

EKLAVYA UNIVERSITY, DAMOH (M.P.)
Scheme of Examination B. Sc Forensic Science Hons.
SEMESTER III

[For batch admitted in Academic Session 2020-2021]

Subject wise distribution of marks and corresponding credits

S.No.	Subject Code	Subject Name	Maximum Marks Allotted						Total Marks	Contact Periods Per week			Total Credits
			Theory Slot			Practical Slot				L	T	P	
			End Sem.	Mid term Examination	Quiz/ Assignment/ Attendance	End Sem	Lab Work/ sessional						
1	BFOSH20S301	Forensic Dermatoglyphics (Core-5A)	60	30	10	-	-	-	100	4	0	0	4
2	BFOSH20S302	Forensic Fingerprints – Practical (Core-5B)	-	-	-	60	40	-	100	0	0	2	2
3	BFOSH20S303	Technological Methods in Forensic Science (Core-6A)	60	30	10	-	-	-	100	4	0	0	4
4	BFOSH20S304	Technological Methods Practical (Core-6B)	-	-	-	60	40	-	100	0	0	2	2
5	BFOSH20S305	Criminalistics (Core-7A)	60	30	10	-	-	-	100	4	0	0	4
6	BFOSH20S306	Crime Scene- Practical (Core-7B)	-	-	-	60	40	-	100	0	0	2	2
7	BFOSH20S307	Crime Scene Management (GE - 3A)	60	30	10	-	-	-	100	4	0	0	4
8	BFOSH20S308	Crime Scene Management- Practicals (GE - 3B)	-	-	-	60	40	-	100	0	0	2	2
9	BFOSH20S309	Introduction to Biometry (SEC - 1)	60	30	10	-	-	-	100	2	0	0	2
		Total	300	150	50	240	160	240	900	18	0	8	26

EKLAVYA UNIVERSITY, DAMOH (M.P.)
Scheme of Examination B. Sc Forensic Science Hons.

SEMESTER IV

[For batch admitted in Academic Session 2020-2021]

Subject wise distribution of marks and corresponding credits

S.No.	Subject Code	Subject Name	Maximum Marks Allotted					Total Marks	Contact Periods Per week			Total Credits
			Theory Slot			Practical Slot			L	T	P	
			End Sem.	Mid term Examination	Quiz/ Assignment/ Attendance	End Sem	Lab Work/ sessional					
1	BFOSH20S401	Forensic Chemistry (Core-8A)	60	30	10	-	-	100	4	0	0	4
2	BFOSH20S402	Forensic Chemistry Practical (Core-8B)	-	-	-	60	40	100	0	0	2	2
3	BFOSH20S403	Questioned Documents (Core-9A)	60	30	10	-	-	100	4	0	0	4
4	BFOSH20S404	Questioned Documents Practical (Core-9B)	-	-	-	60	40	100	0	0	2	2
5	BFOSH20S405	Forensic Biology (Core-10A)	60	30	10	-	-	100	4	0	0	4
6	BFOSH20S406	Forensic Biology Practical (Core-10B)	-	-	-	60	40	100	0	0	2	2
7	BFOSH20S407	Advanced Forensic Science (GE - 4A)	60	30	10	-	-	100	4	0	0	4
8	BFOSH20S408	Advanced Forensic Science – Practical (GE – 4B)	-	-	-	60	40	100	0	0	2	2
9	BFOSH20S409	Handwriting Identification and Recognition (SEC - 2)	60	30	10	-	-	100	2	0	0	2
Total			300	150	50	240	160	900	18	0	8	26

Sharma

Sharma

Sharma

Sharma

Sharma

SYLLABUS

UG			
Class		B.Sc. Forensic Science (Hons.)	
Semester/Year		III Semester – II Year	
Subject & Subject Code		Practical Forensic Science - BFOSH20S304	
Paper		Technological Methods- Practical	
Max. Marks		50= (30+20)	
L	T	P	Credits Total
0	0	2	
2			

PRACTICALS

60 hrs.

1. To determine the concentration of a coloured compound by colorimetry analysis.
2. To carry out thin layer chromatography of ink samples.
3. To carry out separation of organic compounds by paper chromatography.
4. To identify drug samples using UV-Visible spectroscopy.
5. To take photographs using different filters.
6. To take photographs of crime scene exhibits at different angles.
7. To record videography of a crime scene.

Shama

[Signature]

Mehar

Megh

[Signature]

Unit	Syllabus	Periods
UNIT - I	Instrumentation <ul style="list-style-type: none"> • Sample preparation for chromatographic and spectroscopic evidence. Chromatographic methods. • Electrophoresis – fundamental principles and forensic applications. • Neutron activation analysis – fundamental principles and forensic applications. • Centrifugation techniques. 	12 hrs.
UNIT - II	Spectroscopic methods. <ul style="list-style-type: none"> • Fundamental principles and forensic applications of Ultraviolet-visible spectroscopy, infrared spectroscopy, atomic absorption spectroscopy, atomic emission spectroscopy and mass spectroscopy, X-ray spectrometry. • Colorimetric analysis and Lambert-Beer law. 	12 hrs.
UNIT - III	Microscopy <ul style="list-style-type: none"> • Fundamental principles. • Different types of microscopes. • Electron microscope. Comparison Microscope. • Forensic applications of microscopy. 	12 hrs.
UNIT - IV	Chromatographic Techniques <ul style="list-style-type: none"> • General Principles, stationary phase, mobile phase, • Classification of chromatographic techniques • Fundamental principles and forensic applications of thin layer chromatography, gas chromatography and liquid chromatography. 	12 hrs.
UNIT - V	Forensic photography <ul style="list-style-type: none"> • Basic principles and applications of photography in forensic science. 3D photography. • Photographic evidence. • Infrared and ultraviolet photography. Digital photography. Videography. • Crime scene and laboratory photography. 	12 hrs.

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. D.R. Redsicker, The Practical Methodology of Forensic Photography, 2nd Edition, CRC Press, Boca Raton (2000).
4. G.R Chatwal; "Analytical Spectroscopy", 2nd Edition, Himalaya Publishing House, 2002.
5. R.S Khandpur; "Handbook of Analytical Instruments", Tata Mac Graw Hill Publ. Co., 2004.

