MATS University

MATS SCHOOL OF SCIENCES

SYLLABUS

FOR

Three Year Full Time Bachelor Degree Program

BACHELOR OF SCIENCE

B.Sc. Forensic Science

SEMESTER PATTERN

(2025 - 2028)

Curriculum Matrix of B.Sc. Forensic Science

	SEM I			Maximum Marks		Total Marks
	Code	Forensic Science	Credit (L+T+P)	External	Internal	
Discipline Specific Core (DSC)	01FS1101	Introduction to Forensic Science	4 (4+0+0)	70	30	100
	01FS1102	Criminology and Police Science	4 (4+0+0)	70	30	100
	01FS1103	Chemistry-I	4 (4+0+0)	70	30	100
Discipline Specific Core Practical (DSCP)	01FS1104	Lab Course: Crime scene investigation I	2 (0+0+2)	35	15	50
	01FS1105	Lab Course: Criminology and Police Science	2 (0+0+2)	35	15	50
	01FS1106	Lab Course: Chemistry I	2 (0+0+2)	35	15	50
Abillity Enhancement Compulsory Course (AECC)	01AE1101	Environmental Studies	2 (2+0+0)	35	15	50
Skill Enhancement Course (SEC)	01SE1101	Instrumentation and system biology	2 (2+0+0)	35	15	50
	Total		22 (16+0+6)	385	165	550

NOTE: Each SEC paper and DSE paper should have minimum 15 students

L= Lecture, T=Tutorial, P= Practical, 1 credit = 1 hour of teaching/week, 2 hours of Lab/week

Coding Pattern: 1st digit denote semester; 2nd digit for type of paper (1-DSC/DSE, 2-Lab/Practical, 3-For others such as AECC/SEC); 3rd& 4th digit for Paper Number

Curriculum Matrix of B.Sc. Forensic Science

	SEM II			Maximum Marks		Total Marks
	Code	Forensic Science	Credit (L+T+P)	External	Internal	
Discipline Specific Core (DSC)	01FS1201	Criminal Law	4 (4+0+0)	70	30	100
	01FS1202	Forensic Psychology	4 (4+0+0)	70	30	100
	01FS1203	Chemistry-II	4 (4+0+0)	70	30	100
Discipline Specific Core Practical (DSCP)	01FS1204	Lab Course: Criminal Law	2 (0+0+2)	35	15	50
	01FS1205	Lab Course: Forensic Psychology	2 (0+0+2)	35	15	50
	01FS1206	Lab Course: Chemistry II	2 (0+0+2)	35	15	50
Abillity Enhancement Compulsory Course	01AE1201	English	2 (2+0+0)	35	15	50

(AECC)						
Skill Enhancement Course (SEC)	**01SE1201**	**Crime scene management**	**2 (2+0+0)**	**35**	**15**	**50**
	Total		**22 (16+0+6)**	**385**	**165**	**550**
NOTE: Each SEC paper and DSE paper should have minimum 15 students						
L= Lecture, T=Tutorial, P= Practical, 1 credit = 1 hour of teaching/week, 2 hours of Lab/week						
Coding Pattern : 1st digit denote semester; 2nd digit for type of paper (1-DSC/DSE, 2-Lab/Practical, 3-For others such as AECC/SEC); 3rd& 4th digit for Paper Number						

Curriculum Matrix of B.Sc. Forensic Science

	SEM III			**Maximum Marks**		**Total Marks**
	Code	**Forensic Science**	**Credit (L+T+P)**	**External**	**Internal**	
Discipline Specific Core (DSC)		**Forensic Dermatoglyphics**	**4 (4+0+0)**	**70**	**30**	**100**
		Technological methods in Forensic Science	**4 (4+0+0)**	**70**	**30**	**100**
		Chemistry - III	**4 (4+0+0)**	**70**	**30**	**100**
Discipline Specific Core Practical (DSCP)		**Lab Course: Forensic Dermatoglyphics**	**2 (0+0+2)**	**35**	**15**	**50**
		Lab Course: Technological methods	**2 (0+0+2)**	**35**	**15**	**50**
		Lab Course: Chemistry - III	**2 (0+0+2)**	**35**	**15**	**50**
Abillity Enhancement Compulsory Course (AECC)		**Introduction to Biometry**	**2 (2+0+0)**	**35**	**15**	**50**
Skill Enhancement Course (SEC)		**Computational Biology and Bioinformatics**	**2 (2+0+0)**	**35**	**15**	**50**
	Total		**22 (16+0+6)**	**385**	**165**	**550**
NOTE: Each SEC paper and DSE paper should have minimum 15 students						
L= Lecture, T=Tutorial, P= Practical, 1 credit = 1 hour of teaching/week, 2 hours of Lab/week						
Coding Pattern : 1st digit denote semester; 2nd digit for type of paper (1-DSC/DSE, 2-Lab/Practical, 3-For others such as AECC/SEC); 3rd& 4th digit for Paper Number						

Curriculum Matrix of B.Sc. Forensic Science

	SEM IV			Maximum Marks		Total Marks
	Code	Forensic Science	Credit (L+T+P)	External	Internal	
Discipline Specific Core (DSC)		Forensic Chemistry	4 (4+0+0)	70	30	100
		Questioned documents	4 (4+0+0)	70	30	100
		Chemistry - IV	4 (4+0+0)	70	30	100
Discipline Specific Core Practical (DSCP)		Lab Course: Forensic Chemistry	2 (0+0+2)	35	15	50
		Lab Course: Questioned Documents	2 (0+0+2)	35	15	50
		Lab Course: Chemistry - IV	2 (0+0+2)	35	15	50
Abillity Enhancement Compulsory Course (AECC)		Economic Offences	2 (1+1+0)	35	15	50
Skill Enhancement Course (SEC)		Cyber Forensic and Cyber security	2 (1+1+0)	35	15	50
	Total		22 (14+2+6)	385	165	550

NOTE: Each SEC paper and DSE paper should have minimum 15 students

L= Lecture, T=Tutorial, P= Practical, 1 credit = 1 hour of teaching/week, 2 hours of Lab/week

Coding Pattern : 1st digit denote semester; 2nd digit for type of paper (1-DSC/DSE, 2-Lab/Practical, 3-For others such as AECC/SEC); 3rd& 4th digit for Paper Number

