List of Courses Focus on Employability/ Entrepreneurship/ Skill Development

Department : *Forensic Science*

Programme Name : *B.Sc.*

Academic Year : 2018-19

List of Courses Focus on Employability/ Entrepreneurship/Skill Development

Sr. No.	Course Code	Name of the Course
01.	LS/FSC/GE-101/L	Elementary Forensic Science
02.	LS/FSC/GE-101/P	Practical's Based on Crime Scene Investigation
03.	ECA	Extra Curricular Activities/ Tour/Field Visit/ Industrial Training/ NSS/Swachchhata/ Vocational Training/ Sports/Others
04.	LS/FSC/GE-102/L	Applied Forensic Science
05.	LS/FSC/GE-102/P	Practical's Based on Applied Forensic Science
06.	ECA	Extra Curricular Activities/ Tour/Field Visit/ Industrial Training/ NSS/Swachchhata/ Vocational Training/ Sports/Others
07.	LS/FSC/GE-303-L	Crime Scene Management
08.	LS/FSC/GE-303-P	Practical's Based on Crime Scene Management
09.	LS/FSC/SEC-301-L	Introduction To Biometry
10.	LS/FSC/GE-404-L	Advanced Forensic Science
11.	LS/FSC/GE-404-P	Practical's Based on Advanced Forensic Science
12.	LS/FSC/SEC-402-L	Handwriting Identification And Recognition

Scheme and Syllabus

B.Sc. Hon's Forensic Science

Semester	Course Opted	Course Code	Name of the course	Credit	Hour / week
I	Core-1	LS/FSC/C-101L	Introduction to Forensic Science	4	4
	Core -1 Practical	LS/ FSC/C-101P	Practicals based on Crime Scene	2	4
	Core -2	LS/ FSC/C-102L	Crime and Society	4	4
	Core -2 Practical	LS/ FSC/C-102P	Practicals based on Crime and Society	2	4
	Generic Elective - 1 (GE- I)	LS/ FSC/GE-101/L	Elementary Forensic Science	4	4
	Generic Elective - Practical	LS/ FSC/GE-101/P	Practicals based on Crime Scene Investigation	2	4
	Ability Enhancement Compulsory Course (AECC)	LS/ FSC/AECC-101/EC	English Communication / MIL (Hindi Communication)	4*	4
	ECA	LS/FSC/ECA/	ECA-Extracurricular activity/ Tour, Field visit/ Industrial training/ NSS/ Swachhta/ vocational Training/ Sports/ others	2	(2)
			Total	**24**	**28**
II	Core-3	LS/FSC/C-203-L	Criminal Law	4	4
	Core -3 Practical	LS/FSC/C-203-P	Practicals based on preparing schedules	2	4
	Core -4	LS/FSC/C-204-L	Forensic Psychology	4	4
	Core -4 Practical	LS/FSC/C-204-P	Practicals based on Forensic Psychology	2	4
	Generic Elective - 2 (GE-2)	LS/FSC/GE-202-L	Applied Forensic Science	4	4
	Generic Elective - Practical	LS/FSC/GE-202-P	Practicals based on Applied Forensic Science	2	4
	Ability Enhancement Compulsory Course (AECC)	LS/FSC/AE-201/ES	Environmental Science	4*	4
	ECA		ECA-Extracurricular activity/ Tour, Field visit/ Industrial training/ NSS/ Swachhta/	2	(2)