Shama

Meghna

Mehar
Chand

SYLLABUS

UG				
Class		B.Sc. Forensic Science (Hons.)		
Semester/Year		III Semester – II Year		
Subject & Subject Code		Forensic Science - BFOSH20S305		
Paper		Criminalistics		
Max. Marks		100		
L	T	P	Credits Total	4
3	1	0		
<p>Course Objectives: This course provides the knowledge</p> <ul style="list-style-type: none"> • Introduction to crime scene, types of crime scene, various methods of securing, searching and documenting crime scenes, • Evidence and type of evidences, physical evidence and importance of physical evidence • Collecting, packaging and preserving different types of physical and trace evidence at crime scenes, Trace evidences and maintaining chain of custody, 				
<p>Course Outcome: The Students will learn the following:</p> <ul style="list-style-type: none"> • Steps in crime scene management and their significance. • Different searching, collection and packaging methods. • About different physical and trace evidences that are mostly encounter on crime scene with 				
<p>Student Learning Outcomes (SLO): After studying this paper, the students will know –</p> <ul style="list-style-type: none"> • 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. 				
Unit	Syllabus			Periods
UNIT - I	<p>Crime Scene</p> <ul style="list-style-type: none"> • Types of crime scenes – indoor and 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 – photography, videography, sketching and recording notes. Crime scene logs. • Duties of first responders at crime scenes. Coordination between police personnel and forensic scientists at crime scenes. The evaluation of 5Ws (who? what? when? where? why?) and 1H(how?). 			12 hrs.

[Signature]

Sharma

Mishra

Mishra

[Signature]

UNIT - II	Crime Scene Evidence <ul style="list-style-type: none"> • Classification of crime scene evidence – physical and trace evidence. • Locard principle. Collection, labelling, sealing of evidence. • Hazardous evidence. Preservation of evidence. Chain of custody. • Reconstruction of crime scene. • Nature of Examination of Physical Evidences (Instrumental and Chemical). 	12 hrs.
UNIT - III	Physical Evidences <ul style="list-style-type: none"> • Glass evidence – collection, packaging, analysis. Matching of glass samples by mechanical fit and refractive index measurements. • Analysis by spectroscopic methods. Fracture analysis and direction of impact. • Soil evidence – importance, location, collection and comparison of soil samples. 	12 hrs.
UNIT - IV	Trace Evidences <ul style="list-style-type: none"> • Paint evidence – collection, packaging and preservation. Analysis by destructive and non-destructive methods. Importance of paint evidence in hit and run cases. • Fibre evidence – artificial and man-made fibres. Collection of fibre evidence. Identification and comparison of fibres. • Cloth evidence – importance, collection, analysis of adhering material. Matching of pieces. 	12 hrs.
UNIT - V	Toolmark evidence. <ul style="list-style-type: none"> • Classification of toolmarks. Forensic importance of toolmarks. • Collection, preservation and matching of toolmarks. • Restoration of erased serial numbers and engraved marks. Forensic gemology. 	12 hrs.

Suggested Readings-

1. A.J. Barry, Techniques of Crime Scene Investigation, 6th Edition Ed, CRC Press NY (2003).
2. M. Byrd, Crime Scene Evidence: A Guide to the Recovery and Collection of Physical Evidence, CRC Press, Boca Raton (2001).
3. P.L Kirk, Criminal Investigation, Inter Science Publisher Inc, New York.
4. Richard Saferstein, Criminalistics: An Introduction to Forensic Science Hall INC, USA.
5. S. Goutam and M.P. Goutam. Physical Evidences- Introduction & Bibliography on their Forensic Analysis. Shiv Shakti Book Traders, New Delhi.
6. S.H. James and J.J. Nordby. Forensic Science: An Introduction to Scientific and Investigative Techniques, CRC Press, USA.
7. T.J. Gardener and T.M. Anderson, Criminal Evidence, 4th Ed., Wadsworth, Belmont (2001).

Sharma

So

Mehar

Megha

Ant

SYLLABUS

UG				
Class		B.Sc. Forensic Science (Hons.)		
Semester/Year		III Semester – II Year		
Subject & Subject Code		Practical Forensic Science - BFOSH20S306		
Paper		Crime scene- Practical		
Max. Marks		50= (30+20)		
L	T	P	Credits Total	2
0	0	2		

PRACTICALS

60 hrs.

1. To prepare a report on evaluation of crime scene.
2. To reconstruct a crime scene (outdoor and indoor).
3. To compare soil samples by density gradient method.
4. To compare paint samples by physical matching method.
5. To compare paint samples by thin layer chromatography method.
6. To compare glass samples by refractive index method.
7. To identify and compare tool marks.
8. To compare cloth samples by physical matching.

[Signature]

Shama

Megha

Neha
[Signature]

SYLLABUS

UG				
Class		B.Sc. Forensic Science (Hons.)		
Semester/Year		III Semester – II Year		
Subject & Subject Code		Forensic Science - BFOSH20S307		
Paper		Computer Science		
Max. Marks		100		
L	T	P	Credits Total	4
3	1	0		
<p>Course Objectives: This course provides knowledge about</p> <ul style="list-style-type: none"> • Computer system and their parts • Networking and networking components • Working of Internet • The importance of computer language in forensics. • The importance of digital evidence in cyber forensic investigation. 				
<p>Course Outcome: Students will be able to</p> <ul style="list-style-type: none"> • Identify and explain the components of computer system • Explain the working on network and internet • Identify the cybercrimes and digital evidences 				
<p>Student Learning Outcomes (SLO): After studying this Paper, the Students will Know-</p> <ul style="list-style-type: none"> • The basics of computer hardware and their functions, • The basics of networking. • The network security. 				
Unit	Syllabus			Periods
UNIT - I	<p>Basic of Computers Fundamentals of computers, hardware and accessories. Types of Memory — Primary Memory-:RAM, SRAM, DRAM, ROM, EPROM, Secondary Memory- : Magnetic, Floppy, Hard Disk RAM, ROM; Optical Memory-: CDROM, WORM; Concept of Virtual Memory, Concept of Cache, Memory hierarchy.</p>			12 hrs.
UNIT - II	<p>Networking & File System Connecting Devices-: Routers, Hubs, Bridges, Basics of Networking — Types of topologies, LAN, MAN, WAN etc. File system management FAT, NTFS etc. Logic Gates: AND, OR, NOT, NOR, NAND, EX-OR, EX-NOR Operations and their Truth Tables.</p>			12 hrs.