Curriculum Matrix of B.Sc. Forensic Science

	SEM V			Maximum Marks		Total Marks
	Code	Forensic Science	Credit (L+T+P)	External	Internal	
Discipline Specific Core (DSC)		Forensic Ballistics	4 (4+0+0)	70	30	100
		Forensic Toxicology	4 (4+0+0)	70	30	100
		Forensic Biology and Serology	4 (4+0+0)	70	30	100
Discipline Specific Core Practical (DSCP)		Lab Course: Forensic Toxicology	2 (0+0+2)	35	15	50
		Lab Course: Forensic Biology and Serology	2 (0+0+2)	35	15	50
		Seminar/ Presentation	2	35	15	50
Abillity Enhancement Compulsory Course (AECC)		Forensic Serology	2 (1+1+0)	35	15	50
	Total		20 (13+1+6)	350	150	500

NOTE: Each SEC paper and DSE paper should have minimum 15 students

L= Lecture, T=Tutorial, P= Practical, 1 credit = 1 hour of teaching/week, 2 hours of Lab/week

Coding Pattern : 1st digit denote semester; 2nd digit for type of paper (1-DSC/DSE, 2-Lab/Practical, 3-For others such as AECC/SEC); 3rd& 4th digit for Paper Number

Curriculum Matrix of B.Sc. Forensic Science

	SEM VI			Maximum Marks		Total Marks
	Code	Forensic Science	Credit (L+T+P)	External	Internal	
Discipline Specific Core (DSC)		Forensic Anthropology	4 (4+0+0)	70	30	100
		Forensic Medicine	4 (4+0+0)	70	30	100
		Dissertation/Internship	6 (6+0+0)	100	50	150
Discipline Specific Core Practical (DSCP)		Lab Course: Forensic Anthropology	2 (0+0+2)	35	15	50
		Lab Course: Forensic Medicine	2 (0+0+2)	35	15	50
		Seminar/ Presentation	2 (2+0+0)	35	15	50
	Total		20 (16+0+4)	345	155	500

NOTE: Each SEC paper and DSE paper should have minimum 15 students

L= Lecture, T=Tutorial, P= Practical, 1 credit = 1 hour of teaching/week, 2 hours of Lab/week

Grand Total (For Three Years Degree)	128	2235	965	3200

Three year UG Course in Forensic Science
Semester–I
Introduction to Forensic Science

Learning Objectives: After studying this paper the students will know:
a. The significance of forensic science to human society.
b. The fundamental principles and functions of forensic science.
c. The divisions in a forensic science laboratory.
d. The working of the forensic establishments in India and abroad.

Module 1: History of Development of Forensic Science in India

History and development of forensic science. Functions of forensic science. Nature and scope of Forensic science. Definitions and concepts in forensic science. Scope of forensic science. Need of forensic science. Basic principles of forensic science. Frye case and Daubert standard.

Module 2: Basics of Forensic Science

Duties of forensic scientists. Ethics in forensic science. Code of conduct for forensic scientists. Qualifications of forensic scientists. Different agencies involved in crime detection – CBI, IB, RAW, CRPF, BSF, SGP.

Module 3: Organizational set up of Forensic Science Laboratories in India

Hierarchical set up of Central Forensic Science Laboratories, State Forensic Science Laboratories, Government Examiners of Questioned Documents, Fingerprint Bureaus, National Crime Records Bureau, Police & Detective Training Schools, Bureau of Police Research & Development, Directorate of Forensic Science and Mobile CrimeLaboratories, Centre for DNA fingerprinting and Diagnosis, National Investigation Agency, Centre for Defense Technology Studies.

Module 4: Branches of forensic science

Physics Division: Ballistics Section Forensic Engineering. **Chemistry Division**:Chemistry Section, Narcotics Section: Toxicology Section. **Biology Division**: Biology Section, Serology Section, DNA Fingerprinting section. **General Division**: Questioned Documents Section, Polygraph Section, Computer Forensic Section.

Suggested Readings

1. B.B. Nanda and R.K. Tiwari, Forensic Science in India: A Vision for the Twenty First Century, Select Publishers, New Delhi(2001). M.K. Bhasin and S. Nath, Role of Forensic Science in the New Millennium, University of Delhi, Delhi (2002).

2. S.H. James and J.J. Nordby, Forensic Science: An Introduction to Scientific and Investigative Techniques, 2nd Edition, CRC Press, Boca Raton(2005).

3. W.G. Eckert and R.K. Wright in Introduction to Forensic Sciences, 2nd Edition, W.G. Eckert (ED.), CRC Press, Boca Raton(1997).

4. R. Saferstein, Criminalistics, 8th Edition, Prentice Hall, New Jersey(2004).

5. W.J. Tilstone, M.L. Hastrup and C. Hald, Fisher's Techniques of Crime Scene Investigation, CRC Press, Boca Raton(2013).

Three year UG Course in Forensic Science
Semester–I
Core -1 Lab
Practical's based on Crime Scene Investigstion

1. To study the history of crime cases from forensic scienceperspective.
2. To cite examples of crime cases in which apprehensions arose because of Daubertstandards.
3. To write report on different type of crimecases.
4. Collection, packing, labeling, forwarding of Physical evidences (Glass, paint, soil).
5. Collection, packing, labeling, forwarding of Biological evidences (dry and wet exhibits).
6. Collection, packing, labeling, forwarding of Chemical evidences (Drugs, Cartridges, shell case)
7. Collection, packing, labeling, forwarding of general evidences (Documents, audio/video).

Three year UG Course in Forensic Science
Semester–I
Core-2 Theory
. Criminology and Police Science

Learning Objectives: After studying this paper the students will know:

a. *The importance of criminology.*

b. *The causes of criminal behavior.*
c. *The significance of criminal profiling to mitigate crime.*
d. *The consequences of crime in society*
e. *The elements of criminal justice system.*

Module 1: Basics of Criminology

Criminology - Introduction, scope of criminology- History – Famous criminologists- Definition of crime, criminal behaviour- types of crimes, causes of crime, Deviant behavior, public disorders, domestic violence and workplace violence, Psychological Disorders Juvenile delinquency, criminal profiling. Understanding *Corpus delicti* and Modus *operandi*. Penology- Introduction- Administration- Theories of Punishment, Types of Punishments, Prisons and Correctional Institutions.

Module 2: Recent Advancements in Crimes

Brief Introduction towards: Victimology, Juvenile delinquency, Hate crimes, Organized crimes, Situational crime, Economic crime, Sexual Offences, Crime due to intoxication, Cyber crimes and White collar crimes, Modern Approaches towards Investigative strategy and Role of media in the solution of crime.

Module 3: Police Science

Defination and scope, Organizational set up of Police at State, Range and District level. State armed forcesand home guards. Role of Police in crime investigations. State criminal investigation departments , FIR, Police dogs. Services of crime laboratories. Basic services and optionalservices., Police's power of investigation, Filing of criminal charges, CommModuley policing, Correctional measures and rehabilitation of offenders.

