



Rayat Shikshan Sanstha's

**YASHAVANTRAO CHAVAN INSTITUTE OF SCIENCE,
SATARA
LEAD COLLEGE OF KARMAVEER BHAURAO PATIL
UNIVERSITY, SATARA**

Reaccredited by NAAC with 'A⁺' Grade

As per NEP Guidelines 2020 For

Subject – Forensic Science

B. Sc. II

Semester - III & IV

Syllabus to be implemented w. e. f. June, 2024 onwards

Structure of the course:

1. **TITLE : Forensic Science**

2. **YEAR OF IMPLEMENTATION:-**

Syllabus will be implemented from June, 2024 onwards.

3. **PREAMBLE :**

This syllabus is framed to give sound knowledge with understanding of Forensic Science to undergraduate students. The goal of the syllabus is to make the study of Forensic Science popular, interesting and encouraging to the students for higher studies including research.

The aim of the syllabus is to prepare the students to gain knowledge in Forensic science and CSI. The new and updated syllabus is based on a basic and applied approach with vigour and depth. At the same time, precaution is taken to make the syllabus comparable to the syllabi of three Government Institute of Forensic Science, other universities and the needs of Government sector, private sector and research.

The syllabus is prepared after discussion at length with a number of faculty members of the subject and experts from Government and private sectors and research fields.

The units of the syllabus are well defined, taking into consideration the level and capacity of students.

4. **GENERAL OBJECTIVES OF THE COURSE / PAPER :**

1) To make the students knowledgeable with respect to the subject and its practical applicability.

2) To promote understanding of basic and advanced concepts in Forensic Science.

3) To expose the students to various emerging areas of Forensic Science.

4) To prepare students for further studies, helping in their bright career.

5) To expose the students to different processes used in Government and private areas and in the research field.

6) To develop their ability to apply the knowledge of Forensic Science in Crime Scene investigation.

7) To prepare the students to accept the challenges in Crime scene investigation.

8) To develop skills required in various private sectors like banking, private investigative agencies, and research labs and in the field of Government sectors.

5. **DURATION:** The course shall be a full time course.

6. **EXAM PATTERN:** Pattern of examination will be semester.

7. **MEDIUM OF INSTRUCTION:** The medium of instruction shall be in English.

8. **STRUCTURE of B.Sc. II Forensic Science:**

Four Year UG Honours Degree Credit Distribution

Level I	Sem	Subject - 1 Major				Subject - 2 Minor		Subject - 3 GE / OE		VSEC		AEC, VEC, IKS			OJT, FP, CEP, CC, RP, RM					Total
		DSC		DSE						VSC	SEC	AEC	IKS	VEC	CC	FP	CEP	OJT	RM	
		T	P	T	P	T	P	T	P											
4.5	I	4	2	---	---	4	2	6	--	---	---	---	2	---	2	---	---	---	---	22
	II	4	2	---	---	4	2	6	--	---	2	---	---	2	---	---	---	---	---	22
5	III	4	4	---	---	2	2	---	---	2	2	4	---	2	---	---	---	---	---	22
	IV	4	4	---	---	2	2	---	---	2	2	4	---	---	2	---	---	---	---	22
5.5	V	4	2	4 <small>(2 Papers out of four)</small>	2	---	---	---	---	4	---	---	---	---	2	2	2	---	---	22
	VI	4	2	4 <small>(2 Papers out of four)</small>	2	---	---	---	---	2	--	---	---	---	2	2	---	4	---	22
6	VII	12 <small>(3 Papers)</small>	2	4 <small>(1 Paper out of Two)</small>	--	--	---	---	---	---	---	---	---	---	---	---	---	---	4	22
	VIII	12 <small>(3 Papers)</small>	2	4 <small>(1 Paper out of Two)</small>	--	---	---	---	---	---	---	---	---	---	---	---	---	4	---	22
Total		48	20	16	4	12	8	12	--	10	6	8	2	4	8	4	2	8	4	176
		88				20		12			16		14			26				

List Course titles of Major, Minor

Sr. No.	Subject	Semester	Paper no.	Paper Title
1	Forensic Science	Sem I	Paper I	Introduction to Forensic Science
			Paper II	Crime Scene Investigation
			Practical	Practical
		Sem II	Paper III	Forensic Questioned Document & Fingerprint
			Paper IV	Digital Forensics
			Practical	Practical

9. **EXAMINATION STRUCTURE: As per college guidelines**

10. **Structure and titles of the course of B.Sc. I for Semester I & II**

Total credits - 2, Total Hours – 30				
Sem	Paper no. & Code	Paper Title	Unit	Unit name
Sem III	Major Paper I BFST 131	Crime Scene Forensics-I	Unit I	Criminology
			Unit II	Crime Scene Management
			Unit III	Crime Scene Investigation
			Unit IV	Crime Scene Documentation
	Major Paper II BFST 132	Advanced Computer and Digital Forensics I	Unit I	Introduction to Cyber Forensic
			Unit II	Identification of Computer Peripherals
			Unit III	Basics of Mobile Phone Investigation
			Unit IV	Incident Response
	Practical BFSP 133	Practical	Practical	Major Lab I
	Minor Paper I BFST 134	Advanced Forensic Chemistry I and Forensic Physics I	Unit I	Petroleum Products
			Unit II	Cases involving Arson and Explosives
			Unit III	Forensic Trace Analysis
			Unit IV	Tool and Tool Marks
Practical BFSP 135	Practical	Practical	Minor Lab I	

Sem IV	Major Paper II BFST 141	Crime Scene Forensics II	Unit I	Physical Evidences – I
			Unit II	Impression Evidences - I
			Unit III	Impression Evidences – II
			Unit IV	Bloodstain Pattern and Crime Scene Reconstruction
	Major Paper II BFST 142	Advanced Computer and Digital Forensics II	Unit I	Computer Networks
			Unit II	Mobile Crime Investigations
			Unit III	Cyber Forensic Tools and Utilities
			Unit IV	Legal Provisions for Digital Evidences
	Practical BFSP 143	Practical	Practical	Major Lab II
	Minor Paper I BFSP 144	Advanced Forensic Biology II and Forensic Psychology II	Unit I	Forensic Genetics, DNA and Protein Extraction techniques.
			Unit II	Forensic Biology and serology.
			Unit III	Aggression and Behavioural abnormalities.
			Unit IV	Investigative psychology and criminal profiling.
	Practical BFSP 145	Practical	Practical	Minor Lab II

11. OTHER FEATURES :

(A) LIBRARY :

Reference Books – Latest Editions, Journals and Periodicals.

(B) SPECIFIC EQUIPMENTS NECESSARY TO RUN THE COURSE:

OHP, Computer, L.C.D. Projector.

(C) INTERNET

(D) LIST OF THE LABORATORY EQUIPMENTS :

1. Colorimeter
2. Spectrophotometer
3. pH meter
4. Electrophoresis apparatus
5. Computer with printer & internet
6. Water bath
7. Incubator
8. Oven
9. Balance
10. Centrifuge machine
11. Soxhlet extraction apparatus.