[Signature]

Shama

Mehar

Majha

[Signature]

UNIT - III	Basic Internet Introduction to Internet, World Wide Web, E-mails, Chat, Search Engines, types of portals, Networking Protocols-TCP/IP Protocol, FTP, SMTP, HTTP, SSC, POP etc. Network Security - Threats, Vulnerabilities, Access control, DOS attack, Virus, Trojans, cloud-based application.	12 hrs.
UNIT - IV	Operating System and 'C' Programming Introduction to operating System, process management, concurrency, — scheduling, synchronization, Introduction to C programming -: Introduction, Data Types and Variables, Simple Program Structure, Simple Input and Output, Simple and Compound Conditions (Branching), Looping (For, While, Do. While).	12 hrs.
UNIT - V	Cyber Crime What is Cyber Crime; Cyber Forensic and Digital Evidence, Conventional crime VS cybercrime, Nature of digital evidence, Precautions while dealing with digital evidence. Types of cybercrimes, Digital Evidence, Digital Vs. Physical Evidence.	12 hrs.

Suggested Readings-

1. Computer Organization and Architecture Designing for Performance, Eight Edition, William Stallings, Pearson Publication.
2. Computer System Architecture, M. Morris Mano, PHI Publications
3. Operating System Concepts, Silberschatz, Galvin, Gagne, John Wiley and Sons Publications.
4. Introduction to Algorithms, Cormen, Leiserson, Rivest, Stein.
5. Introduction to C: Kanetkar.
6. Digital Evidence and Computer Crime, 2nd ed.: Eoghan Casey Computer Forensics: Principles and Practices: Linda Volonino, Reynaldo.

[Handwritten signature]

Shama

Megha

Mehar

[Handwritten signature]

SYLLABUS

UG				
Class		B.Sc. Forensic Science (Hons.)		
Semester/Year		III Semester – II Year		
Subject & Subject Code		Practical Forensic Science - BFOSH20S308		
Paper		Computer Science- Practical		
Max. Marks		50= (30+20)		
L	T	P	Credits Total	2
0	0	2		

PRACTICALS

60 hrs.

1. Working of Networking Devices.
2. Windows – Installation.
3. Windows - Basic commands.
4. Windows - Network Configuration.
5. Finding results of different logic gates & their combinations.
6. Tracing and analyzing E — mail senders IP Address of received e—mail.
7. C Programming for Basic program.
8. C programming for Variable.
9. C programming for Loop.
10. C programming for Mathematical Operations.

Shamg

Mehar

Megha

Ro

Adit

School of Basic and Applied Sciences

SYLLABUS

UG				
Class		B.Sc. Forensic Science (Hons.)		
Semester/Year		III Semester – II Year		
Subject & Subject Code		Forensic Science - BFOSH20S309		
Paper		Introduction to Biometry		
Max. Marks		100		
L	T	P	Credits Total	2
2	0	0		
Course Objectives:				
<p>This course will provide knowledge about</p> <ul style="list-style-type: none"> • Biometry and its classification • Biometric identification process • Significance of biometric identification 				
Course Outcome:				
<p>After studying this paper students will be able to know how to</p> <ul style="list-style-type: none"> • Enroll, identify and verify for the biometric process • Differentiate between physiological and behavioral biometric 				
Student Learning Outcomes (SLO):				
<p>After studying this paper the students will know –</p> <ul style="list-style-type: none"> • The basis of biometry. • The classification of biometric processes. • The importance of behavioral biometry. 				
Unit	Syllabus			Periods
UNIT - I	Introduction to Biometrics <ul style="list-style-type: none"> • Fundamental Aspects • Definition, • Characteristics and operation of biometric system. 			06 hrs.

[Signature]

Shams

Mehar

[Signature]

Megha

UNIT - II	Key biometric processes – <ul style="list-style-type: none"> • Enrollment, identification and verification. • Positive and negative identification. • Performance measures used in biometric systems – FAR, FRR, GAR, FTA, FTE and ATV. • Biometric versus traditional technologies. 	06 hrs.
UNIT - III	Classification of biometric systems – <ul style="list-style-type: none"> • Physiological and behavioral. • Strength and weakness of physiological and behavioral biometrics. • Multimodal biometrics. 	06 hrs.
UNIT - IV	Physiological Biometrics <ul style="list-style-type: none"> • Fingerprints, • Palm prints, iris, retina, • Geometry of hand and face. 	06 hrs.
UNIT - V	Behavioral Biometrics <ul style="list-style-type: none"> • Handwriting, • Signatures, • Keystrokes, • Gait and voice. 	06 hrs.

Suggested Readings-

1. Saferstein: Forensic Science Handbook, Vol I, II & III, Prentice Hall Inc. USA.
2. Saferstein: Criminalistics, 1976, Prentice Hall Inc. USA.
3. S. Nanavati, M. Thieme and R. Nanavati, Biometrics, Wiley India Pvt. Ltd. (2002).
4. P. Reid, Biometrics for Network Security, New Delhi (2004).
5. J.R. Vacca, Biometric Technologies and Verification Systems, Butterworth-Heinemann, Oxford (2007).