Module 4: Criminal Justice System

Criminal justice system in India- Introduction, Administration of civil and criminal justice system. Introduction to constitution of India- Indian Penal Code(IPC), Criminal Procedure Code (Cr.PC) and Indian Evidence Act (IEA).Hierarchy of courts- Powers of courts, types of courts, Lok Ayukta & Lok Adalat. Role and responsibilities of Public Prosecution, Admissibility of Expert Testimony –Expert Evidence fallacies- Definition & Value of Expert Testimony.

Suggested Readings:

1. S.H. James and J.J. Nordby, Forensic Science: An Introduction to Scientific and Investigative Techniques, 2nd Edition, CRC Press, Boca Raton(2005).

2. R. Saferstein, Criminalistics, 8th Edition, Prentice Hall, New Jersey(2004).

3. J.L. Jackson and E. Barkley, Offender Profiling: Theory, Research andPractice,Wiley,

Chichester(1997).

4. R. Gupta, Sexual Harassment at Workplace, LexisNexis, Gurgaon(2014).

5. Paranjape, N.V. Criminology and Penology, Central LawPublication, Allahabad.

6. William Bailey,The Encyclopedia of Police Science, Second Edition Garland publishing, INC, London.

7. Suderland,E.H.andDonaldR.Cressy;ThePrincipalsofCriminology,The Times of India Press, Bombay,1968

8. Ahuja,Ram Criminology,Rawat Publication,Jaipur

9. Wayne Petherick,, Brent Turvey , Claire Ferguson , Forensic Criminology, Academic Press

Donald, J. (1992), The Police Photographer's Guide, Photo Test Books, ArlingtonHeights.

Three year UG Course inForensic Science
Semester–I
Core -2 Lab
Practical's based on Criminology and Police Science

1. To review crime cases where criminal profiling assisted the police to apprehend the accused.
2. To cite examples of crime cases in which the media acted as a pressure group.
3. To evaluate the post-trauma stress amongst victims of racial discrimination.
4. To correlate deviant behavior of the accused with criminality (take a specific example).
5. To examine a case of juvenile delinquency and suggest remedial measures.
6. To review the recommendations on modernization of police stations and evaluate how far these have been carried out in different police stations.
7. To visit a 'Model Police Station' and examine the amenities vis-à-vis conventional police stations.
8. To examine steps being taken for rehabilitation of former convicts and suggests improvements.
9. To prepare a report on interrogation cells and suggest improvements.

Three year UG Course in Forensic Science
Semester–II
Core – 3 Theory
Criminal Law

Learning Objectives: After studying this paper the students will know:

a.Elements of Criminal Procedure Code related to forensic science.
b.Acts and provisions of the Constitution of India related to forensic science.
c.Acts governing socio-economic crimes.
d.Acts governing environmental crimes.

Module 1: Constitution of India

Preamble, Fundamental Rights, Directive Principles of State Policy– Articles 14, 15, 20, 21, 22, 51A, summary trial-Section 260 (2) and Judgments in abridged forms-Section 355. Criminal Procedure Code. Cognizable and non-cognizable offences. Bailable and non-bailable offences. Sentences which the court of Chief Judicial Magistrate may pass.

Module 2: Law to Combat Crime

Indian Penal Code pertaining to offences against persons – Sections 121A, 299, 300, 302, 304A, 304B, 307, 309, 319, 320, 324, 326, 351, 354, 359, 362. Sections 375 & 377 and their amendments.

Indian Penal Code pertaining to offences against property Sections – 378, 383, 390, 391, 405, 415, 420, 441, 463, 489A, 497, 499, 503, 511.

Module 3: Indian Evidence Act

Evidence and rules of relevancy in brief. Expert witness. Cross examination and re-examination of witnesses. Sections 32, 45, 46, 47, 57, 58, 60, 73, 135, 136, 137, 138, 141. Section 293 in the code of criminal procedure.

Module 4: Acts Pertaining to Socio-economic and Environmental Crimes

Detail description of Narcotic, Drugs and Psychotropic Substances (NDPS) Act, Essential Commodity Act, Drugs and Cosmetics Act, Explosive Substances Act, Arms Act. Dowry Prohibition Act, Prevention of Food Adulteration Act, Prevention of Corruption Act, Wildlife Protection Act. I.T. Act 2000, Environment Protection Act, Untouchability Offences Act

Suggested Readings

1. D.A. Bronstein, Law for the Expert Witness, CRC Press, Boca Raton(1999).
2. Vipa P. Sarthi, Law of Evidence, 6th Edition, Eastern Book Co., Lucknow(2006).
3. A.S. Pillia, Criminal Law, 6th Edition, N.M. Tripathi Pvt Ltd., Mumbai(1983).
4. R.C. Nigam, Law of Crimes in India, Volume I, Asia Publishing House, New Delhi(1965).
5. (Chief Justice) M. Monir, Law of Evidence, 6th Edition, Universal Law Publishing Co. Pvt. Ltd., New Delhi(2002).
6. Bayer Acts of Indian Penal Code, Criminal Procedure Code and Indian EvidenceAct.
7. Turrey B; Criminal Profiling - An Introduction to Behavioral Evidence Analysis, Acad. Press Lond
8. Paranjape, N.V. Criminology and Penology, CentralLawPublication, Allahabad.
9. William Bailey,The Encyclopedia of Police Science, Second Edition Garland publishing, INC, London.
10. Suderland , E.H.and Donald R. Cressy; The Principals of Criminology, The Times of India Press,

Bombay,1968

11. Reid,Sue Titus, Crime and Criminology,The DrydenPress,Illions
12. Ahuja,RamCriminology,RawatPublication,Jaipur
13. Suderland , E.H.; White Collar Crime, The Dryden Press,Newyork
14. Wayne Petherick,, Brent Turvey , Claire Ferguson , Forensic Criminology, AcademicPress
15. Donald, J. (1992), The Police Photographer's Guide, Photo Test Books, ArlingtonHeights,

Three-year UG Course in Forensic Science
Semester–II
Core 3 Lab
Practical's based on preparing schedules

1. To prepare a schedule of five cognizable and five non-cognizable offences.
2. To study the powers and limitations of the Court of Judicial Magistrate of First Class.
3. To study a crime case in which an accused was punished on charge of murder under Section 302.
4. To study a crime case in which an accused was punished on charge of rape under Section 375.
5. To cite example of a case in which the opinion of an expert was called for under Section 45 of the Indian Evidence Act.
6. To prepare a schedule of persons convicted under Narcotics, Drugs and Psychotropic Act statistically analyze the age group to which they belonged.
7. To study a case in which Arms Act was invoked.
8. In light of Section 304B of the Indian Penal Code, cite a case involving dowry death.