12. Micropipettes
13. Glassware
14. Chromatographic jar
15. Chromatography column
16. CSI Kit
17. CSI Management Kit
18. Fingerprint development kit
19. Fingerprint collection kit
20. Blood detection Kit
21. Semen detection Kit
22. GSR detection Kit
23. Traveling Microscope
24. Polarimeter
25. Logic gate Kit
26. Bridge rectifier
27. OS forensic
28. LASER
29. Sonometer
30. Electromagnetic device
31. Digital Camera

Semester – III

Course Name: Forensic Science

Major Paper - I: Criminology and Crime Scene Forensics-I

SEMESTER – III Major Paper – I Criminology and Crime Scene Forensics-I

Course Objectives: Students should be able to,

1. Study the fundamentals of Criminology and Crime scene Investigation.
2. Know about investigative techniques.
3. Gain knowledge about handling of evidence and crime.
4. Understand about the handling of crime scenes.

Credits (Total Credits 2)	SEMESTER – III Major Paper – I	No. of hours per unit (30)
Unit – I	Criminology	(08)
	<p>1.1 Definition, aims and scope, Theories of criminal behavior–classical, positivist, sociological. Criminal anthropology, Criminal profiling, Understanding modus operandi, Investigative strategy, Role Of Media,</p> <p>1.2 Definition of crime, victimology, criminological perspective, characteristics of crime</p> <p>1.3 classification of crimes: atrocity, seriousness, motive, Elements, nature, causes consequences crime,</p> <p>1.3 Types of Crime-Deviant Behavior,Hate Crimes,organized crime and public disorder,domestic violence and workplace violence,White Collar Crimes,</p> <p>1.4Juvenile Delinquency.Social Change And Crime, Psychological Disorders and Criminality. Situational Crime Prevention.</p>	
Unit – II	Crime Scene Management	(08)
	<p>2.1 Crime Scene, crimes without scene.</p> <p>2.2 Types of Crime Scenes, based on manner of crime: homicide, suicide, accidental,</p> <p>2.3 Important Terminology: Accused, Victim, Suspect, Witness,</p> <p>2.4 Types of evidence found in the crime scene, Role and Qualities of an Investigating Officer</p>	
Unit – III	Crime Scene Investigation	(07)
	<p>3.1 Role of different agencies involved in crime scene management: Police, Forensic Science Laboratories, Medico legal experts, Judicial officers.</p> <p>3.2 Duties of first responders at crime scenes.</p> <p>3.3 Crime Scene Management-Technology Management, Logistic Management, Manpower Management, Golden rules for an ideal crime scene Management.</p> <p>3.4 Securing the Scene: Procedure and Precautions,</p>	
Unit – IV	Crime Scene Documentation	(07)

	<p>4.1 Searching Methods: Types and Applications, Recording the Scene: Forensic Photography, Forensic Videography, Sketching, Types and Procedure, Note Making.</p> <p>4.2 Safety measures at crime scenes, The evaluation of 5Ws (who?, what?, when?, where?, why?) and 1H (how).</p> <p>4.3 Collection, Preservation and Packaging of different evidences.,</p> <p>4.4 Chain of Custody and Forwarding: Significance of Chain of Custody, Forwarding Letter.</p> <p>4.5 Report Writing:Preparation of report, Purpose of writing an investigative report</p>	
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Course Outcomes: After completion of the units students will be able to:

1. Comprehend the significance of crime scenes.
2. Analyze the various types of cases.
3. Evaluate and interpret crucial information from various types of trace evidence.
4. Analyze the scientific principles of crime scene investigation including proper evidence handling.

Reference Books:

1. James, S.H. and Nordby, J.J. Forensic Science: An Introduction to Scientific and Investigative Techniques. CRC Press: USA; (2003).
2. Saferstein, R. Criminalistics -An Introduction to Forensic Science. Prentice Hall: USA; (1995).
3. Nanda, B.B. and Tiwari, R.K. Forensic Science in India- A Vision for the Twenty First Century. Select Publisher: New Delhi; (2001)
4. Barry, A.J. Fisher- Techniques of Crime Scene Investigation, 7th ed. R.C. Press, New York (2003)
5. Sharma, B.R. Forensic Science in Criminal Investigation and Trails. Universal Law Publishing: (2003).
6. Meguire, M., Morgan, R. and Reiner, R.The Oxford Handbook of Criminology 2nd ed. Oxford University Press: New York; (2002)
7. Bell, W.R. Practical Criminal Investigation in Correctional Facilities. CRC Pres: London; (2001).
8. Lyman M.D. Criminal Investigation- The Art and the Science. Pearson Education: India; (2013)

9. Henry Lee's Crime Scene Handbook: Henry C Lee (2001)
10. Stuart H. James Forensic Science: An Introduction to Scientific and Investigative Techniques 3rd ed.(2012)

SEMESTER – III Major Paper – II Advanced Computer and Digital Forensics I		
Course Objectives: Students should be able to,		
<ol style="list-style-type: none"> 1. Study the digital crime scene and its process. 2. Learn the cyber forensic investigative steps. 3. Understand the roles and responsibilities of cyber experts. 4. Gain knowledge about mobile forensic investigative techniques. 		
Credits (Total Credits 2)	SEMESTER – III Major Paper – II	No. of hours per unit (30)
Unit – I	Introduction to Cyber Forensic	(08)
	Introduction to Cyber Forensic, Cyber Forensic Steps (Identification, Seizure, Acquisition, Authentication, Presentation, Preservation), Computer Forensic Expert, Cyber Forensic Investigation Process, Types of Cyber Attacks: Malware, Phishing, DDoS, Insider Threats. The Goal of the Forensic Investigation, establishing a Basis or Justification to Investigate, Role of Cyber Forensic Expert in Legal Proceedings. Establishing a Basis or Justification to Investigate, Determining the	

	Impact of Incident, Auditing Vs. Cyber Forensic Investigations, Legal and Ethical Considerations in Cyber Forensic Investigations, Role of Cyber Forensic Expert in Legal Proceedings.	
Unit – II	Identification of Computer Peripherals	(08)
	Components of a Computer, Composition of a Computer, CMOS, BIOS, Input Devices, Storage Devices, Secondary Storage Devices, Other Components of a Computer - Processor, Motherboard, Input/Output Ports - USB, Infra-Red, Bluetooth, Network Connections - RAID, SMPS, How Computer Memory is Measured, Understanding System Architecture and Boot Process, Troubleshooting Hardware Issues.	
Unit – III	Basics of Mobile Phone Investigation	(07)
	Cell Phone Work, Mobile System Network, Mobile Technologies, Mobile Number Tracing, Modes of Data Transfer, Latest Cell Phone Crimes, Types of Mobile Crimes, Mobile Crime Investigation, Investigating - Mobile Handset Theft, Flash SMS, SMS Tampering, Back/Post Dated SMS, SMS Spoofing, MMS Scandals, Techniques for Extracting and Analysing Mobile Phone Data, Mobile Forensic Tools and Techniques.	
Unit – IV	Incident Response	(07)
	Introduction to Incident Response Process (What is a Computer Security Incident, Goals of Incident Response Involved in Incident Response Process, Incident Response Methodology, formulating a Response Strategy, Investigating the Incident), Preparing for Incident Response, Overview of Pre-incident Preparation, Identifying Risk, After Detection of an Incident, Incident Response Tools and Technologies, Incident Response Team Roles and Responsibilities.	
Course Outcomes: After completion of the units students will be able to:		

1. Differentiate between conventional crime scene and digital crime scene.
2. Identify the different types of digital evidence.
3. Extraction processes form digital evidence..
4. Analyse the digital evidence by utilizing different investigative applications.