Shama

[Signature]

[Signature]

[Signature]

[Signature]

SYLLABUS

UG				
Class		B.Sc. Forensic Science (Hons.)		
Semester/Year		IV Semester – II Year		
Subject & Subject Code		Forensic Science - BFOSH20S401		
Paper		Forensic Chemistry		
Max. Marks		100		
L	T	P	Credits Total	4
3	1	0		
<p>Course Objectives: This course provides knowledge about</p> <ul style="list-style-type: none"> The methods of analyzing trace amounts of petroleum products in crime scene evidence. The classification and characteristics of the narcotics, drugs and psychotropic substances. The method of searching, collecting, preserving and analyzing arson evidence. 				
<p>Course Outcome: The Students will learn the following:</p> <ul style="list-style-type: none"> The different classification of narcotic drugs and psychotropic substances. The collection and preservation of different types of evidences. 				
<p>Student Learning Outcomes (SLO): After studying this paper, the students will know –</p> <ul style="list-style-type: none"> The methods of analyzing trace amounts of petroleum products in crime scene evidence. The methods of analyzing contaminants in petroleum products. The method of searching, collecting, preserving and analyzing arson evidence. The significance of bomb scene management. The classification and characteristics of the narcotics, drugs and psychotropic substances. 				
Unit	Syllabus			Periods
UNIT - I	<p>Forensic Chemistry and Scope</p> <ul style="list-style-type: none"> Forensic chemistry: Definition and scope, Analytical methods of analysis of IMFL, Country made and Illicit liquor Denatured spirits and their analysis. Edible oil and their adulterants 			12 hrs.
UNIT - II	<p>Drugs</p> <ul style="list-style-type: none"> Introduction to Narcotic drugs, Depressants, stimulants, Hallucinogens their Active components and method of analysis, Designer Drugs & Anabolic steroids. 			12 hrs.

[Signature]

Meghe

Shama

Mahar

[Signature]

UNIT - III	Petroleum Products <ul style="list-style-type: none"> • Analysis of petroleum products Diesel. • Analysis of traces of petroleum products in forensic exhibits. • Comparison of petroleum products. • Adulteration of petroleum products. 	12 hrs.
UNIT - IV	Cases Involving Arson <ul style="list-style-type: none"> • Chemistry of fire. Fire scene patterns. • Location of point of ignition. Recognition of type of fire. Searching the fire scene. Collection and preservation of arson evidence. • Analysis of fire debris. Analysis of ignitable liquid residue. • Scientific investigation and evaluation of clue materials. Information from smoke staining. • Identification of corrosive acid in Vitriol Throwing (Vitriolage) cases. 	12 hrs.
UNIT - V	Explosives <ul style="list-style-type: none"> • Classification of explosives – low explosives and high explosives. Homemade explosives. Military explosives. Blasting agents. • Pyrotechniques, Synthesis and characteristics of TNT, PETN and RDX. Explosion process. • Bomb scene management. Searching the scene of explosion. Post blast residue collection and analysis. • Blast injuries. Detection of hidden explosives. 	12 hrs.

Suggested Reading-

1. Khan, Javed I., Ho, Mat H. Analytical Methods in Forensic Chemistry. New York:
2. 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).
3. R. Saferstein, Criminalistics, 8th Edition, Prentice Hall, New Jersey (2004).
4. W.J. Tilstone, M.L. Hastrup and C. Hald, Fisher's, Techniques of Crime Scene Investigation, CRC Press, Boca Raton (2013).
5. Parikh C.K; Text Book of Medical Jurisprudence Forensic Medicines and Toxicology. CBS Pub. New Delhi.
6. Kennedy, Thomas J., Christian, Jr., Donnell Basic Principles of Forensic Chemistry, Springer
7. J.D. DeHaan, Kirk's Fire Investigation, 3rd Edition, Prentice Hall, New Jersey (1991)
8. Feigl; Spot Test in Organic Analysis, Elsevier Pub., New Delhi.
9. Curry A.S; Analytical Methods in Human Toxicology, Part II, CRC Press Ohio
10. Clark, E.G.C.; Isolation and Identification of Drugs, Vol I&II, Academic Press,
11. Sunshine I; Year book of Toxicology, CRC Press Series, USA
12. Michael J. Deverlanko et al: Hand Book of Toxicology CRC Press, USA.

Shama

Shama

Shama

Shama

Shama

SYLLABUS

UG			
Class		B.Sc. Forensic Science (Hons.)	
Semester/Year		IV Semester – II Year	
Subject & Subject Code		Practical Forensic Science - BFOSH20S402	
Paper		Forensic Chemistry- Practical	
Max. Marks		50= (30+20)	
L	T	P	Credits Total
0	0	2	
2			

PRACTICALS

60 hrs.

1. To carry out analysis of gasoline.
2. To carry out analysis of diesel.
3. To carry out analysis of kerosene oil.
4. To analyze arson accelerators.
5. To prepare a case report on a case involving arson.
6. To carry out analysis of explosive substances.
7. To separate explosive substances using thin layer chromatography.
8. To prepare a case report on bomb scene management.

[Signature]

Stam

Mohu
Ching

Megha

SYLLABUS

UG

Class	B.Sc. Forensic Science (Hons.)		
Semester/Year	IV Semester – II Year		
Subject & Subject Code	Forensic Science - BFOSH20S403		
Paper	Questioned Documents		
Max. Marks	100		
L	T	P	Credits Total 4
3	1	0	

Course Objectives:

This course provides the knowledge of

- Detecting frauds and forgeries by analyzing questioned documents.
- The tools required for examination of questioned documents.
- Examination of computer generated, typed and Xeroxed documents.
- Natural variations and fundamental divergences in handwritings.
- Examination of counterfeit Indian currency notes, passports, visas and stamp papers, seal, rubber & other mechanical impressions.

Course Outcome:

The Students will learn the following:

- The methods for examine the different types of questioned documents.
- Natural variations in hand writings
- Examination of counterfeit Indian currency notes, passports and other mechanical impressions

Student Learning Outcomes (SLO):

After studying this paper, the students will know –

- The importance of examining questioned documents in crime cases.
- The tools required for examination of questioned documents.
- The significance of comparing hand writing samples.
- The importance of detecting frauds and forgeries by analyzing questioned documents.

Unit	Syllabus	Periods
UNIT - I	Nature and Scope of Questioned Documents <ul style="list-style-type: none"> • Definition of questioned documents. • Types of questioned documents. • Preliminary examination, Collection, Handling and Transportation of document. • Examination of computer generated, typed and Xeroxed documents. • Determining the age of documents. 	12 hrs.
UNIT - II	Handwriting and its Comparison <ul style="list-style-type: none"> • Handwriting and its Principles. Requested and Standard Documents. • Comparison of handwriting. Natural variations and fundamental divergences in handwritings. Class and individual characteristics. • Examination of signatures characteristics, Examination of paper and ink. 	12 hrs.