Three year UG Course in Forensic Science
Semester–II
Core – 4 Theory
Forensic Psychology

Learning Objectives: After studying this paper the students will know –

a. *The overview of forensic psychology and itsapplications.*
b. *The legal aspects of forensicpsychology.*
c. *The significance of criminalprofiling.*
d. *The importance of psychological assessment in gauging criminalbehaviour.*

Module 1: Basics of Forensic Psychology

Definition and fundamental concepts, Forensic psychiatry, Psychology and law. Ethical issues in forensic psychology. Mental disorders and forensic psychology. Psychology of evidence – eyewitness testimony, confession evidence. Criminal profiling. Psychology in the courtroom, with special reference to Section 84 IPC

(McNaughton’s Rule), Durham Rule ofInsanity.

Module 2: Psychological Disorders

Classification of psychiatric disorders- Common Psychiatric Disorders- Schizophrenia, Bipolar Disorders, Anxiety Disorders, Phobia, Personality Disorder, Attention Deficit Hyperactive Disorder, Psychology of Serial murderers, terrorism. Use of Media and Intelligence for Commission of Crime. Gender Justice and Crime.

Module 3: Juvenile delinquency

Theories of offending (social cognition, moral reasoning), Child abuse (physical, sexual, emotional), Juvenile Sex Offenders, legal controversies. Laws Related to Forensic Psychology & Competency to Stand Trial, Criminal and Civil Responsibilities.

Module 4: Deception Detection Tools

Interviews, non-verbal detection, statement analysis, Voice stress analyser, Hypnosis, Polygraphy – operational and question formulation techniques, ethical and legal aspects, the guilty knowledge test. Narco analysis and Brain Fingerprinting – principle and theory, ethical and legal issues.

Suggested Readings

1.A.A. Moenssens, J. Starrs, C.E. Henderson and F.E. Inbau, Scientific Evidence in Civil and Criminal Cases, 4th Edition, The Foundation Press, Inc., New York(1995).

2.R. Saferstein, Criminalistics, 8th Edition, Prentice Hall, New Jersey(2004).

3.J.C. DeLadurantey and D.R. Sullivan, Criminal Investigation Standards, Harper & Row, New York (1980).

4.J. Niehaus, Investigative Forensic Hypnosis, CRC Press, Boca Raton(1999).

5.E. Elaad in Encyclopedia of Forensic Science, Volume 2, J.A. Siegel, P.J. Saukko and G.C. Knupfer (Eds.), Academic Press, London(2000).

Three-year UG Course in Forensic Science
Semester–II
Core 4 Lab
Practical's based on Forensic Psychology

1.To cite a crime case where legal procedure pertaining to psychic behavior had to beinvoked.

2.To prepare a report on relationship between mental disorders and forensicpsychology.

3.To review a crime case involving serial murders. Comment on the psychological traits of the accused.

4.To cite a crime case involving a juvenile and argue for and against lowering the age for categorizing an individual asjuvenile.

5.To study a criminal case in which hypnosis was used as a means to detectdeception.

6.To prepare a case report on Minnesota multiphasic personality inventorytest.

7.To prepare a case report on Bhatia's battery of performance test ofintelligence.

8.To cite a criminal case in which narco analysis was used as a means to detectdeception.

Three-year UG Course in Forensic Science
Semester–II

SEC

Crime Scene Management

Learning Objectives: After studying this paper the students will know –

a. The methods of securing, searching and documenting crimescenes.

b. The art of collecting, packaging and preserving different types of physical and trace evidence at crimescenes.

c. The legal importance of chain ofcustody.

d. The tools and techniques for analysis of different types of crime sceneevidence.

Module 1: Crime Scene Management

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. 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?). Crime scene logs.

Module 2: Crime Scene Evidence

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).

Module 3: Physical Evidences

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. Paint evidence – collection, packaging and preservation. Analysis by destructive and non-destructive methods. Importance of paint evidence in hit and run cases. Cloth evidence- importance, location, collection and comparison of cloth samples. Forensic gemmology.

Module 4: Trace Evidences

Fibre evidence – artificial and man-made fibres. Collection of fibre evidence. Identification and comparison of fibres. Soil evidence – importance, location, collection and comparison of soil samples. Hair evidence – importance, collection, analysis of adhering material. Matching of pieces. Tool mark evidence. Classification of tool marks. Forensic importance of tool marks. Collection, preservation and matching of tool marks. Restoration of erased serial numbers and engraved marks.

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, NewYork.
4. Richard Saferestein, 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, NewDelhi.
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).
8. W.J. Tilstone, M.L. Hastrup and C. Hald, Fisher's, Techniques of Crime Scene Investigation, CRC Press, Boca Raton(2013).

Three year UG Course in Forensic Science
Semester–II
SEC - Practical's based on Crime scene samples

1. To prepare a report on evaluation of crimescene.
2. To reconstruct a crime scene (outdoor andindoor).
3. To compare soil samples by density gradientmethod.
4. To compare paint samples by physical matchingmethod.
5. To compare paint samples by thin layer chromatographymethod.
6. To compare glass samples by refractive indexmethod.
7. To identify and compare toolmarks.
8. To compare cloth samples by physical matching.

Three year UG Course in Forensic Science
Semester–III
Core – 5 Theory

Forensic Dermatoglyphics

Learning Objectives: After studying this paper the students will know –

a. The fundamental principles on which the science of fingerprinting is based.

b. The method of classifying criminal record by fingerprints

c. The physical and chemical techniques of developing fingerprints on crime scene evidence.

d.The significance of foot, palm, ear and lip prints.

Module 1: Basics of fingerprinting

Fingerprint, History of fingerprint. Development of fingerprints. Formation of ridges. Types of fingerprint patterns. Classification of fingerprint : Primary, Secondary, Sub secondary, Major, Final and Key.

Module 2: Types of fingerprint evidences

Development of Latent fingerprint: Physical and Chemical method. Development of latent print on human skin, Constituents of sweat residue. Preservation of developed fingerprints.

Module 3: Development of latent fingerprints

Application of light sources in fingerprint detection. Digital imaging for fingerprint enhancement, Developing fingerprints on gloves. Metal deposition method, Automated Fingerprint Identification System.

Module 4: Other Impressions

Importance of footprints, Casting of foot prints, Electrostatic lifting of foot prints. Palm prints, Lip prints - Nature, location, collection and examination of lip prints. Ear prints and their significance.