Reference Books:

- 1.Digital forensics for legal professionals, by Larry Daniel (Second edition) (Unit-I)2009
- 2.Investigating computer related crime, by Peter Stephenson (Second edition)(Unit II) 2007
- 3.Incident Response & Computer Forensics by KavinMandia, Chrisporis, Mattpepe (Second Edition)(Unit-IV). 2003
- 4.Mobile Forensic Investigations: A Guide to Evidence Collection, Analysis, and Presentation 1stEdition.(Unit-III) 2012
- 5.Cybercrime and Digital Forensics: An Introduction 2ndEdition.(Unit-I,II). Digital Forensics.2016
- 6.Digital Evidence in Criminal Investigations by Angus Mc Kenzie Marshall.(Unit-I,II,III,IV)2009

Major Practical Paper - I

Credits (Total Credits 2)	SEMESTER – III Major Practical Paper - I List of Practical	No. of hours per Practical
Course Objectives: Students should be able to,		
	<ol style="list-style-type: none"> 1. Study initial response in crime scene and investigation techniques of indoor and outdoor crime scene. 2. Understand the crime scene management and crime scene documentation. 3. Gain know Process of Recovery of Data and Analysis Process for Data. 4. Learn the Use of Software’s & tools for Analysis Purpose. 	
1	Arriving at the Scene: Initial Response/ Prioritization of Efforts	
2	To investigate the indoor crime scene.	
3	To investigate the outdoor crime scene.	

4	To study the documentation process of crime scene investigation.	
5	To study the various type of photography of crime scene and To record videography of a crime scene	
6	To take photographs using different filters.	
7	To take photographs of crime scene exhibits at different angles.	
8	Collection, packing and forwarding of different types of evidences	
9	To study the Triangulation method of various types of crime scene	
10	To study the rectangular polar coordinate method and cross projection method of sketching.	
11	To prepare a crime scene sketch by using a baseline method and triangulation method	
12	To simulate a phishing attack and analyse the phishing email analysis tools	
13	To set up and configure a DDoS attack simulation using DDoS tools.	
14	To analyse system logs and BIOS setting to identify hardware configuration	
15	To trace the location of a mobile phone using GPS tracking software.	
16	To identify, seize and preserve digital evidence computers from crime scenes.	
17	To detect deletions, obliterations and modifications of files using encase software.	
18	To trace routes followed by e-mails and chats.	
19	To identify the IP address of the sender of emails.	
20	To document incident response activities and findings in an incident response.	
21	To create an incident response plan document outlining response procedures and responsibilities.	

Course Outcomes- Students will be able to:

1. Utilize the crime scene investigation process.
2. Operate the different photographic techniques.
3. Perform retrieves the deleted data from various pen drives, flash drives etc.
4. Acquire thorough knowledge regarding collection of digital evidence and their analysis.

Reference Books

1. James, S.H. and Nordby, J.J. Forensic Science: An Introduction to Scientific and Investigative Techniques. CRC Press: USA; (2003).
2. Saferstein, R. Criminalistics -An Introduction to Forensic Science. Prentice Hall: USA; (1995).

3. Nanda, B.B. and Tiwari, R.K. Forensic Science in India- A Vision for the Twenty First Century. Select Publisher: New Delhi; (2001)
4. Barry, A.J. Fisher- Techniques of Crime Scene Investigation, 7th ed. R.C. Press, New York (2003)
5. Sharma, B.R. Forensic Science in Criminal Investigation and Trails. Universal Law Publishing: (2003).
6. Meguire, M., Morgan, R. and Reiner, R. The Oxford Handbook of Criminology 2nd ed. Oxford University Press: New York; (2002)
7. Bell, W.R. Practical Criminal Investigation in Correctional Facilities. CRC Press: London; (2001).
8. Lyman M.D. Criminal Investigation- The Art and the Science. Pearson Education: India; (2013)
9. Henry Lee's Crime Scene Handbook: Henry C Lee
10. Stuart H. James Forensic Science: An Introduction to Scientific and Investigative Techniques 3rd ed.
11. Mobile Forensic Investigations: A Guide to Evidence Collection, Analysis, and Presentation, Second Edition 2nd Edition by Lee Reiber.
12. Practical Mobile Forensics: Forensically investigate and analyze iOS, Android, and Windows 10 devices, 4th Edition Paperback -April 9, 2020 by Rohi Tamma (Author), Oleg Skulkin (Author), Heather Mahalik (Author), Satish Bommisetty (Author).
13. Handbook of Digital Forensics and Investigation 1st Edition by Eoghan Casey, Elsevier Academic Press 2010.

SEMESTER – III
Minor Paper – I
Advanced Forensic Chemistry I & Forensic Physics I

Course Objectives: Students should be able to,

1. Understand the quality control criteria for petroleum products and motor fuels.
2. Determining the origin and cause of a fire.
3. Learn the forensic applications of trace evidence such as glass, paint.

4. Comprehend the basics of tools and tool marks.

Credits (Total Credits 2)	SEMESTER – III Minor Paper – I	No. of hours per unit (30)
Unit – I	Petroleum Products	(07)
	1.1 Distillation and fractionation of petroleum 1.2 Commercial uses of different petroleum fractions 1.3 Analysis of traces of petrol, diesel, ATF, Kerosene in forensic exhibits. 1.4 Comparison of petrol, Diesel, ATF and Kerosene, Case Study.	
Unit – II	Cases Involving Arson and Explosive	(08)
	2.1 Chemistry of fire. Conditions for fire. Collection and preservation of arson evidence. 2.2 Analysis of fire debris. Analysis of ignitable liquid residue. 2.3 Scientific investigation and evaluation of clue materials. Information from smoke staining, 2.4 Classification of explosives, Blasting agents, Bomb scene management, 2.5 Synthesis and characteristics of TNT, PETN and RDX. Explosion process Searching the scene of the explosion, Post blast residue collection and analysis	
Unit – III	Forensic Trace Analysis	(08)
	3.1 Physical properties of materials: temperature, weight and mass, density, refractive index and their forensic importance. 3.2 Glass: Composition of glass, Comparison of glass fragments, Measuring and comparing density and refractive index of glass, classification of glass samples, Glass fractures, Collection and preservation of glass evidence. 3.3 Paint: Composition of paint, Classification of common paints, Pigment Volume concentration number, Microscopic examination of paint, Analytical tools used in paint comparison, significance of paint evidence, collection and preservation of paint evidence. Forensic	