Shama
Megha
Neha
Sant

UNIT - III	Forgeries <ul style="list-style-type: none"> • Types of Forgery and its examination. • Alterations, Erasures, and Obliterations in documents. • Indented and invisible writings. Charred documents. Disguised writing and anonymous letters. • Examination of counterfeit Indian currency notes, passports, visas and stamp papers, seal, rubber & other mechanical impressions. 	12 hrs.
UNIT - IV	Typescript Comparisons <ul style="list-style-type: none"> • Type Writers Examination Fax Machines Examination. • Photocopier, Fax, and Printer Examination. • Computer Printers Examination. 	12 hrs.
UNIT - V	Basic tools for examination of Documents <ul style="list-style-type: none"> • Basic tools needed for forensic documents' examination. • Ultraviolet, Visible and Fluorescence Spectroscopy. • Photomicrography, Microphotography. • Video Spectral Comparator (VSC). • Electrostatic Detection Apparatus (ESDA). 	12 hrs.

Suggested reading-

1. O. Hilton, Scientific Examination of Questioned Documents, CRC Press, Boca Raton (1982).
3. R.N. Morris, Forensic Handwriting Identification: Fundamental Concepts and Principles, Academic Press, London (2000).
4. E. David, The Scientific Examination of Documents – Methods and Techniques, 2nd Edition, Taylor & Francis, Hants (1997).
5. Albert S. Osborn; Questioned Documents, 2nd Ed., Universal Law Pub., Delhi.
6. Wilson R. Harrison; Suspect Documents Their Scientific Examination.
7. Saferestein, Criminalistics: An Introduction to Forensic Science. Prentice, Hall.
8. Sharma, B.R.: Forensic Science in Criminal Investigation and Trials, Central Law Agency, Allahabad, 1974.
10. Laboratory working procedure manual, Documents DFS, New Delhi, 2005

[Handwritten signature]

Shama

Mehar
Megha

[Handwritten signature]

SYLLABUS

UG				
Class		B.Sc. Forensic Science (Hons.)		
Semester/Year		IV Semester – II Year		
Subject & Subject Code		Practical Forensic Science - BFOSH20S404		
Paper		Questioned Documents- Practical		
Max. Marks		50= (30+20)		
L	T	P	Credits Total	2
0	0	2		

PRACTICALS

60 hrs.

1. To identify handwriting characters.
2. To study natural variations in handwriting.
3. To compare handwriting samples.
4. To detect simulated forgery.
5. To detect traced forgery.
6. To study the line quality defects in handwriting samples.
7. To examine the security features of currency notes, passports and plastic money.
8. To study alterations, obliterations and erasures in handwriting samples.
9. To cite a case wherein Section 45 of Indian Evidence Act was invoked, seeking expert opinion for authentication of handwriting and/or signatures.
10. To cite a case wherein Section 489A of the Indian Penal Code was invoked in context of fake currency.
11. Examination of Secret and Indented writing.

Shama

Mehar

Ant *Megha*

SYLLABUS

UG				
Class		B.Sc. Forensic Science (Hons.)		
Semester/Year		IV Semester – II Year		
Subject & Subject Code		Forensic Science - BFOSH20S405		
Paper		Forensic Biology		
Max. Marks		100		
L	T	P	Credits Total	4
3	1	0		
<p>Course Objectives: This course provides the knowledge about</p> <ul style="list-style-type: none"> • The significance of biological and serological evidences. • Biological fluids – blood, urine, semen, saliva, sweat and milk – in crime investigations. • Fundamentals and significance of wild life Forensics. • Protected and endangered species of animals and plants. 				
<p>Course Outcome: The Students will learn the following:</p> <ul style="list-style-type: none"> • Understanding the biological and serological evidences • Obtain the knowledge about the preliminary and confirmatory examination of biological fluids. • Importance of Wild life evidences. 				
<p>Student Learning Outcomes (SLO): After studying this paper, the students will know –</p> <ul style="list-style-type: none"> • The significance of biological and serological evidence. • The forensic importance of hair evidence. • The importance of biological fluids – blood, urine, semen, saliva, sweat and milk – in crime investigations. • How wildlife forensics aid in conserving natural resources. • How forensic entomology assists in death investigations. 				
Unit	Syllabus			Periods
UNIT - I	<p>Biological Evidence</p> <ul style="list-style-type: none"> • Nature and importance of biological evidence. • Composition and Functions of Blood and Semen. • Types and identification of microbial organisms of forensic significance. • Diatoms and their forensic significance. 			12 hrs.

[Signature]

Slama

Mehar *Algha* *[Signature]*

UNIT - II	Introduction and Examinations of Biological Evidences <ul style="list-style-type: none"> • Blood, Semen, Saliva, Vomit, Tears, Nails, Viscera. • Identification of Blood, Semen, Saliva and Urine through preliminary and confirmatory crystal examinations. 	12 hrs.
UNIT - III	Examinations of Hair Evidences <ul style="list-style-type: none"> • Morphology and biochemistry of human hair. • Significance of hair evidences. Transfer, persistence and recovery of hair evidence. • Structure and comparison of human and Animal hair. 	12 hrs.
UNIT - IV	Wildlife Forensics <ul style="list-style-type: none"> • Fundamentals of wildlife forensic. Significance of wildlife forensic. • Protected and endangered species of animals and plants. • Illegal trading in wildlife items, such as skin, fur, bone, horn, teeth, flowers and plants. • Identification of physical evidence pertaining to wildlife forensics. • Identification of pug marks of various animals. 	12 hrs.
UNIT - V	Forensic Entomology <ul style="list-style-type: none"> • Basics of forensic entomology. • Different Insects of forensic importance. • Collection of entomological evidence during death investigations. 	12 hrs.