Suggested Readings

1. J.E. Cowger, Friction Ridge Skin, CRC Press, Boca Raton (1983).
2. D.A. Ashbaugh, Quantitative-Qualitative Friction Ridge Analysis, CRC Press, Boca Raton (2000).
3. C. Champod, C. Lennard, P. Margot an M. Stoilovic, Fingerprints and other Ridge Skin Impressions, CRC Press, Boca Raton (2004).
4. Lee and Gaensleen's, Advances in Fingerprint Technology, 3rd Edition, R.S. Ramotowski (Ed.), CRC Press, Boca Raton (2013).

Three year UG Course in Forensic Science
Semester – III
Core - 5 Lab
Practical's based on Finger Prints

1. To record plain and rolled fingerprints.
2. To carry out ten digit classification of fingerprints.
3. To identify different fingerprint patterns.
4. To carry out ridge tracing and ridge counting.
5. To develop latent fingerprint by physical and chemical method

Three year UG Course in Forensic Science
Semester – III
Core – 6 Theory
Technological Methods in Forensic Science

Learning Objectives: After studying this paper the students will know –
a. The importance of chromatographic and spectroscopic techniques in processing crime scene evidence.
b. The utility of colorimetry, electrophoresis and neutron activation analysis in identifying chemical and biological materials.
c. The significance of microscopy in visualizing trace evidence and comparing it with control samples.
d. The usefulness of photography and videography for recording the crime scenes.

Module 1: Instrumentation

Sample preparation for chromatographic and spectroscopic evidence. Chromatographic methods. Fundamental principles and forensic applications of thin layer chromatography, gas chromatography and liquid chromatography. Electrophoresis – fundamental principles and forensic applications. Neutron activation analysis – fundamental principles and forensic applications.

Module 2: Spectroscopic methods.

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.

Module 3: Microscopy

Fundamental principles. Different types of microscopes. Electron microscope. Comparison Microscope. Forensic applications of microscopy.

Module 4: Forensic photography

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.

Suggested Readings

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

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

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

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

Three year UG Course in Forensic Science
Semester – III
Core - 6 Lab
Practical's based on Technological Methods

1. To determine the concentration of a colored 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.

Three year UG Course in Forensic Science
Semester – III
SEC - Introduction to Biometry

Learning Objectives: After studying this paper the students will know –
a. The basis of biometry.
b. The classification of biometric processes.
c. The importance of behavioral biometry.

Unit 1: Fundamental Aspects

Definition, characteristics and operation of biometric system. Classification of biometric systems – physiological and behavioral. Strength and weakness of physiological and behavioral biometrics. Multimodal biometrics. Key biometric processes – enrollment, identification and verification.

Module – 2: System Performance measures

Positive and negative identification. Performance measures used in biometric systems – FAR, FRR, GAR, FTA, FTE and ATV. Biometric versus traditional technologies.

Unit 3: Physiological Biometrics

Fingerprints, palm prints, iris, retina, geometry of hand and face.

Unit 4: Behavioral Biometrics

Handwriting, signatures, keystrokes, gait and voice.

Suggested Readings

1. S. Nanavati, M. Thieme and R. Nanavati, *Biometrics*, Wiley India Pvt. Ltd. (2002).
2. P. Reid, *Biometrics for Network Security*, New Delhi (2004).
3. J.R. Vacca, *Biometric Technologies and Verification Systems*, Butterworth-Heinemann, Oxford (2007).

Three year UG Course in Forensic Science
Semester – IV

Core – 7 Theory
Forensic Chemistry

Learning Objectives: After studying this paper the students will know –
a. The methods of analyzing trace amounts of petroleum products in crime scene evidence.
b. The methods of analyzing contaminants in petroleum products.
c. The method of searching, collecting, preserving and analyzing arson evidence.
d. The significance of bomb scene management.
f. The classification and characteristics of the narcotics, drugs and psychotropic substances.

Module1: Forensic Chemistry and Scope

Forensic chemistry: Definition and scope, Introduction to Narcotic drugs, Depressants, stimulants, Hallucinogens their Active components and method of analysis, Designer Drugs & Anabolic steroids, Analytical methods of analysis of IMFL, Country made and Illicit liquor, Denatured spirits and their analysis.

Module2: Petroleum Products and Edible oil

Analysis of petroleum products Diesel. Analysis of traces of petroleum products in forensic exhibits. Comparison of petroleum products. Adulteration of petroleum products. Edible oil and their adulterants

Module 3: Cases Involving Arson

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,

Module 4: Explosives

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.

Suggested Readings:

1. Khan, JaVed I., Ho, Mat H. Analytical Methods in Forensic Chemistry. New York:

Working Procedure Manua Chemistry/Toxicology/Explosives/Narcotics, DFS Pub. New Delhi

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. S. Ballou, M. Houck, J.A. Siegel, C.A. Crouse, J.J. Lentini and S. Palenik in Forensic Science, D.H. Ubelaker (Ed.), Wiley-Blackwell, Chichester (2013).

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. Goutam, M. P. and Goutam S Analysis of Plant Poison, Selective & Scientific Books, New Delhi.

9. Feigl; Spot Test in Organic Analysis, Elsevier Pub., New Delhi.

10. Curry A.S; Analytical Methods in Human Toxicology, Part II, CRC Press Ohio

11. Clark, E.G.C.; Isolation and Identification of Drugs, Vol I&II, Academic Press,

12. Sunshine I; Year book of Toxicology, CRC Press Series, USA

13. Michael J. Deverlanko et al: Hand Book of Toxicology CRC Press, USA.

14. Parikh C.K; Text Book of Medical Jurisprudence Forensic Medicines and Toxicology. CBS Pub. New Delhi.

15. Balraj S. Parmar et al; Pesticide Formulation, CBS Publishers, New Delhi.

Three year UG Course in Forensic Science
Semester – IV
Core – 7 Lab
Practical's based on Forensic Chemistry

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.

Three year UG Course in Forensic Science
Semester – IV
Core – 8 Theory
Questioned Documents

Learning Objectives: After studying this paper the students will know –
a. The importance of examining questioned documents in crime cases.
b. The tools required for examination of questioned documents.
c. The significance of comparing hand writing samples.
d. The importance of detecting frauds and forgeries by analyzing questioned documents.

Module 1: Nature and Scope of Questioned Documents

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.

Module 2: Handwriting and its Comparison

Handwriting and its Principles. Comparison of handwriting.. Natural variations and fundamental divergences in handwritings. Class and individual characteristics. Request and Standard Documents. Examination of signatures characteristics, Examination of paper and ink

Module 3: Forgeries

Types of Forgery and its examination. Alterations 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.