			vocational Training/ Sports/ others		
			Total	**24**	**28**
SUMMER Internship: 15 days			**Swayam Swachhta / NSS / Industrial Tour/ others**	**2**	**100**
III	Core-5	LS/FSC/C-305-L	Forensic Dermatoglyphics	4	4
	Core -5 Practical	LS/FSC/C-305-P	Practicals based on Finger Prints	2	4
	Core -6	LS/FSC/C-306-L	Technological Methods in Forensic Science	4	4
	Core -6 Practical	LS/FSC/C-306-P	Practicals based on Technological Methods	2	4
	Core - 7	LS/FSC/C-307-L	Criminalistics	4	4
	Core – 7 Practical	LS/FSC/C-307-P	Practicals based on Crime scene samples	2	4
	Generic Elective - 3 (GE-3)	LS/FSC/GE-303-L	Crime Scene Management	4	4
	Generic Elective - Practical	LS/FSC/GE-303-P	Practicals based on Crime Scene Management	2	4
	Skill Enhancement Course (SEC - 1)	LS/FSC/SEC-301-L	Introduction to Biometry	4*	2 (4)
			Total	**28**	**34**
IV	Core-8	LS/FSC/C-408-L	Forensic Chemistry	4	4
	Core -8 Practical	LS/FSC/C-408-P	Practicals based on Forensic Chemistry	2	4
	Core -9	LS/FSC/C-409-L	Questioned Documents	4	4
	Core -9 Practical	LS/FSC/C-409-P	Practicals based on Questioned Documents	2	4
	Core - 10	LS/FSC/C-410-L	Forensic Biology	4	4
	Core -10 Practical	LS/FSC/C-410-P	Practicals based on Forensic Biology	2	4
	Generic Elective - 4 (GE-4)	LS/FSC/GE-404-L	Advanced Forensic Science	4	4
	Generic Elective - Practical	LS/FSC/GE-404-P	Practicals based on Advanced Forensic Science	4	4
	Skill Enhancement Course (SEC -2)	LS/FSC/SEC-402-L	Handwriting Identification and Recognition	4*	2 (4)
			TOTAL	28	34
SUMMER Internship: 15 days			**Swayam Swachhta / NSS / Industrial/ others**	**2**	**100**
V	Core-11	LS/FSC/C-511-L	Forensic Ballistics	4	4

Three year UG Course in Forensic Science
Semester – IV LS/FSC/GE-404 L
Generic Elective-4
Advanced Forensic Science

Unit I: Forensic psychology

Forensic psychology, Importance of forensic psychology, Role of forensic psychology in Civil and Criminal cases, Modus Operandi and its role in criminal investigations, criminal profiling, methods of investigations, Narco analysis, Hypnosis, Brain Fingerprinting.

Unit II: Wildlife Forensics

Introduction to Wild life Forensics, Protected and endangered species of Animals and Plants, Identification of wild life materials, Identification of Pug marks of various animals, Forensic (medico-legal) necropsy of wildlife,Identification of Pollen grains.

Unit III: Forensic Anthropology

Definition and Scope, Identification of different types of bones, Age and gender determination from skull, Pelvis, and skeletal remains, Significance of Somatoscopy, Somatometery, Osteometery and Craniometery in Personal Identification.

Unit IV: Forensic Genetics

General principles of DNA extraction and PCR, Personal identification techniques - PCR, RFLP, Y-STR, Mitochondrial DNA, DNA profiling applications in disputed paternity cases, child swapping, missing person's identity.

Recommended Books:

1. Encyclopedia of criminal and deviant behavior (2001) Cliffon D. Pryart, Editor in chief rout ledge, Taylor and Francis group.
2. David Canter, Forensic Psychology, Oxford University Press.
3. Irving B. Weiner, Allen K. Hess. The Handbook of Forensic Psychology. John Wiley & Sons.
4. Denis Howitt. Introduction to forensic and criminal psychology . Pearson Education, Ltd.
5. Jane E. Huffman, John R. Wallace Wildlife Forensics: Methods and Applications, Wiley Blackwell.