Suggested reading-

1. L. Stryer, Biochemistry, 3rd Edition, W.H. Freeman and Company, New York (1988).
2. R.K. Murray, D.K. Granner, P.A. Mayes and V.W. Rodwell, Harper's Biochemistry, APPLETON & Lange, Norwalk (1993).
3. S. Chowdhuri, Forensic Biology, BPRD, New Delhi (1971).
4. R. Saferstein, Forensic Science Handbook, Vol. III, Prentice Hall, New Jersey (1993).
5. G.T. Duncan and M.I. Tracey, Serology and DNA typing in, Introduction to Forensic Sciences, 2nd Edition, W.G. Eckert (Ed.), CRC Press, Boca Raton (1997).

Shama

Bo

Meyla

Mehar

Adar

SYLLABUS

UG				
Class		B.Sc. Forensic Science (Hons.)		
Semester/Year		IV Semester – II Year		
Subject & Subject Code		Practical Forensic Science - BFOSH20S406		
Paper		Forensic Biology Practical		
Max. Marks		50= (30+20)		
L	T	P	Credits Total	2
0	0	2		

PRACTICALS

60 hrs.

1. To examine hair morphology and determine the species to which the hair belongs.
2. To prepare slides of scale pattern of human hair.
3. To examine human hair for cortex and medulla.
4. To carry out microscopic examination of pollen grains.
5. To carry out microscopic examination of diatoms.
6. To cite a crime case in which diatoms have served as forensic evidence.
7. To prepare a case report on forensic entomology.
8. To prepare a case report on problems of wildlife forensics.

[Handwritten signature]

Solama

Megha

Mehar

[Handwritten signature]

SYLLABUS

UG			
Class		B.Sc. Forensic Science (Hons.)	
Semester/Year		IV Semester – II Year	
Subject & Subject Code		Forensic Science - BFOSH20S407	
Paper		Physics	
Max. Marks		100	
L	T	P	Credits Total
3	1	0	
4			
Course Objectives: This course provides knowledge about <ul style="list-style-type: none"> • Mechanics and acoustics • Wave optics • Electrons and LASER • Atom and its structure. 			
Course Outcome: Students will be able to <ul style="list-style-type: none"> • Determine refractive index different materials • Determine wavelength of light and LASER • Use microscope to analyze the material 			
Student Learning Outcomes (SLO): After studying this paper the students will know — <ul style="list-style-type: none"> • Properties of mechanics and acoustic • Reflection & refraction of Light • Interference of Light • Properties & applications of Laser • Phenomenon of Radioactivity 			
Unit	Syllabus		Periods
UNIT - I	Mechanics & Acoustics Concept of force, Inertia, Newton's first law of motion: Momentum, Newton's second law of motion; Impulse; Newton's third law of motion, Law of conservation of linear momentum, Static and kinetic friction. Laws of friction. Velocity of sound, echo, absorption coefficient, introduction to ultrasonic, production of ultrasonic waves, applications of ultrasonic waves, Generation of sound, amplitude, Vibration, Physical properties of vibrating systems.		12 hrs.

Shama

Mishra

Megha

Choudhary

UNIT - II	Wave Optics -I Reflection of light. Refraction of light, Total internal reflection and its applications, Diffraction of light, types of diffraction, Diffraction of light in a single slit. Aberrations in images and types of aberrations. Principle and applications of some optical instruments: Simple Microscope, Compound Microscope, Polarizing Microscope. Stereomicroscope, Comparison Microscope. Electron Microscope, Simple table spectrometer.	12 hrs.
UNIT - III	Wave Optics-II Wave front and Huygens's principle, Huygen's theory of secondary wavelets, Introduction to interference, Interference in thin films, Michelson's Interferometer, Coherent sources, Polarisation, Plane polarised light, Brewsters' law, Malus law.	12 hrs.
UNIT - IV	Electronics and LASER Conductors, semi-conductors & Insulators, Types of semi-conductors, Conduction in N-type and P-type semi-conductors, Diode, Bias, Rectifier, Transistors, Emitter characteristic curve, Collector characteristic curve, Transconductance, Amplifier. Production of LASER, Types of LASER, Properties of Laser, applications of LASER, Optical fibres, Propagation of light through optical fibre, Angle of acceptance and numerical aperture.	12 hrs.
UNIT - V	Nuclear Physics Composition and size of nucleus, atomic masses, isotopes, isobars, isotones. Nuclear forces, fission, fusion, nuclear properties and half-life, Radioactive decays, alpha, beta & gamma rays, Applications of Radio Isotopes, counters and detectors- Giger-muller counter, scintillation counter.	12 hrs.

Suggested reading-

1. Applied Fluid Mechanics, by- Mott Robert, Pearson Benjamin Cummir, VI Edition, Pearson Education/Prentice Hall International, New Delhi
2. Atomic and Nuclear physics, by- N. Subramanyam, Brijlal.
3. Fundamental of Acoustics 4th Edition, by- Kinsler , John Wiley and Sons
4. Mechanics, by- D. S. Mathur, S Chand.
5. Nuclear Physics, by- S. N. Ghoshal.
6. Optics, by- Brijlal and Subramayam.
7. Physics for Degree Students B.Sc. Forensic Science (Hons.)-Part-I, by- C. L. Arora, Dr. P. S. Hemne, S Chand & Company.
8. The Physics of waves and oscillation, by- N. K. Bajaj, Tata McGraw-Hill, publishing co. Itd.
9. LASERS- Theory and Applications, by- Thyagarajan and A. K. Ghatak

[Signature]

Shama

Mehra

[Signature]

[Signature]

SYLLABUS

UG				
Class		B.Sc. Forensic Science (Hons.)		
Semester/Year		IV Semester – II Year		
Subject & Subject Code		Practical Forensic Science - BFOSH20S408		
Paper		Physics- Practical		
Max. Marks		50		
L	T	P	Credits Total	2
0	0	2		

PRACTICALS

60 hrs.

1. Standard Operating Procedures for using Vernier Caliper, Micrometer Screw Gauge.
2. Standard Operating Procedures for using Travelling Microscope, Comparison Microscope
3. Standard operating Procedure for using Abbes Refractrometer, Stereo Microscope.
4. Determination of refractive index of given liquid using Abbes refractrometer (Four Liquid).
5. Determination of refractive index of material of prism using Spectrometer.
6. To determine the wavelength of Sodium lamp using Newton's Ring Experiment
7. To study the 'n' diffraction pattern using spectrometer.
8. To study Forward and Reverse characteristics of Zener diode.
9. Measurement of wavelength of LASER light source using diffraction grating.