Module 4: Basic tools for examination of Documents

Basic tools needed for forensic documents' examination. Ultraviolet, Visible and Fluorescence Spectroscopy. Photomicrography , Microphotography. Video Spectral Comparator, Electrostatic Detection Apparatus

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. 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.
9. Roy A Huber, A.M. Headrick; Handwriting Identification- Facts and
10. Laboratory working procedure manual, Documents DFS, New Delhi,2005
11. Fundamental, CRC Press identification, profusely illustrated, Law Book, Allahabad Universal Law Pub. Delhi Indian

Three year UG Course in Forensic Science
Semester – IV
Core – 8 Lab
Practical's based on Questioned Documents

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.

Three year UG Course in Forensic Science
Semester – IV

Core – 9 Theory

Cyber Forensics and Cyber security

Learning Objectives: After studying this paper the students will know –

a. The basics of digital forensics.

b. The cases which fall under the purview of digital crimes.

c. The types of digital crimes.

d. The elements involved in investigation of digital crimes.

Module 1: Fundamentals and Concepts

Fundamentals of computers Hardware and accessories – development of hard disk, physical construction, CHS and LBA addressing, encoding methods and formats. Memory and processor. Methods of storing data. Operating system. Software. .

Module 2: Computer Crimes

Definition and types of computer crimes. Distinction between computer crimes and conventional crimes. Reasons for commission of computer crimes. Breaching security and operation of digital systems. Computer virus, and computer worm – Trojan horse, trap door, super zapping, logic bombs. Types of computer crimes – computer stalking, pornography, hacking, crimes related to intellectual property rights, computer terrorism, hate speech, private and national security in cyber space. An overview of hacking, spamming, phishing and stalking.

Module 3: Computer Forensics Investigations

Seizure of suspected computer. Preparation required prior to seizure. Protocol to be taken at the scene. Extraction of information from the hard disk. Treatment of exhibits. Creating bit-stream of the original media. Collection and seizure of magnetic media. Examining forensically sterile media. Restoration of deleted files. Encryption and decryption methods.

Module 4: Fundamentals of Networking

Introduction to network, LAN, WAN and MAN, TCP/IP Protocol, OSI Model, Relevant Section of IT Act 2000, Networking Protocols, Password cracking and E-mail tracking, File system, Network Security Threats, Vulnerabilities.

Suggested Readings

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

2. C.B. Leshin, *Internet Investigations in Criminal Justice*, Prentice Hall, New Jersey (1997).

3. R. Saferstein, *Criminalistics*, 8th Edition, Prentice Hall, New Jersey (2004).

4. E. Casey, *Digital Evidence and Computer Crime*, Academic Press, London (2000).

5. Andrew S. Tanenbaum, Computer Networks, 5th edition Library of Congress Cataloging-in-Publication Data, (1981).

Three year UG Course in Forensic Science
Semester – IV
Core – 9 Lab
Practical's based on Cyber Forensics

1. To identify, seize and preserve digital evidence from crime scenes.
2. To detect deletions, obliterations and modifications of files using encase software.
3. To trace routes followed by e-mails and chats.
4. To identify the IP address of the sender of e-mails.
5. To demonstrate concealment techniques using cryptographic PGP.
6. To identify encrypted files.
7. To identify hidden files.
8. To use digital signatures for securing e-mail and online transactions.
9. To acquire data from PCs/laptops/HDDs/USBs, pen drives, memory cards and SIM cards.
10. To use symmetric and asymmetric keys for protection of digital record.
11. To carry out imaging of hard disks.

Three year UG Course in Forensic Science
Semester – IV

SEC – Theory
Economic Offences

Learning Objectives: After studying this paper the students will know –
a. Basic economic and financial terminology.
b. Economic crimes in India are linked to several other crimes.
c. Economic crimes often have a bearing on national security.
d. Types of common economic offences and their consequences.
e. Steps involved in mitigating economic crimes.

Unit 1: Taxonomy of Economic Offences

Fundamentals of economics in economic offences. Tax evasion. Excise duty evasion. Fraudulent bankruptcy. White collar crime. Economic exclusion. Black money. Corruption and bribery of public servants. Money laundering and hawala transactions.

Unit 2: Criminogenic Factors

Insurance frauds. Corporate frauds. Bank frauds. Ponzi scheme. Pyramid scheme. Illicit trafficking in contraband goods. Illicit trafficking in arms. Illicit trafficking in explosives. Illicit drug trafficking. Trafficking in human organs. Cultural objects trafficking. Racketeering in employment. Racketeering in false travel documents.

Unit 3: Applied Economics in Processing Evidence

Forensic accountancy and forensic auditing. Valuation of economic losses. Violation of Intellectual Property Rights.

Unit 4: Prevention of Economic Offences

Legislations to deal with different forms of economic offences. RBI Act. SEBI Act. Competition Commission of India Act. Credit card frauds. Enforcement agencies to deal with different forms of economic offences. International perspectives – measures adopted by FBI and INTERPOL.
Case histories of economic offences.

Suggested Readings

1. R.V. Clarke, *Situational Crime Prevention: Successful Case Studies*, 2nd Edition, Criminal Justice Press, New York (1997).
2. S.P. Green, *Lying, Cheating and Stealing: A Moral Theory of White Collar Crime*, Oxford University Press, Oxford (2006).
3. G. Geis, R. Meier, L. Salinger (Eds.), *White-Collar Crime: Classic & Contemporary Views*, Free Press, New York (1995).
4. J. Reiman, *The Rich get Richer and the Poor get Prison*, Allyn & Bacon, Boston (1998).
5. Indian Audit and Accounts department, *Audit of Fraud, Fraud Detection and Forensic Audit*, 2007.

6. State Crime Branch, Haryana, *Investigation of Economic Offences*.

Three year UG Course in Forensic Science
Semester – IV
SEC – Lab
Economic Offences

1. To prepare a draft on fraudulent bankruptcy.
2. To cite a case of money laundering and hawala transactions in India and prepare a note on it.
3. To cite a case involving bank fraud and suggest measures to prevent such crimes.
4. To study a case involving illicit drug trafficking and trace the route by which the item was being smuggled.
5. To prepare a report on trafficking of heritage artefacts, including religious deities in India.
6. To study the applications of accounting software.
7. To review the legislative measures to deal with a particular economic offence, identifying the loopholes and suggesting ways to plug the loopholes.
8. To prepare a schedule of national agencies involved in curbing economic offences. Outline their specific duties.

Three year UG Course in Forensic Science
Semester – V
Core – 10 Theory
Forensic Ballistics

Learning Objectives: After studying this paper the students will know –
a. The classification of firearms and their firing mechanisms.
b. The methods of identifying firearms.
c. The characteristics of ammModuleion.

d. The importance of firearm evidence.
e. The nature of firearm injuries.
f. The methods for characterization of gunshot residue.