	examination of paint.	
Unit – IV	Tools and Tool Marks	(07)
	<p>4.1 Common Hand Tools: Levers (screw drivers, crow bars, pry bars, nail pullers, pinch bars, moulding bar, wrecking bar)</p> <p>4.2 Hand saw (Rip saw, cross cutting saw, bow saw, teeth saw, compass saw, dip cut, coping saw, wallboard saw, bow saw, hacksaw, chisel teeth saw, coarse cut carpenter saw)</p> <p>4.3 Striking Tools (Hammers, Hatches and Axes),</p> <p>4.4 Grasping Tools (Wrenches, Vise grips, Pliers)</p> <p>4.5 Cutting Tools (Metal snips, wire cutters, bolt and cable cutters)</p> <p>4.6 Crimping Tools, Knives, Scissors and shears, Chisels and punches, Drill bits.</p> <p>4.7 Tool Marks: Marks made by hand tools (Impression / compression marks, dent, saw marks, drill marks and holes, punctures, point to point blade cut marks, scratch and scour marks.</p> <p>4.8 Collection and documentation of tool mark</p>	
<p>Course Outcomes: After completion of the units students will be able to:</p> <ol style="list-style-type: none"> 1. Understand comparison of petrol, diesel, Kerosene and ATF. 2. To Analyze classification of explosives. 3. Discuss forensic applications of trace evidence such as glass, paint. 4. Elaborate the basics of tools and tool marks. 		
<p>Reference Books:</p> <ol style="list-style-type: none"> 1. J.D. DeHaan, Kirk’s Fire Investigation, 3rd Edition, Prentice Hall, New Jersey . (Unit III) 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). (Unit-III,IV) 4. S. Ballou, M. Houck, J.A. Siegel, C.A. Crouse, J.J. Lentini and S. Palenik in Forensic Science, (2013) 5. D.H. Ubelaker (Ed.), Wiley - Blackwell, Chichester (2013).(Unit - III, IV) 6. Instrumental Method of Chemical Analysis. Chatwal & Anand, Himalaya Publication.(2011)(Unit - I, II, III) 7. SeropeKalpakjian, Steven R Schmid. “Manufacturing Engineering and Technology”. International edition. 4th Ed. Prentice Hall, Inc. 2001. ISBN 0-13-017440-8. (Unit-I,II) 		

8. Hans-J. Koslowski. "Dictionary of Man - made fibers". Second edition. Deutscher Fachverlag. (1998) (Unit - III)
9. James, S.H. and Nordby, J.J. Forensic Science: An Introduction to Scientific and Investigative Techniques. CRC Press: USA; (2003).
10. Saferstein, R. Criminalistics -An Introduction to Forensic Science. Prentice Hall: USA; (1995).
11. Nanda, B.B. and Tiwari, R.K. Forensic Science in India- A Vision for the Twenty First Century. Select Publisher: New Delhi; (2001)
12. Barry, A.J. Fisher- Techniques of Crime Scene Investigation, 7th ed. R.C. Press, New York (2003)
13. Sharma, B.R. Forensic Science in Criminal Investigation and Trails. Universal Law Publishing: (2003).
14. Meguire, M., Morgan, R. and Reiner, R. The Oxford Handbook of Criminology 2nd ed. Oxford University Press: New York; (2002)
15. Bell, W.R. Practical Criminal Investigation in Correctional Facilities. CRC Pres: London; (2001).
16. Lyman M.D. Criminal Investigation- The Art and the Science. Pearson Education: India; (2013)
17. Henry Lee's Crime Scene Handbook: Henry C Lee (2001)
18. Stuart H. James Forensic Science: An Introduction to Scientific and Investigative Techniques 3rd ed. (2009)

Minor Practical Paper - I

Credits (Total Credits 2)	SEMESTER – I Minor Practical Paper - I List of Practical	No. of hours per Practical
Course Objectives: Students should be able to, <ol style="list-style-type: none"> 1. Prepare a case report on a case involving arson. 2. Carry out analysis of explosives substances. 3. Learn the methods of analysis of glass fragments. 4. Understand the methods of analysis of tool and tool marks. 		
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.(no.2)	
5	To prepare a case report on a case involving arson.	
6	To carry out analysis of explosive substances.(no.2)	
7	To separate explosive substances using thin layer chromatography.(no.2)	
8	To prepare a case report on bomb scene management.	
9	Chemical analysis of explosive materials.(Gun powder)- Color test, Microscopic examination.(no.2)	
10	Examination of fire arson cases by GC, TLC.(no.2)	
11	Comparison and physical matching of glass fragments.	
12	Study of glass fractures due to impacts / heat.	
13	Study the refractive index of glass samples.	
14	Determination of density of a given sample.	
15	Microscopic examination of paint sample.	
16	Identification of tools using standard data sheets.	
17	Physical matching of broken tools.	
18	Comparison of tool and tool marks under comparison microscope.	
19	Examination of structural properties tools by Comparison Microscope.	
20	Examination of tool marks and identification of tools.	
Course Outcomes- Students will be able to: <ol style="list-style-type: none"> 1. Understand how to carry out chemical analysis of explosives materials. 		

2. Understands how to carry out examinations of fire arson cases by GC,TLC.
3. Apply the methods of analysis of glass fragments.
4. Perform the methods of analysis of tool and tool marks.

Reference Books

1. DFSL manual(2005)
2. Forensic Analysis pre laboratory and laboratory student manual Dr. E. Hywel Evan (2001)
3. James, S.H. and Nordby, J.J. Forensic Science: An Introduction to Scientific and Investigative Techniques. CRC Press: USA; (2003).
4. Saferstein, R. Criminalistics -An Introduction to Forensic Science. Prentice Hall: USA; (1995).
5. Nanda, B.B. and Tiwari, R.K. Forensic Science in India- A Vision for the Twenty First Century. Select Publisher: New Delhi; (2001)
6. Barry, A.J. Fisher- Techniques of Crime Scene Investigation, 7th ed. R.C. Press, New York (2003)

SEC: Handwriting Identification & Recognition

Credits (Total Credits 2)	SEMESTER – III List of Practical	No. of hours per Practical
<p>Course Objectives: Students should be able to,</p> <ol style="list-style-type: none"> 1. Learn handwriting characteristics and their analysis. 2. Carry out analysis of handwriting examinations. 3. Learn about forgery. 4. Understand the process of analysis of forged documents. 		
1	To perform examination of handwriting with the given samples.	
2	To perform examination of handwriting on various surfaces.	
3	To examine handwriting influenced by age.	
4	To examine handwriting samples of a twin.	
5	To examine forged signatures.	
6	To examine simulated handwriting.	
7	To examine the handwriting numerals.	
8	To examine disguise in handwriting.	
9	To perform analysis of handwriting strokes documents.	
10	To perform analysis of currency and other security documents.	
11	Identification of General Characteristics of Handwriting	
12	Study of Natural variations in Handwriting	
13	Examination of forged documents.	
14	Examination of alteration, erasures, overwriting, additions and obliteration.	
15	Decipherment of secret writings using VSC	
<p>Course Outcomes- Students will be able to:</p> <ol style="list-style-type: none"> 1. Perform handwriting characteristics and their analysis. 2. Perform analysis of handwriting examinations. 3. Elaborate about forgery. 4. Perform the process of analysis of forged documents. 		
<p>Reference Books</p> <ol style="list-style-type: none"> 1. DFSL manual (2005) 		