Sham

to

Mehar

Arb

Megha

School of Basic and Applied Sciences

SYLLABUS

UG			
Class		B.Sc. Forensic Science (Hons.)	
Semester/Year		IV Semester – II Year	
Subject & Subject Code		Forensic Science - BFOSH20S409	
Paper		Handwriting Identification and Recognition	
Max. Marks		100	
L	T	P	Credits Total
2	0	0	
2			
<p>Course Objectives: This course provides knowledge about</p> <ul style="list-style-type: none"> • Handwriting Identification • Brain and related organs involved in handwriting • Examine and recognition of handwriting 			
<p>Course Outcome: Students will be able to</p> <ul style="list-style-type: none"> • Personal Identification on the basis of Handwriting • Take samples for handwriting examination 			
<p>Student Learning Outcomes (SLO): After studying this paper, the students will learn –</p> <ul style="list-style-type: none"> • Important features in handwriting identification. • Basis of handwriting characteristics. • Methods of handwriting identification. 			
Unit	Syllabus		Periods
UNIT - I	<p>Handwriting</p> <ul style="list-style-type: none"> • Basis of handwriting. 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. 		06 hrs.



Shama

Nikhar



Megha

UNIT - II	Neuromuscular Basics of Handwriting <ul style="list-style-type: none"> • Human Nervous System, Brodman's area, Brain function for Hand Motor Control, Neuroanatomical Bases of hand Motor Control, Frontal-Subcortical Neural Circuits and Motor Function. • The Cerebellum and Brain Stem. Handwriting as a Motor Program. • Hierarchical Models of Handwriting Motor Control. 	06 hrs.
UNIT - III	Identification of Handwriting <ul style="list-style-type: none"> • Basics of handwriting identification. • Development of individuality in handwriting. • Natural variations and fundamental divergences in handwritings. • Class and individual characteristics. 	06 hrs.
UNIT - IV	Handwriting Examination <ul style="list-style-type: none"> • Basis of handwriting comparison. • Collection of handwriting samples. • Forgery detection. Counterfeiting. • Examination of altered and erased documents. • Tools used in handwriting examination. 	06 hrs.
UNIT - V	Handwriting Recognition <ul style="list-style-type: none"> • 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. 	06 hrs.

Suggested Readings-

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. R.N. Morris, Forensic Handwriting Identification: Fundamental Concepts and Principles, Academic Press, London (2000).
4. E. David, The Scientific Examination of Documents – Methods and Techniques, 2nd Edition, Taylor & Francis, Hants (1997).
5. Z. Liu, J.H. Cai and R. Buse, Handwriting Recognition: Soft Computing and Probabilistic Approach (Volume 133), Springer Science and Business Media (2003)

Shama

Mehar

for

Shama

Mehar

SYLLABUS

UG				
Class		B.Sc. Forensic Science (Hons.)		
Semester/Year		V Semester – III Year		
Subject & Subject Code		Forensic Science - BFOSH20S501		
Paper		Forensic Ballistics		
Max. Marks		100		
L	T	P	Credits Total	4
3	1	0		
Course Objectives: This course provides the knowledge about <ul style="list-style-type: none"> • Firearms and their firing mechanisms. • The methods of identifying firearms. • The methods for characterization of gunshot residue. 				
Course Outcome: The Students will be able to: <ul style="list-style-type: none"> • Classify the firearms and their mechanisms. • Characterization and identification of Gunshot Residue. 				
Student Learning Outcomes (SLO): After studying this paper, the students will know – <ul style="list-style-type: none"> • The methods of identifying firearms. • The characteristics of ammunition. • The importance of firearm evidence. • The nature of firearm injuries. 				
Unit	Syllabus			Periods
UNIT - I	Introduction to Firearm <ul style="list-style-type: none"> • History and development of firearms. • Classification of firearms. Weapon types and their operation. • Firing mechanisms of different firearms. 			08 hrs.
UNIT - II	Internal Ballistic <ul style="list-style-type: none"> • Definition, • Ignition of propellants, shape and size of propellants, • Manner of burning. • Various factors affecting the internal ballistics: lock time, ignition time, barrel time, erosion, corrosion and gas cutting. 			12 hrs.
UNIT - III	External/Terminal Ballistic <ul style="list-style-type: none"> • External Ballistics –Measurements of trajectory parameters, introduction to automated system of trajectory computation and automated management of ballistic data. • Terminal Ballistics – Effect of projectile on hitting the target: function 			12 hrs.

[Signature]

Shama

Neha

[Signature]

Megha

	of bullet shape, striking velocity, striking angle and nature of target, tumbling of bullets Ricochet and its effects, stopping power.	
UNIT - IV	Ammunition <ul style="list-style-type: none"> • Types of ammunition. Constructional features and characteristics of different types of cartridges and bullets. • Primers and priming compounds. • Projectiles, Headstamp markings on ammunitions. • Different types of marks produced during firing process on cartridge – firing pin marks, breech face marks, chamber marks, extractor and ejector marks. 	13 hrs.
UNIT - V	Firearm Evidence <ul style="list-style-type: none"> • Matching of bullets and cartridge cases in regular firearms. • Identification of bullets, pellets and wads fired from improvised, country made firearms. • Automated method of bullet and cartridge case comparison. • Determination of range of fire and time of fire. • Mechanisms of formation of gunshot residues. • Methods of analysis of gunshot residues from shooting hands and targets, with special reference to clothing's. • Identification and nature of firearms injuries. • Reconstruction with respect to accident, suicide, murder and self defence. 	15 hrs.

Suggested reading-

1. B.J. Heard, Handbook of Firearms and Ballistics, Wiley and Sons, Chichester (1997).
2. W.F. Rowe, Firearms identification, Forensic Science Handbook, Vol. 2, R. Saferstein (Ed.), Prentice Hall, New Jersey (1988).
3. A.J. Schwoeble and D.L. Exline, Current Methods in Forensic Gunshot Residue Analysis, CRC Press, Boca Raton (2000).
4. E. Elaad in Encyclopedia of Forensic Science, Volume 2, J.A. Siegel, P.J. Saukko and G.C. Knupfer (Eds.), Academic Press, London (2000).