5. Barry,A.J.Fisher.; Techniques of Crime Scene Investigation,6th Edition Ed, C.R.C Press NY(2003)

6. Nordby, J Deed Reckoning ; The Art of Forensic Detection, CRC Pre LLC(2000)

7. Eckett, W.G & James S.H; Interpretation of Bloodstains, Evidence of Crime Scene, Elsevier Pub. NY (1989)

Three year UG Course in Forensic Science
Semester – III LS/ FSC/GE-303 P
Generic Elective -3 Practical
Practicals based on Crime Scene Management

1. Reconstruction of crime scene.
2. Searching of physical evidence at crime scene.
3. Collection, packing and preservation of Physical evidences
4. Lifting of prints and impressions by caste and replicas.
5. Evaluation of Crime scene and photographs.
6. Sole prints comparison and their lifting from the scene of crime.

Three year UG Course in Forensic Science
Semester – III LS/FSC/GE-303 L
Generic Elective-3
Crime Scene Management

Unit I: Crime Scene Management

Introduction to Crime scene investigation, Types of Crime scene, Locard's Exchange Principle, Expert's Team composition, Methodological Approach to processing the Crime scene, Sketching and mapping, Role of First responding Officer.

Unit II:Processing a Crime Scene

History and Development of Forensic Science, Basic Principles of Forensic Science, Organizational structure of Forensic Science Laboratories at State and Central level, White Collar crime, Organized Crimes, Economic crimes, Cyber crimes, Crime against children and Women.

Unit III: Searching the Crime Scene

Searching the Crime scene, Types of Searches, Zone Search: Ever Widening, Circle Strip Search, and Grid Search, Indoor searches and outdoor searches, searching of pattern and marks, Collection.

Unit IV: Collection and Packaging of evidence

Physical Evidences: Collection, Packaging and Forwarding of different types of evidences to the laboratories, Techniques for Handling Evidence, Biological evidence, Impression Evidence, Firearms and Ballistic Evidence, Drug Evidence, Toxicological Evidences.

Recommended Books:

1. Sharma, B.R.: Forensic Science in Criminal Investigation and Trials, Central Law Agency, Allahabad, 1974.
2. Saferstein: Forensic Science Handbook, Vol I, II & III, Prentice Hall Inc. USA.
3. Saferstein: Criminalistics, 1976, Prentice Hall Inc. USA.
4. Siegel, J. A., Saukko, P. J. And Knupfer, G.C., Encyclopedia of Forensic Sciences, Academic Publishers, London .

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

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

9. Arms Acts, 1959 and Arms Rule, 1962.

10. Working procedure Manual: Ballistics, DFS New Delhi, Publication, 2005.

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

Three year UG Course in Forensic Science
Semester – II LS/ FSC/GE-202 P
Generic Elective -2 Practical
Practicals based on Applied Forensic Science

1. Characterization of blood by Presumptive test and Crystallization assay
2. Identification of Saliva, Semen, Urine by Preliminary tests.
3. Analysis of narcotic drugs.
4. Identification of Dhatura alkaloids by TLC
5. Determination of methanol and ethanol in liquor sample.
6. Detection of adulterant in vegetable oil
7. Identification of firearms, cartridges, bullets, gunpowder, etc.
8. Matching bullets and cartridge cases by comparison microscope.

Three year UG Course in Forensic Science
Semester – II LS/FSC/GE-202 L
Generic Elective-2
Applied Forensic Science

Unit I: Forensic Biology

Preliminary and Confirmatory examination of Blood, Saliva, Semen, Urine and its Forensic Significance. Microscopic examination of Human and Animal Hair, Importance of Wild Life Forensics and Identification of Pug marks of various animals. DNA Fingerprinting in Forensic Science.

Unit II: Forensic Medicine and Toxicology:

Poisons–Definition, Scope, Classification, Legislations concern to poisoning in India, Medico-legal Autopsy, Medico-legal Report, P M Findings in unnatural death, Introduction to methods of isolation of poison from Viscera, Collection and Preservation of viscera in fatal cases.

Unit III: Forensic Chemistry

Definition and Scope, Examination of Fire and Arson, Country made and Illicit liquor, Vitriolage cases, Analysis of Petrol and Diesel, Drugs: Definition, Classification and legislations, Introduction to Narcotic, Depressants, stimulants, and Hallucinogens, Designer Drugs & Nootropics.