Module 1: Introduction to Firearm

History and development of firearms. Classification of firearms. Weapon types and their operation. Firing mechanisms of different firearms.

Module 2: Internal/External/Terminal Ballistic

Internal ballistics – Definition, ignition of propellants, shape and size of propellants, manner of burning, and various factors affecting the internal ballistics: lock time, ignition time, barrel time, erosion, corrosion and gas cutting. 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 of bullet shape, striking velocity, striking angle and nature of target, tumbling of bullets Ricochet and its effects, stopping power.

Module 3: Ammunition

Types of ammunition. Constructional features and characteristics of different types of cartridges and bullets. Primers and priming compounds. Projectiles, Head stamp markings on ammModuleions. Different types of marks produced during firing process on cartridge – firing pin marks, breech face marks, chamber marks, extractor and ejector marks.

Module 4: Firearm Evidence

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 clothings. Identification and nature of firearms injuries. Reconstruction with respect to accident, suicide, murder and self defence.

Suggested Readings

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).

Three year UG Course in Forensic Science
Semester – V
Core – 10 Lab
Practical's based on Forensic Ballistics

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.

Three year UG Course in Forensic Science
Semester – V
Core – 11 Theory
Forensic Toxicology

Learning Objectives: After studying this paper the students will know:
a. The significance of toxicological studies in forensic science.
b. The classification of poisons and their modes of actions.
c. The absorption of poisons in body fluids.
d. The forensic identification of illicit liquors.
e. The classification and characteristics of the narcotics, drugs and psychotropic substances.

Module 1: Basics of Toxicology

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.

Module 2: Poisons

Poison: Definition, Classification, Physico-chemical characteristics and mode of action of poisons, Metabolism and excretion, 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

Module 3: Identification and Analysis of Poisons

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.

Module 4: Identification and Analysis of Drugs

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.

Suggested Readings

1. R. Saferstein, Criminalistics, 8th Edition, Prentice Hall, New Jersey (2004).
2. F.G. Hofmann, A Handbook on Drug and Alcohol Abuse, 2nd Edition, Oxford University Press, New York (1983).

3. S.B. Karch, The Pathology of Drug Abuse, CRC Press, Boca Raton (1996).
4. A.W. Jones, Enforcement of drink-driving laws by use of per se legal alcohol limits: Blood and/or breath concentration as evidence of impairment, Alcohol, Drug and Driving, 4, 99 (1988).
5. Kennedy, Thomas J., Christian, Jr., Donnell Basic Principles of Forensic Chemistry, Springer
6. Saferestein, Criminalistics: An Introduction to Forensic Science. Prentice Hall
7. John D. DeHaan ; Kirk's Fire Investigation, Prentice Hall Eaglewood Cliffs, N.J
8. Yinon J; Modern Methods & Application in Analysis of Explosives, John Wiley.
9. Goutam, M. P. and Goutam S Analysis of Plant Poison, Selective & Scientific Books, New Delhi.
10. Feigl; Spot Test in Organic Analysis, Elsevier Pub., New Delhi.
11. Clark, E.G.C.; Isolation and Identification of Drugs, Vol I&II, Academic Press,
12. Sunshine I; Year book of Toxicology, CRC Press Series, USA
13. Michael J. Deverlanko et al: Hand Book of Toxicology CRC Press, USA.
14. Parikh C.K; Text Book of Medical Jurisprudence Forensic Medicines and Toxicology. CBS Pub. New Delhi.
15. Robert J. Flanagan, Andrew A. Taylor, Ian D. Watson, Robin Whelpton Fundamentals of Analytical Toxicology, Wiley.
16. Bamford Frank. Poisons- their isolation and identification, J &.A Churchill Ltd

Three year UG Course in Forensic Science
Semester – V
Core – 11 Lab
Practical's based on Forensic Toxicological analysis

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.

Three year UG Course in Forensic Science
Semester – V
Core – 12 Theory
Forensic Biology

Learning Objectives: After studying this paper the students will know –
a. The significance of biological and serological evidence.
b. The forensic importance of hair evidence.
c. The importance of biological fluids – blood, urine, semen, saliva, sweat and milk – in crime investigations.
d. How wildlife forensics aid in conserving natural resources.
e. How forensic entomology assists in death investigations.

Module 1: Biological Evidence

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.

Module 2: Examinations of Biological Evidences

Identification of Blood, Semen, Saliva and Urine through preliminary and confirmatory crystal examinations. 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.

Module 3: Wildlife Forensics

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.

Module 4: Forensic Entomology

Basics of forensic entomology. Different Insects of forensic importance. Collection of entomological evidence during death investigations.

Suggested Readings

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).

Three year UG Course in Forensic Science
Semester – V
Core - 12 Lab
Practical's based on Forensic Biology

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

Three year UG Course in
Forensic Science Semester – V
SEC – Theory
Forensic Serology

Learning Objectives: After studying this paper the students will know –
a. The significance of serological evidence.
b. The importance of biological fluids – blood, urine, semen, saliva, sweat and milk – in crime investigations.
c. The usefulness of genetic markers in forensic investigations.
d. The forensic importance of bloodstain patterns

Unit 1: Forensic Importance of Blood

Composition and functions of blood. Collection and preservation of blood evidence. Distinction between human and non-human blood. Determination of blood groups. Antigens and antibodies. Forensic characterization of bloodstains. Typing of dried stains. Blood enzymes and proteins.

Unit 2: Forensic Characterization of Body fluids

Common body fluids Semen. Forensic significance of semen. Composition, functions and morphology of spermatozoa. Collection, evaluation and tests for identification of semen. Individualization on the basis of semen examination. Composition, functions and forensic significance of saliva, sweat, milk and urine. Tests for their identifications.

Unit 3: Genetic Marker Analysis

Cellular antigens. ABO blood groups. Extracellular proteins and intracellular enzymes. Significance of genetic marker typing data. Sexual assault investigations.

Unit 4: Bloodstain Pattern Analysis

Bloodstain characteristics. Impact bloodstain patterns. Cast-off bloodstain patterns. Projected bloodstain patterns. Contact bloodstain patterns. Blood trails. Bloodstain drying times. Documentation of bloodstain pattern evidence. Crime scene reconstruction with the aid of bloodstain pattern analysis.

Suggested Readings

1. W.G. Eckert and S.H. James, *Interpretation of Bloodstain Evidence at Crime Scenes*, CRC Press, Boca Raton (1989).

2. G.T. Duncan and M.I. Tracey in *Introduction to Forensic Sciences*, 2nd Edition, W.G. Eckert (Ed.), CRC Press, Boca Raton (1997).