Shama

[Signature]

[Signature]

[Signature]

[Signature]

SYLLABUS

UG			
Class		B.Sc. Forensic Science (Hons.)	
Semester/Year		V Semester – III Year	
Subject & Subject Code		Practical Forensic Science - BFOSH20S502	
Paper		Forensic Ballistics- Practical	
Max. Marks		50= (30+20)	
L	T	P	Credits Total
0	0	2	
			2

PRACTICALS

60 hrs.

1. To describe, with the aid of diagrams, the firing mechanisms of different types of firearms.
2. To correlate the velocity of bullet with the impact it produces on the target.
3. To correlate the striking angle of the bullet with the impact on the target.
4. To estimate the range of fired bullets.
5. To carry out the comparison of fired bullets.
6. To carry out the comparison of fired cartridge cases.
7. To identify gunshot residue.
8. To correlate the nature of injuries with distance from which the bullet was fired.
9. To differentiate, with the aid of diagram, contact wounds, close range wounds and distant wounds.

[Signature]

Shama

Mehar

Anil

Megha

SYLLABUS

UG			
Class		B.Sc. Forensic Science (Hons.)	
Semester/Year		V Semester – III Year	
Subject & Subject Code		Forensic Science - BFOSH20S503	
Paper		Forensic Toxicology	
Max. Marks		100	
L	T	P	Credits Total
3	1	0	
Course Objectives:			
This course provides the knowledge of			
<ul style="list-style-type: none"> The classification of poisons and their modes of actions. The classification and characteristics of the narcotics, drugs and psychotropic substances. The significance of toxicological studies in forensic science 			
Course Outcome:			
The Students will be able to			
<ul style="list-style-type: none"> Identify the classification and mode of poison. Classify and Identify NDPS, Narcotics, stimulants, depressants and hallucinogens 			
Student Learning Outcomes (SLO):			
After studying this paper, the students will know –			
<ul style="list-style-type: none"> The significance of toxicological studies in forensic science. The classification of poisons and their modes of actions. The absorption of poisons in body fluids. The forensic identification of illicit liquors. 			
Unit	Syllabus		Periods
UNIT - I	Basics of Toxicology <ul style="list-style-type: none"> Toxicology: Definition and Scope, Significance of toxicological findings, Techniques used in toxicology, Toxicological analysis and chemical intoxication tests, Postmortem Toxicology, Clinical toxicology, Dose-response relationship, Lethal dose 50, Lethal concentration 50 and Effective dose 50. 		12 hrs.
UNIT - II	Poisons <ul style="list-style-type: none"> Poison: Definition, Classification, Physico-chemical characteristics and mode of action of poisons, Metabolism and excretion. 		12 hrs.

Shang

to

Mehar

Ant
Mehar

UNIT - III	Types of Poisoning and Collection <ul style="list-style-type: none"> • Accidental, suicidal and homicidal poisonings and relevant Sections, Signs and symptoms of common poisoning and their antidotes, • Collection and preservation of viscera, blood and urine for various poison cases, • Extraction and isolation of poison from viscera. 	12 hrs.
UNIT - IV	Identification and Analysis of Poisons <ul style="list-style-type: none"> • Identification and Analysis of Biocides and Heavy metals in body fluids, • General Introduction to Animal poisons, Vegetable poisons, Poisonous seeds, fruits, roots and mushrooms, • Alcoholic and non-alcoholic illicit liquors, Analysis and identification of ethyl alcohol, Estimation of ethyl alcohol in blood and urine. 	12 hrs.
UNIT - V	Identification and Analysis of Drugs <ul style="list-style-type: none"> • Drug: Definition, Classification and Identification of NDPS, Narcotics, stimulants, depressants and hallucinogens, • General characteristics and common example of natural, synthetic and semi-synthetic narcotics, drugs and psychotropic substances, • Designer drugs, Drugs and driving. Dope tests. 	12 hrs.

Suggested reading-

1. R. Saferstein, Criminalistics, 8th Edition, Prentice Hall, New Jersey (2004).
2. S.B. Karch, The Pathology of Drug Abuse, CRC Press, Boca Raton (1996).
3. Kennedy, Thomas J., Christian, Jr., Donnell Basic Principles of Forensic Chemistry, Springer
4. Saferstein, Criminalistics: An Introduction to Forensic Science. Prentice Hall.
5. Goutam, M. P. and Goutam S Analysis of Plant Poison, Selective & Scientific Books, New Delhi.
6. Feigl; Spot Test in Organic Analysis, Elsevier Pub., New Delhi.
7. Clark, E.G.C.; Isolation and Identification of Drugs, Vol I&II, Academic Press,
8. Sunshine I; Year book of Toxicology, CRC Press Series, USA
9. Michael J. Deverlanko et al: Hand Book of Toxicology CRC Press, USA.
10. Parikh C.K; Text Book of Medical Jurisprudence Forensic Medicines and Toxicology. CBS Pub. New Delhi.

[Handwritten signature]

Shama

Mehar

[Handwritten signature]

Mylor

SYLLABUS

UG				
Class		B.Sc. Forensic Science (Hons.)		
Semester/Year		V Semester – III Year		
Subject & Subject Code		Practical Forensic Science - BFOSH20S504		
Paper		Forensic Toxicological- Practical		
Max. Marks		50= (30+20)		
L	T	P	Credits Total	2
0	0	2		

PRACTICALS

60 hrs.

1. To identify biocides.
2. To identify metallic poisons.
3. To identify organic poisons.
4. To identify ethyl alcohol.
5. To identify methyl alcohol.
6. To carry out quantitative estimation of ethyl alcohol.
7. To prepare iodoform.
8. To identify drugs of abuse by spot tests.
9. To perform color tests for barbiturates.
10. To separate drugs of abuse by thin layer chromatography.

Shama

to

Mehar

Shruti

Megha