2. Forensic Analysis pre laboratory and laboratory student manual Dr. E. Hywel Evan (2001)
3. James, S.H. and Nordby, J.J. Forensic Science: An Introduction to Scientific and Investigative Techniques. CRC Press: USA; (2003).
4. Saferstein, R. Criminalistics -An Introduction to Forensic Science. Prentice Hall: USA; (1995).
5. Nanda, B.B. and Tiwari, R.K. Forensic Science in India- A Vision for the Twenty First Century. Select Publisher: New Delhi; (2001)
6. Barry, A.J. Fisher- Techniques of Crime Scene Investigation, 7th ed. R.C. Press, New York (2003)

Vocational and Skill based course

SEMESTER – III		
Practical Paper - I		
Lab exercise in Essential component in Cyber security		
List of Practical		
<p>Course Objectives-Students should be able to:</p> <ol style="list-style-type: none"> 1. Learn about the Privacy and security settings for social media. 2. Understand the Firewall, Windows defender and MS office tools. 3. Learn the Secure net banking, Online transactions 4. Understand the use of Internet & Email Securely. 		
Credits (Total Credits 2)	SEMESTER – I Practical Paper - I List of Practical	No. of hours per Practical
1	Basic checklist, privacy and security settings for popular Social media platforms.	
2	Reporting and redressal mechanism for violations and misuse of Social media platforms.	
3	Configuring security settings in Mobile Wallets and UPIs.	

4	Checklist for secure net banking.	
5	Installation and configuration of computer Anti-virus.	
6	Installation and configuration of Computer Host Firewall.	
7	Demonstrate the use of Network tools: ping, ipconfig, ifconfig, tracert, arp, netstat, whois	
8	Working with Windows	
9	Working with MS-Office (Word, Excel, PowerPoint)	
10	Working with external storage devices (Reading and writing data on Storage devices)	
11	Understanding of firewall	
12	Use of the Internet - Visiting websites, searching information using search engines.	
13	Understanding use of Email	
14	Tracing and analyzing Email sender's IP Address of received email.	
15	Understanding LAN-client /Server, windows user creation, password protection	

Course Outcomes- Students will be able to:

1. Perform the Privacy and security settings for social media.
2. Utilize the Firewall, Windows defender and MS office tools.
3. Perform the Secure net banking, Online transactions
4. Describe the use of Internet & Email Securely.

SEMESTER – IV
Major Paper – I
Crime Scene Forensics-II

Course Objectives: Students should be able to,

1. Understand the physical evidence and their handling process.
2. Know about investigative techniques.
3. Gain knowledge about handling evidence and crime.
4. Understand about the blood spatter analysis and CSR.

Credits (Total Credits 2)	SEMESTER – I Major Paper – II	No. of hours per unit (30)
Unit – I	Physical Evidences – I	(08)
	1.1 Soil evidence – importance, location, collection and comparison of soil samples. 1.2 Cloth evidence- importance, collection, analysis of adhering material. Matching of pieces. 1.3 Fibre evidence- artificial and man-made fibres. Collection of fibre evidence. Identification and comparison of fibres. 1.4 Forensic Gemology	
Unit – II	Impression evidences – I	(07)
	2.1 Lip print analysis (Development, collection, packaging, preservation, analysis) 2.2 Gait pattern analysis (Development, collection, packaging, preservation, analysis) 2.3 Ear print (Development, collection, packaging, preservation, analysis) 2.4 Palm print (Development, collection, packaging, preservation, analysis)	
Unit – III	Impression evidences – II	(07)
	3.1 Tire marks (Development, collection, packaging, preservation, analysis) 3.2 Skid mark analysis 3.3 Fingerprint (Development, collection, packaging, preservation,	

	analysis) 3.4 Footprints and Shoe prints (Development, collection, packaging, preservation, analysis)	
Unit – IV	Bloodstain Pattern and Crime Scene Reconstruction	(08)
	4.1 Bloodstain Pattern: Historical perspective, Physical and biological properties of human blood. 4.2 Classification: Spatter and non-spatter, droplet directionality and angle of impact, determination of point of convergence and point of origin, altered bloodstain patterns. 4.3 Crime Scene reconstruction (CSR): nature and importance of CSR, basic principles and stages. Role of protocol in reconstruction. 4.4 Reconstruction of motor accident, firing, post blast cases, fire. Collection of data (videography photography, measurements, analysis of data) Writing of CSR reports, courtroom testimony.	
<p>Course Outcomes: After completion of the units students will be able to:</p> <ol style="list-style-type: none"> 1. Comprehend the significance of physical evidence to investigate crime. 2. Analyse the various types of cases. 3. To Evaluate and interpret crucial information from various types of trace evidence. 4. To analyze the scientific principles of crime scene investigation including proper evidence handling. 		
<p>Reference Books:</p> <ol style="list-style-type: none"> 11. James, S.H. and Nordby, J.J. Forensic Science: An Introduction to Scientific and Investigative Techniques. CRC Press: USA; (2003). 12. Saferstein, R. Criminalistics -An Introduction to Forensic Science. Prentice Hall: USA; (1995). 13. Nanda, B.B. and Tiwari, R.K. Forensic Science in India- A Vision for the Twenty First Century. Select Publisher: New Delhi; (2001) 14. Barry, A.J. Fisher- Techniques of Crime Scene Investigation, 7th ed. R.C. Press, New York (2003) 15. Sharma, B.R. Forensic Science in Criminal Investigation and Trails. Universal Law Publishing: (2003). 16. Meguire, M., Morgan, R. and Reiner, R. The Oxford Handbook of Criminology 2nd ed. Oxford University Press: New York; (2002) 		

17. Bell, W.R. Practical Criminal Investigation in Correctional Facilities. CRC Pres: London; (2001).
18. Lyman M.D. Criminal Investigation- The Art and the Science. Pearson Education: India; (2013)
19. Henry Lee's Crime Scene Handbook:Henry C Lee (2001)
20. Stuart H. James Forensic Science: An Introduction to Scientific and Investigative Techniques 3rd ed.(2012)

**SEMESTER – IV
Major Paper – II**

Course Objectives: Students should be able to,

1. Know the Basic Computer networking information.
2. Know the tools used in Mobile Crime Investigation.
3. Know the Extraction of data from mobile device, analysis tools.
4. Know the Registration of FIR of Cyber Crimes.

Credits (Total Credits 2)	SEMESTER – IV Major Paper – II	No. of hours per unit (30)
Unit – I	Computer Networks	(08)
	1.1 Computer Networks, 1.2 Client Server architecture, 1.3 Network technologies, Network 1.4 Topologies, Network Devices, Network Commands.	
Unit – II	Mobile Crime Investigations	(07)
	2.1 Seizure note for Mobile Handset, care taken for while confiscating Mobile Handset. 2.2 Toolkit for Investigation of mobile Handset, Software Required for 2.3 Investigation.Mobile Number Portability, 2.4 Mobile Number Tracing, Tracing Stolen/Lost Handset.	

