5	To study the indented writing

Unit No.	Title of the Unit	Content of Unit	Contact Hrs.	Mapped CO
1	INTRODUCTION TO QUESTIONED DOCUMENTS	1. To study and create the master pattern of given handwriting sample.	4	CO1-5
2	ANALYSIS OF QUESTIONED DOCUMENTS	2. To analyses the different types of ink by chemical/ Instrumental method.	4	
3	HANDWRITING ANALYSIS	3. To study and identify the class characteristics of handwriting, by given handwriting sample. 4. To study and identify the individual characteristics of handwriting, by given handwriting sample.	4	
4	FORGERIES	5. To study free hand forgery. 6. To study and detect different types of traced forgery. 7. To study erasures, alterations and obliterations in handwriting samples.	4	
5	CHARRED DOCUMENTS AND AUTHORSHIP EXAMINATION OF DOCUMENTS	8. To study indented writings 9. To study secret writings.	4	

Reference Books:

1. Albert, S. Osborn, Questioned Documents, Second Ed., Universal Law Publishing, Delhi, 1998.
2. Charles, C. Thomas, I.S.Q.D. Identification System for Questioned Documents, Billy Prior Bates, Springfield, Illinois, USA, 1971
3. Hard less, H.R., Disputed Documents, handwriting and thumbs – print identification: profusely illustrated, Low Book Co., Allahabad, 1988.

e-Learning Source:

1. <https://epgp.inflibnet.ac.in/Home/ViewSubject?catid=eCJfy23Kjy3c0vICLa6VYg==#>
2. https://youtu.be/Is6t1EP_3eg
3. <https://youtu.be/64gSr30GdyY>

Course Articulation Matrix: (Mapping of COs with POs and PSOs)

PO-PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	3	3	2	3	3	3	2	3	3	3	2	3	3	2	3	2
CO2	3	3	2	3	3	2	3	3	3	3	3	3	2	3	2	3	3
CO3	3	2	3	3	3	3	3	3	3	3	2	2	3	3	3	3	3
CO4	2	3	3	3	3	3	2	3	3	3	3	2	2	3	2	2	3
CO5	3	3	2	3	2	3	3	2	3	2	2	3	3	2	3	3	3

1- Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation

Attributes & SDGs

Course Code	Course Title	Attributes							SDGs No.
FS313	QUESTIONED DOCUMENT EXAMINATION-LAB	Employability	Entrepreneurship	Skill Development	Gender Equality	Environment & Sustainability	Human Value	Professional Ethics	3,4
		√	√	√			√	√	



Integral University, Lucknow

Effective from Session: 2023-24

Course Code	FS314	Title of the Course	FINGERPRINTS & IMPRESSIONS - LAB	L	T	P	C
Year	III	Semester	VI	0	0	2	1
Pre-Requisite	NIL	Co-requisite	Nil				
Course Objectives	To provide a detailed practical knowledge to analyze fingerprints and impressions.						

Course Outcomes

CO1	To record and identify fingerprints
CO2	Students will be able to carry out ten-digit classification of fingerprints
CO3	Students will be able to identify different ridge characteristics
CO4	Photography and documentation of fingerprints
CO5	Forensic examination of lip prints, ear prints and bite marks.

Unit No.	Title of the Unit	Content of Unit	Contact Hrs.	Mapped CO
1	INTRODUCTION TO FINGERPRINTS	1. Perform Henry 10 Digit Classification of fingerprints. 2. To Find out different Minutiae or ridge characteristics. 3. To identify and classify core and delta. 4. To carry out ridge tracing and ridge counting.	4	C0-1-5
2	FINGERPRINTS EXAMINATIONS	5. To record plain and rolled fingerprints and identify different fingerprint patterns. 6. Development & Lifting of Latent fingerprints with Powder methods.	4	
3	FINGERPRINT COMPARISON	7. To identify class characteristics of fingerprint impression. 8. To identify individual characteristics of fingerprint impression.	4	
4	FINGERPRINTS ENHANCEMENTS TECHNIQUES	9. To identify fingerprint impression on porous and non-porous surfaces by different methods.	4	
5	OTHER IMPRESSIONS	10. To record lip prints and forensic examination of lip prints. 11. Forensic examination of tier/skid marks.	4	

Reference Books:

1. Henry, E.R., Classification and Uses of Finger Prints, George Routledge and Sons Ltd
2. Nath, S., Fingerprint Identification, Shiv Shakti Book Traders, New Delhi, 2010.
3. James, S. H. and Nordby, J. J. (Eds), Forensic Science - An Introduction to Scientific and Investigation Techniques, CRC Press, London, 2003
4. Sudha, S.I., Biometrics and Fingerprint Analysis, Selective and Scientific Books, New Delhi, 2012

e-Learning Source:

1. <https://youtu.be/Thk-M4kuJzs>
2. <https://epgp.inflibnet.ac.in/Home/ViewSubject?catid=eCJfy23Kjy3c0vICLa6VYg==#>

Course Articulation Matrix: (Mapping of COs with POs and PSOs)

PO-PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	2	3	2	3	2	2	3	3	3	3	2	3	3	2	3	2
CO2	2	3	2	3	3	2	3	2	2	3	3	3	2	3	2	3	3
CO3	3	3	2	2	3	3	3	2	2	3	2	2	2	2	3	3	3
CO4	2	3	3	2	2	3	2	3	3	3	3	2	2	3	3	2	2
CO5	3	2	3	3	2	3	3	2	3	3	3	3	3	2	3	2	3

1- Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation

Attributes & SDGs

Course Code	Course Title	Attributes							SDGs No.
FS314	FINGERPRINTS & IMPRESSIONS - LAB	Employability	Entrepreneurship	Skill Development	Gender Equality	Environment & Sustainability	Human Value	Professional Ethics	3,4
		√	√	√			√	√	



Integral University, Lucknow

Effective from Session: 2023-24

Course Code	FS315	Title of the Course	PROJECT WORK/ DISSERTATION	L	T	P	C
Year	III	Semester	VI	0	0	20	10
Pre-Requisite	Nil	Co-requisite	Nil				
Course Objectives	The main objective of this course is to develop independence in the research skills and to develop the research interpretation skill. To promote education and research in Forensic Sciences and provide academic and professional excellence for immediate productivity in hospital, governmental, or clinical settings for an ultimate benefit of society and environment.						

Course Outcomes

CO1	The students will be able to perform literature review, identify state of the art in that field.
CO2	The students will be able to define the problem and develop synopsis of a defined research problem
CO3	The students will be able to establish a methodology using advanced tools / techniques for solving the problem including project management and finances.
CO4	The students will be able to prepare the research report and its oral demonstrations.
CO5	The students will be gain practical experience in project management in biotechnological industry, be able to use various techniques in contemporary research for project, perform numerical analysis and interpret the results

PROJECT ASSESSMENTN FORM

Name of Student:		Session:	
Enrolment Number:		Date:	
Name of Subject:	PROJECT WORK/ DISSERTATION	Subject code:	FS315
Topics:			

S. No.	Evaluation	Point to be Considered	Max. Marks	Marks Obtained
1.	On the basics of continuous assessment (10 Marks)	Periodic Consultation with Guide	2	
2.		Regular collection of Data with the consultation of guide.	2	
3.		Command of the topic & presentation skill	2	
4.		Methods, analysis, dissuasion and Conclusions	2	
5.		Contribution to knowledge and thesis structure	2	
		Review all heading		
1.	On the basics of External Evaluators at the time of End Sem Examination.	Introduction	3	
2.		Aims, objectives & research hypothesis	3	
3.		Review of literature	3	
4.		Material & Methods	3	
5.		Data analysis & results	3	
6.		Discussion, lamination & future study	3	
7.		Conclusion, signification.	3	
8.		Bibliography	3	
9.		Tables, graph, diagram & Annexure (if any) Statistical Analysis Master Chart	3	
10.		The deface of study	3	
		Total Score	40	

EVALUATION OF BFS PROJECT WORK/ DISSERTION

Evaluation of Project of BFS- Students has to prepare oral presentation during the final viva; each student will be assessed in a 20 minutes time (15 min for presentation & 5 min for discussion). The evaluation of dissertation by external examiner with proper approval of concern authorities. The end semester examination will be 40 marks as external evaluations and 60 marks will be by the internal examiner (continuous assessment):

Comments/Suggestions:

(Name and signature of Incharge)

(Head, Paramedical Sciences)

	Course Articulation Matrix: (Mapping of COs with POs and PSOs)																
PO-PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	2	3	3	2	3	2	3	1	2	1	-	-	3	2	3	3	2
CO2	3	3	3	3	2	2	3	2	1	3	-	-	2	2	3	2	3
CO3	3	3	3	3	2	2	3	2	1	3	-	-	3	2	2	2	3
CO4	3	3	3	3	2	2	3	2	1	3	-	-	2	3	2	2	3
CO5	3	3	3	3	2	2	3	2	1	3	-	-	3	2	3	3	2

1- Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation

Attributes & SDGs

Course Code	Course Title	Attributes							SDGs No.
FS315	PROJECT WORK/ DISSERTATION	Empl yability	Entrepre neurship	Skill Development	Gender Equality	Environment & Sustainability	Human Value	Professional Ethics	3,4,9, 17
		√	√	√	√		√	√	