Unit IV: Forensic Ballistics

Ballistics: Definition and scope, Firearms: Definition, Classification and Characteristics, Ammunition: Definition as per Indian Arms Act and classification, General Introduction to explosives.

Recommended Books

1. Richard Saferstein; Forensic Science Hand Book, Vol II Prentice Hall, Englewood Cliff, NJ.
2. Goutam Shubhra. ; An Introduction to Forensic Hair Examination; Selective and Scientific Book, New Delhi
3. Saferstein R. – Criminalistics Prentice Hall, Inc, New York.
4. Working procedure manual: Biology/ Serology; DFS, New Delhi
5. Saferestein, Criminalistics: An Introduction to Forensic Science. Prentice Hall
6. Goutam, M. P. and Goutam S Analysis of Plant Poison, Selective & Scientific Books, New Delhi.

7. Esharenana, Adoni, Frame works for ICT Policy Government, Social and Legal Issues. Information Science Reference, Harsey, New YORK.
8. Robert C. Newman ,Computer Forensics: Evidence Collection and Management Auerbach Publications.
9. Eoghan Casey , Handbook of Computer Crime Investigation: Forensic Tools and Technology Academic Press
10. Clark, Franklin, and Diliberto, Ken, (1996). Investigating computer Crime, CRC Press, Boca Raton, Florida, USA

Three year UG Course in Forensic Science
Semester – ILS/ FSC/GE-101P
Generic Elective -1 Practical
Practicals based on Crime Scene Investigation

1. Sketching and Photography of Crime scene.
2. Searching and collection of physical evidence at crime scene.
3. Recording and Identification of Fingerprints.
4. Development of latent finger print on glass, paper, polished surface.
5. Examination of Erasures on Questioned document
6. Comparison of Handwriting and Signatures.
7. Imaging of hard disc, restoration of deleted file.
8. Password cracking and e-mail tracking.

Three year UG Course in Forensic Science
Semester – ILS/FSC/GE-101L
Generic Elective-1
Elementary Forensic Science

Unit I: Elementary Forensic Science

Forensic Science and its branches, Principles of Forensic Science; Scene of Crime – Types, Sketching and Searching methods, Chain of custody; Collection, packing and forwarding of Physical evidences; Forensic Experts; Introduction to IPC, IEA, CrPC.

Unit II: Criminology and Police Science

Crime and Criminal, Criminology and Penology; Classification of Offences under IPC; Police Science and Organizational structure of Police; State Armed Force (SAF), Home Guard, Research and Analysis Wing (RAW), CID, CBI, BPR&D and Interpol.

Unit III: Finger Prints and Questioned Documents

Questioned Documents: Definition, Classification Types, Principles of Hand writing Identification and its Characteristics Fingerprints: History, Classification, Development, Pattern, Types and characteristics for personal identification.

Unit IV: Cyber Forensics

Cyber Forensic, Cyberspace, Computer crime, LAN,WAN, MAN, IT ACT 2000, OSI Model, Basic principle of security, Active attack, Passive attack, Basic of Forensic Speaker Identification, Hacking and Types of Hackers, Basic of Cryptography and Stegnography.

Recommended Books:

1. Hilton; O. Scientific Examination of Questioned Documents, Elsevier, NY.
2. Albert S. Osborn; Questioned Documents, 2nd Ed., Universal Law Pub., Delhi.
3. Wilson R. Harrison; Suspect Documents Their Scientific Examination.
4. Saferestein, Criminalistics: An Introduction to Forensic Science. Prentice, Hall.
5. Sharma, B.R.: Forensic Science in Criminal Investigation and Trials, Central Law Agency, Allahabad, 1974.
6. Relevant sections of Information technology Act 2000.