Unit – III	Cyber Forensic Tools and Utilities	(07)
	3.1 Introduction, 3.2 Examining a Breadth of Products Cyber Forensic, 3.3 Tools Good, Better,Best: What’s the Right Incident Response,Tool for Your Organization, 3.4 Tool Review Forensic Toolkit, Encase, Mobil edit, F-RAT, FTK, Cyber check suites, etc. Specifications for Forensic toolTested.	
Unit – IV	Legal Provisions For Digital Evidences	(08)
	4.1 Registration of FIR(ITAA 2008), 4.2 Panchnama(Seizure Memo),Seizure Proceedings, Legal Procedure after Seizure of Evidence.Expert Opinion from Forensic Examiner,Gathering information from ISP/MSP/other service Providers, 4.3 Analyzing and Handling external data. Guideline to Prepare Chargesheet, Guideline for IO on what to include in Charge sheet, 4.4 Tips to preserve seized digital media,Deposition of Evidence in court.	
<p>Course Outcomes: After completion of the units students will be able to:</p> <ol style="list-style-type: none"> 1. Understand & Study the Computer Network & its Applications. 2. Learn & understand the detailed Process of Mobile phone investigation. 3. Study the Toolkit & Software use. 4. Learn the Legal Procedures related Digital evidence. 		
<p>Reference Books:</p> <ol style="list-style-type: none"> 1. Incident Response and Computer Forensic by Kelvin Mandia, TMH publication. (2012) (Unit-I,II,III,IV) 2. Digital Forensics : Digital Evidence in Criminal Investigation byAngus McKenzie Marshall.(2008)(Unit-II) 3. Cyber Forensic A field Manual for Collecting Examining and Preserving Evidence of Computer. Crimes by Albert J Menedez.Auerba (2010) .(Unit-III) 4. Richard Saferstein: Forensic science from the crime scene to the crime lab.(2015)(Unit-IV) 		

Major Practical Paper - I

Credits (Total Credits 2)	SEMESTER – IV Major Practical Paper - I List of Practical	No. of hours per Practical
<p>Course Objectives: Students should be able to,</p> <ol style="list-style-type: none"> 1. learn the different examination and report writing process of forensic evidence. 2. understand the crime scene management and crime scene documentation. 		
1	To identify and compare toolmarks.	
2	Examination fiber by using a microscope.	
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 analyze the lip print.	
8	To study gait pattern analysis.	
9	To examine the skid mark and perform an analysis process of it.	
10	To analyze the bloodstain pattern.	
11	To set up and troubleshoot a VPN connection between two computers.	
12	To analyze network traffic using Wireshark to identify network protocols.	
13	To configure user authentication using ACLs on a network router.	
14	To analyze call logs and text messages from a mobile phone image using forensic analysis tools.	
15	To practice secure storage and evidence integrity verification using digital evidence management software.	
16	To conduct file carving on forensic images using digital forensic analysis techniques.	
17	To practice live forensics techniques to extract data from running systems without altering the state of the system.	
18	To analyze volatile memory using Volatility to extract evidence from a running system.	
19	To demonstrate the use of FTK Imager to create forensic images of storage devices.	
20	To use Autopsy to perform file carving and recover deleted files from a disk image.	
<p>Course Outcomes- Students will be able to:</p> <ol style="list-style-type: none"> 5. Utilize the crime scene investigation process. 		

6. Operate the different photographic techniques.
7. Perform retrieves the deleted data from various pen drives, flash drives etc.
8. Acquire thorough knowledge regarding collection of digital evidence and their analysis.

Reference Books

14. James, S.H. and Nordby, J.J. Forensic Science: An Introduction to Scientific and Investigative Techniques. CRC Press: USA; (2003).
15. Saferstein, R. Criminalistics -An Introduction to Forensic Science. Prentice Hall: USA; (1995).
16. Nanda, B.B. and Tiwari, R.K. Forensic Science in India- A Vision for the Twenty First Century. Select Publisher: New Delhi; (2001)
17. Barry, A.J. Fisher- Techniques of Crime Scene Investigation, 7th ed. R.C. Press, New York (2003)
18. Sharma, B.R. Forensic Science in Criminal Investigation and Trails. Universal Law Publishing: (2003).
19. Meguire, M., Morgan, R. and Reiner, R. The Oxford Handbook of Criminology 2nded. Oxford University Press: New York; (2002)
20. Bell, W.R. Practical Criminal Investigation in Correctional Facilities. CRC Pres: London; (2001).
21. Lyman M.D. Criminal Investigation- The Art and the Science. Pearson Education: India; (2013)
22. Henry Lee's Crime Scene Handbook: Henry C Lee (2001)
23. Stuart H. James Forensic Science: An Introduction to Scientific and Investigative Techniques 3rd ed. (2012)
24. Mobile Forensic Investigations: A Guide to Evidence Collection, Analysis, and Presentation, Second Edition 2nd Edition by Lee Reiber. (2018)
25. Practical Mobile Forensics: Forensically investigate and analyze iOS, Android, and Windows 10 devices, 4th Edition Paperback -April 9, 2020 by Rohi Tamma (Author), Oleg Skulkin (Author), Heather Mahalik (Author), Satish Bommisetty (Author).
26. Handbook of Digital Forensics and Investigation 1st Edition by Eoghan Casey, Elsevier Academic Press 2010.

SEMESTER – IV
Minor Paper – II
Minor Paper - I: Advances in Forensic Biology II & Forensic Psychology II

Course Objective: Student should be able to :

1. Understand the advanced knowledge of genetics and study of various Extraction and purification methods for DNA and protein analysis.
2. Learn the analysis of biological fluid and analysis of macromolecules by using blotting techniques.
3. Study will understand the Application of Forensic Psychology in Civil and Criminal Legal Proceedings.
4. Gain knowledge about Investigative Psychology and Correctional Psychology.

Credits (Total Credits 2)	SEMESTER – IV Minor Paper – II	No. of hours per unit (30)
Unit I	Forensic Genetics, DNA and Protein Extraction techniques:	(8)
	<p>Advanced Genetics: Cell division: Cell cycle, mitosis and meiosis, Structural and definitive properties of chromosomes, nomenclature of chromosomes, types of chromosomes, packaging of heredity material, concept of euchromatin and heterochromatin, chromatin modification, Human genome: genes and related sequences, non-coding sequences (interspersed and tandem repeats), human DNA polymorphism.</p> <p>Forensic mitochondrial analysis: Comparison of mitochondrial and nuclear DNA maternal inheritance and its genome organization. Y chromosome and gender typing. Sources of DNA evidence. DNA Extraction: Basic Principles, Method of DNA extraction (Physical, chemical and biological). DNA Quantification: Quantitative PCR (Polymerase Chain Reaction) assay, Slot Blot Assay, DNA databasing Electrophoretic Methods – Agarose gel, SDS-PAGE, Native PAGE, Southern /Northern Blotting.</p> <p>Protein purification and Metabolism: Protein Extraction and Purification: Methods of cell disruption (blenders, grinding with abrasives, presses, enzymatic method, sonication); salt participation – salting in, salting out, organic solvent precipitation.</p>	
Unit II	Forensic Biology and Serology:	(7)