3. R. Saferstein, *Criminalistics*, 8th Edition, Prentice Hall, New Jersey (2004).

4. T. Bevel and R.M. Gardner, *Bloodstain Pattern Analysis*, 3rd Edition, CRC Press, Boca Raton (2008).

Three year UG Course in
Forensic Science
Semester – V
SEC – Lab
Forensic Serology

1. To determine blood group from fresh blood samples.
2. To determine blood group from dried blood sample.
3. To carry out the crystal test on a blood sample.
4. To identify blood samples by chemical tests.
5. To identify the given stain as sliva.
6. To identify the given stain as urine.
7. To carry out cross-over electrophoresis.
8. To study the correlation between impact angle and shape of bloodstain.
9. To identify the point of convergence from the bloodstain patterns.

Three year UG Course in
Forensic Science Semester – VI
Core – 13 Theory
Forensic Anthropology

Learning Objectives: After studying this paper the students will know –
a. Importance of forensic anthropology in identification of persons.
b. Different techniques of facial reconstruction and their forensic importance.
c. Significance of somatoscopy and somatometry.

Module 1: Significance of Forensic Anthropology

Scope of forensic anthropology. Introduction and forensic significance of osteometry and craniometry in personal identification Study of human skeleton. Nature, formation, types and identification of human bones. Comparative skeletal anatomy of human and non human bones. Determination of age, sex, stature and side (long bones) from skeletal material.

Module 2: Forensic Odontology

Development and scope. Role in mass disaster and personal identification. Types of teeth and their functions. Structural variation in human and non human teeth. Dental anomalies and their importance in personal identification. Eruption sequence, Gustafson's method. Age and sex determination from teeth. Bite marks its forensic significance and role in personal identification.

Module 3: Personal Identification – Somatoscopy and Somatometry

Somatoscopy – Introduction and forensic significance in personal identification. Observation of hair on head, forehead, eyes, root of nose, nasal bridge, nasal tip, chin, Darwin's tubercle, ear lobes, supra-orbital ridges, physiognomic ear breadth, circumference of head. Scar marks and occupational marks. Somatometry – Introduction and forensic significance in personal identification .Measurements of head, face, nose, cheek, ear, hand and foot, body weight, height. Indices - cephalic index, nasal index, cranial index, upper facial index.

Module 4: Facial Reconstruction

Portrait Parle/ Bertillon system. Photofit/identi kit. Facial superimposition

techniques. Cranio facial super imposition techniques – photographic super imposition, videosuperimposition, Roentgenographic superimposition. Use of somatoscopic and craniometric methods in reconstruction. Importance of tissue depth in facial reconstruction. Genetic and congenital anomalies – causes, types, identification and their forensic significance.

Suggested Readings

1. M.Y. Iscan and S.R. Loth, The scope of forensic anthropology in, Introduction to Forensic Sciences, 2nd Ed., W.G. Eckert (Ed.), CRC Press, Boca Raton (1997).
2. D. Ubelaker and H. Scammell, Bones, M. Evans & Co., New York (2000).
3. S.Rhine, Bone Voyage: A Journey in Forensic Anthropology, University of Mexico Press, Mexico (1998).

Three year UG Course in
Forensic Science Semester – VI
Core - 13 Lab
Practical's based on Forensic Anthropology

1. To determine age from skull and teeth.
2. To determine of sex from skull.
3. To determine sex from pelvis.
4. To study identification and description of bones and their measurements.
5. To investigate the differences between animal and human bones.
6. To perform somatometric measurements on living subjects.
7. To carry out craniometric measurements of human skull.
8. To estimate stature from long bone length.
9. To conduct portrait parley using photo fit identification kit.

Three year UG Course in
Forensic Science Semester – VI
Core – 14 Theory
Forensic Medicine

Learning Objectives: After studying this paper the students will know –

a. The duties of the first responding officer who receives a call on homicide or suicide case.
b. The steps involved in processing the death scene.
c. The importance of ascertaining whether the crime was staged to appear as suicide or accident.
d. The importance of bloodstain patterns in reconstructing the crime scene.
e. The importance of autopsy.
f. The importance of forensic odontology

Module 1: Medical Jurisprudence

Definition, aims, concept, fundamental aspects and scope of medical Jurisprudence, Legal procedure in criminal court, Medical evidence and medical witness, Legal aspects of medical practices, Medical negligence, Consent in medical practices.

Module 2: Autopsy

Objectives of Autopsy, Rules for medico-legal Autopsies, Medico-legal verus Hospital Autopsy, Autopsy report, Procedure of Autopsy: laboratory procedure, Second Autopsy, obscure Autopsy, Preservation of dead bodies, Handling of highly infected bodies, Psychological Autopsy, Artifacts.

Module 3: Death and its Investigation

Death: definition, classification, mode, manner and causes of death, Exhumation, Determination of time since death, Investigation of Asphyxial death, Death due to drowning. Investigation of sexual offences

Module 4: Injuries and its Examination:

Injuries: Definition, types and classification, Injuries due to burns and scald, lightning and electricity, Radiation Injuries, Mechanical injuries, Bomb blast and explosion injuries, Traffic injuries and Regional injuries, Ante mortem and post mortem injuries, Aging of injuries, Artificial injuries.

Suggested Readings

1. K. Smyth, The Cause of Death, Van Nostrand and Company, New York (1982).
2. M. Bernstein, Forensic odontology in, Introduction to Forensic Sciences, 2nd Ed., W.G. Eckert (Ed.), CRC Press, Boca Raton (1997).
3. J. Dix, Handbook for Death Scene Investigations, CRC Press, Boca Raton (1999).
4. H.B. Baldwin and C.P. May in, Encyclopedia in Forensic Science, Volume 1, J.A. Siegel, P.J. Saukko and G.C. Knupfer (Eds.), Academic Press, London (2000).
5. V.J. Geberth, Practical Homicide Investigation, CRC Press, Boca Raton (2006).
6. T. Bevel and R.M. Gardner, Bloodstain Pattern Analysis, 3rd Edition, CRC Press, Boca Raton (2008).
7. W.J. Tilstone, M.L. Hastrup and C. Hald, Fisher's, Techniques of Crime Scene Investigation, CRC Press, Boca Raton (2013)

Three year UG Course in
Forensic Science Semester – VI
Core - 14 Lab
Practical's based on Forensic Medicine

1. To design a questionnaire for the first responder to the death scene.
2. To design a protocol to deal with the media at the crime scene.
3. To design a checklist for the forensic scientists at the death scene.
4. To design a canvass form giving description of an unidentified victim.
5. To analyze and preserve bite marks.