6. Vincent J. M. Di Maio, Suzanna E. Dana Handbook of forensic pathology CRC/Taylor & Francis.

7. Krogman, W.M. And Iscan, M. (1987): Human Skeleton in Forensic Medicine Charles & Thomas, U.S.A.

8. Nath,S An Introduction to Forensic Anthropology.Gian Publishing House, New Delhi.

9. A Seigel, P.J Saukoo and G C Knupfer; Encyclopedia of Forensic Sciences Vol. I, II and III, Acad. Press (2000)

10. Beals, R.L. and Hoizer, H. (1985): An introduction to Anthropology, Macmillan, New Delhi.

11. Saferstein, Richard, Handbook of Forensic Science, Vol. I, II, (Ed.) Prentice Hall, Eaglewood Cliffs, NJ.

12. William Goodwin, Adrian Linacre, SibteHadi; An introduction to forensic genetics John Wiley &son's ltd, UK.

13. John M. Butler. Forensic DNA Typing, Second Edition: Biology, Technology, and Genetics of STR Markers Elsevier Academic Press.

14. Siegel, J.A., Saukko, P.J., Knupfer, G. C., Encyclopedia of Forensic Science, Academic Press, London, 2000.

15. Evett, I.W. & Weir, B.S. 1998 Interpreting DNA Evidence: Statistical Genetics for Forensic Scientists. Sunderland Mass: Sinauer.

Three year UG Course in Forensic Science
Semester – IV LS/ FSC/GE-404 P
Generic Elective -4 Practical
Practicals based on Advanced Forensic Science

1. Identification of pollen grains
2. Identification of Pug marks of animals
3. Determination of sex from Skull Sutures & Pelvis
4. Determination of age from teeth & Skull
5. DNA extraction of conventional method
6. DNA typing by PCR

B.Sc IIIrd Semester

LS/FSC/SEC/301-L

Skill Enhancement Course (SEC-1)

Introduction to Biometrics

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

a. The fundamental principles on which the science of fingerprinting is based.
b. Fingerprints are the most infallible means of identification.
c. The world's first fingerprint bureau was established in India.
d. Biometrics uses in different aspects.
e. Different types of Biometric parameters

Unit 1: Definition of Biometrics, Features and function of biometric system, working of biometrics, Classification of biometric systems – physical and behavioral. Strength and weakness of physical and behavioral biometrics.

Unit 2: Physical Biometrics: Fingerprints, Iris, Retina, Facial recognition, Hand geometry, DNA.

Unit 3: Behavioral Biometrics: Speaker recognition, Signature, Gait biometrics.

Unit 4: Biometric parameters: FM, FNM, FTC, FTE, FAR, FRR, EER, ROC, DET; Emerging Biometric Technologies.

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).

B.Sc IVth Semester

LS/FSC/SEC/402-L

Skill Enhancement Course (SEC-2)

Handwriting Identification and Recognition

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..

Unit 1: Handwriting Identification

Basis of handwriting identification. Characteristics of handwriting – scope and application. Class and individual characteristics. Arrangement, alignment, margin, slant, speed, pressure, spacing, line quality, embellishments, movement and pen lifts. Factors influencing handwriting – physical, mechanical, genetic and physiological.

Unit 2: Handwriting Examination

Basis of handwriting comparison. Collection of handwriting samples. Forgery detection. Counterfeiting. Examination of altered and erased documents. Tools used in handwriting examination.

Unit 3: Handwriting Recognition

Basis of handwriting recognition. Off-line and on-line handwriting recognition. Steps involved in handwriting recognition – pre-processing, feature extraction and classification. Applications of handwriting recognition.

Unit 4: Basic tools for examination of Documents

Application of Basic tools for the examination of Questioned document, 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. Albert S. Osborn; Questioned Documents, 2nd Ed., Universal Law Pub., Delhi.

4. Wilson R. Harrison; Suspect Documents Their Scientific Examination.

5. Saferestein, Criminalistics: An Introduction to Forensic Science. Prentice, Hall.

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