	<p>Analysis of Biological Fluid and Other evidence: Saliva, Semen, Vaginal Fluid, Urine, Sweat, Blood, Vomit, Other Evidence-Hair, Nails and tissue samples.</p> <p>Enzymology: Enzymes: Introduction, IUB classification, active site, energy of activation, transition state hypothesis, lock and key hypothesis, induced fit hypothesis. Allosteric enzymes, enzyme inhibition (reversible and irreversible), MM equation.</p> <p>Human Skeleton and Locomotion: Human Skeleton: Axial Skeleton, Appendicular Skeleton Locomotion: Types of joints</p>	
Unit III	Aggression and Behavioural abnormalities:	(7)
	<p>1.1 Aggression: Definition, Nature, Types of aggression.</p> <p>1.2 Violence- Definition, Nature of Violence-Self-directed, Interpersonal, family and community interpersonal, and Collective. Types of Violence-Physical, Sexual, Emotional, Psychological, Spiritual and Cultural.</p> <p>1.3 Memory: Definition. Types of Memory, Memory Process, Methods of memory improvement</p> <p>1.4 Behavioural abnormalities – Harassment and types of harassment, Bullying and types of bullying. Psychology of Personality: Concept and nature; Basic issues related to study of personality. Eastern and Western perspective, Trait and type approaches: Allport, Cattell, Eysenck, and Big-five model.</p>	
Unit IV	Investigative psychology & Criminal Profiling:	(8)

1.1 Investigative psychology: Criminal psychological profiling Nature, definition, Psychological tests used Criminal psychological profiling, psychological autopsy, Forensic hypnosis, Narco-analysis, Polygraph, Brain fingerprinting, layered voice analysis, Stalking the Psychology of violence.

1.2 Eyewitness: Police Interrogations, Lineups and Effect of Media Coverage on Perception of Defendants. Eyewitness Testimony, Errors /Problems in Eyewitness Testimony, Solutions for Increasing Eyewitness Accuracy.

1.3 Perspective of Criminal Behaviour and Legal Proceedings: Psychobiological Approaches, Psychological Approaches- Emotional Deprivation, Psychological Motives of Crime, Frustration, Attitudes, Peer Influence.

1.4 Civil Proceedings-Domestic law and Rights of Adults, Assessment of Civil Competency, Personal Injury Evaluation, Evaluation of Trauma Caused by Sexual Harassment or Rape.

1.5 Criminal Proceedings-Competency to stand trial, Criminal responsibility and insanity defence, Risk assessment, Evaluation of Eyewitness testimony, Psychotherapeutic and Counselling services.

Course Outcomes: After completion of the units students will be able to:

1. Know the advanced knowledge about the chromosome and its packaging.
2. Understand the modern concept of gene, human DNA polymorphism, different types of DNA extraction methods, protein extraction and purification, Electrophoresis techniques and their types, Forensic application.
3. Understand the analysis of the biological fluid sample and Human Skeleton and their types.
4. Understand the Aggression and violation and Forensic application
5. Understand the thoughtful versus Thoughtless and Forensic application.
6. Understand the application of Forensic Psychology in Civil and Criminal Legal Proceeding.

Reference Books:

1. Cell biology, genetics, molecular biology, evolution and ecology: V.S Verma, V.K Agrawal, S.Chand and company,2005
2. Principles of Genetics, Snustad and Simmons,12 December, 2006
3. Genetics a conceptual approach 4th edition.: Benjamin A Pierce., W. H Freeman and company, NewYork 19 December, 2016
4. Bioinstrumentation by L.Veerakumari 1 January 2011
5. Bioinstrumentation by Bhawana Pandey M.H.Fulekar 1 January 2019
6. Forensic DNA analysis : A Laboratory Manual McClintock, J.Thomas 19 February 2008
7. Principles of Biochemistry Lehninger 16 March 2021
8. Principles and Techniques and molecular biology, Wilson and Walkers 8etd 1 January 2018.
9. Cell biology, genetics, molecular biology, evolution and ecology: V.S Verma, V.K Agrawal, S.Chand and company,2005
10. Fundamentals of Enzymology, by Nicholas C.Price 3rd edition,1 January 2009

11. Forensic DNA analysis : A Laboratory Manual McClintock, J.Thomas 19 February 2008 (Unit II)
12. Protein Purification, Philip L.R.Booner 2nd edition,2019
13. Principles of Biochemistry Lehninger 16 March 2021
14. Biological Anthropology of the Human Skeleton, M.Anne katzenberg and Anne L.Grauer October 2018
15. Bachhav, Aun M. (2012). Criminal Psychology. Chandralok Prakashan, Kanpur – 208021
16. Bharati, A. (2012). 12. Studies on Criminological Psychology. G.S. Rawat for Ceber Tech Publications. New Delhi- 110 002 Cohen, R.J., Swerdlik, M.E. (2005).
17. Psychological testing and assessment (6th ed.). Delhi: Tata McGraw-Hill. Gregory, R.J. (2005). Psychological Testing (4th ed.). Delhi: Pearson education Pte.Ltd. Suryanarayana, N.V.S, Himabindu Goteti, Neelima V. (2011).
18. ‘Human Aggression-theory, research and intervention’, Sunil Saini, Nilam Goyal, Edition 1st Global Vision Publication House, New Delhi.2011.
19. ‘Criminology, Penology and Victimology, [2016] S. M. A. Qadri, Seventh edition, EBC Publication, Lucknow. (Unit I)
20. ‘Crime Psychology’, Dr. R. G. Parmar, Jignesh H. Tapariya, Edition 1st, 2010, Paradise Publishers, Jaipur.
21. ‘Criminology’, DigumartiBhaskara Rao, Edition 1st, 2012, Discovery Publication House PVT. LTD., New Delhi.
22. ‘Criminal Profiling-An Introduction to Behavioural Evidence analysis’, Brent Turvey, Edition 4th, 2011, Elsevier Academic press.
23. ‘Abnormal Psychology-The Problem of Maladaptive Behaviour’, Irwin G. Sarson, Barbara R. Sarson, Edition 11th, 2012, PHI Publication, New Delhi.
24. ‘Abnormal Psychology’, James N. Butcher, Susan M. Mineka, Jill M. Hooley, Edition 15th, 2014, Pearson.
25. ‘Forensic Criminology’, Petherick W. A., Turvey B. E., Ferguson C. E., [2010], Elsevier Inc.
26. ‘Social Psychology’, Robert A. Baron, Nyla R. Branscombe, Donn Byrne, Gopa Bhardwaj, Edition 12th ,2010 Pearson Publication.
27. Social theory and social structure’ Robert K. Merton., (1981), Amerind Publications & Co., New Delhi.

Credits (Total Credits 2)	SEMESTER – IV Minor Practical Paper - I List of Practical	No. of hours per Practical
Course Objective: Students should be able to... <ol style="list-style-type: none"> 1. Study the analysis & handling of Centrifugation Instrumentation. 2. Study the Isolation technique of DNA. 3. Learn about the psychological test and their interpretation. 		

4. Study the different types of psychological test.		
1.	To study the centrifugation of milk.	
2.	To demonstrate the gel electrophoresis.	
3.	To study the Isolation of chromosomal DNA.	
4.	Study of DNA Extraction and Quantification.	
5.	To perform electrophoresis for separation of various polymorphic enzymes.	
6.	DNA extraction by Phenol-Chloroform method.	
7.	DNA extraction by Silica –column-based method.	
8.	Detection of Amylase activity- a) Starch-Iodine Assay.	
9.	Estimation of vitamin C from a biological source.	
10.	Separation of compounds using TLC, calculation of Rf values.	
11.	Microscopic Comparison of Hair- i] Human Hair ii] Animal Hair	
12.	Presumptive test for Blood a] Phenolphthalein Assay b] Benzidine c] Leuco Malachite Green d] Luminol test	
13.	Confirmatory Tests for Blood –Crystallization Assays.	
14.	Standard progressive matrices- J. Raven, J.C. Raven and J. H. Court	
15.	Locus of Control	
16.	Koh's block design test	
17.	Aggression test – C.G. Pati	
18.	Personality assessment using any projective test	
19.	Cattell's 16 P.F.	
20.	Lie Detection Test (Polygraph Testing).	
21.	Abstract reasoning 164 B.Sc. Forensic science • b Numerical • c Spatial • d Verbal • e Clerical • f Mechanical	
22.	Achievement motivation- Deo Mohan	

Reference Books :

1. Forensic Serology and Blood examination, by A.K.Dwivedi, Dr.Archana Tripathi,2012
2. Li, Richard. Forensic Biology. CRC Press eBooks, 2008
3. Bioinstrumentation by Bhawana Pandey M.H.Fulekar 1 January 2019
4. Forensic DNA analysis: A Laboratory Manual McClintock, J.Thomas 19 February 2008
5. Principles of Biochemistry Lehninger, 16 March 2021
6. Forensic Analysis pre laboratory and laboratory student manual Dr. E. Hywel Evans
7. 'Social Psychology', Robert A. Baron, Nyla R. Branscombe, Donn Byrne, Gopa Bhardwaj, Edition 12th ,2010 Pearson Publication.
8. Social theory and social structure' Robert K. Merton., (1981), Amerind Publications & Co., New Delhi.
9. Harold Franck and Darren Frank, Forensic Engineering Fundamentals, (5th edition)
10. Standard progressive matrices- J. Raven, J.C. Raven and J. H. Court
11. Emotional Maturity Scale. Dr. Yashvir Singh and Dr. Manesh Bhargav.

SEC: Questioned Document Recognition & Examination

Credits (Total Credits 2)	SEMESTER – I List of Practical	No. of hours per Practical
Course Objectives: Students should be able to,		
1. Prepare a case report on a case involving questioned documents.		
2. Carry out analysis of different types of documents.		
3. Learn the analysis of charred documents.		
4. understand the analysis of printed documents.		
1	Examination of watermarks in documents.	
2	Comparison of documents.	
3	Handling and preserving of documents	
4	Handling and preserving of charred documents	
5	Examination of Age of Document.	
6	To study types of documents.	

7	Identification of source of photocopier machine by examination of photocopied documents.	
8	Identification of different types of printing technology on documents.	
9	Identification and detection of type written matter on documents.	
10	Examination of fire arson cases by GC, TLC.(no.2)	
<p>Course Outcomes- Students will be able to:</p> <ol style="list-style-type: none"> 1. Prepare a case report on a case involving questioned documents. 2. perform analysis of different types of documents. 3. apply methods of analysis of charred documents. 4. perform analysis of printed documents. 		
<p>Reference Books</p> <ol style="list-style-type: none"> 7. DFSL manual 8. Forensic Analysis pre laboratory and laboratory student manual Dr. E. Hywel Evan 9. James, S.H. and Nordby, J.J. Forensic Science: An Introduction to Scientific and Investigative Techniques. CRC Press: USA; (2003). 10. Saferstein, R. Criminalistics -An Introduction to Forensic Science. Prentice Hall: USA; (1995). 11. Nanda, B.B. and Tiwari, R.K. Forensic Science in India- A Vision for the Twenty First Century. Select Publisher: New Delhi; (2001) 12. Barry, A.J. Fisher- Techniques of Crime Scene Investigation, 7th ed. R.C. Press, New York (2003) 		

VSC:- Lab exercise based on Cyber Crime

<p>SEMESTER- II</p> <p>VSE Paper- II</p> <p>List of Practical</p>
<p>Course Objectives- Students should be able to:</p> <ol style="list-style-type: none"> 1. Study Do's and Don't's about social media sharing 2. Learn the registering complaint about cyber crime 3. Understand the Antivirus Importance and Installation 4. Learn the security patch management in computer system and Mobile Phone.

Credits (Total Credits 2)	SEMESTER- II Open Elective Paper- II List of Practical	No. of hours per Practical
1	Setting privacy settings on social media platforms.	
2	Do's and Don'ts for posting content on Social media platforms.	
3	Registering complaints on a Social media platform.	
4	Prepare password policy for computer and mobile devices.	
5	List out security controls for computers and implement technical security controls in the personal computer.	
6	List out security controls for mobile phones and implement technical security controls in the personal mobile phone.	
7	Log into computer system as an administrator and check the security policies in the system.	
8	Platforms for reporting cyber crimes.	
9	Checklist for reporting cyber crimes online.	
10	Wi-Fi security management in computer and mobile.	
11	Setting, configuring and managing three password policy in the computer (BIOS, Administrator and Standard User).	
12	Setting and configuring two factor authentication in the Mobile phone.	
13	Security patch management and updates in Computer and Mobiles.	
14	Managing Application permissions in Mobile phones.	
15	Installation and configuration of computer Anti-virus.	
16	Installation and configuration of Computer Host Firewall.	
<p>Course Outcomes- Students will be able to:</p> <ol style="list-style-type: none"> 1. Describe the Do's and Don't's about social media sharing 2. Describe the registering complaint about cyber crime 3. Perform the Antivirus Installation. 4. Perform the security patch management in computer system and Mobile Phone. 		

Reference Books

1. Data Privacy Principles and Practice by Natraj Venkataramanan and Ashwin Shriram, CRC Press.
2. Information Security Governance, Guidance for Information Security Managers by W. KragBrothy, 1st Edition, Wiley Publication.
3. Auditing IT Infrastructures for Compliance By Martin Weiss, Michael G. Solomon, 2nd Edition, Jones Bartlett Learning.
4. Cyber Crime Impact in the New Millennium, by R. C Mishra , Auther Press. Edition 2010.
5. Cyber Security Understanding Cyber Crimes, Computer Forensics and Legal Perspectives by Sumit Belapure and Nina Godbole, Wiley India Pvt. Ltd. (First Edition, 2011)
6. Security in the Digital Age: Social Media Security Threats and Vulnerabilities by Henry A. Oliver, Create Space Independent Publishing Platform. (Pearson , 13th November, 2001)