



BANGALORE UNIVERSITY

Syllabus for

B.Sc. Forensic Science (UG)

CHOICE BASED CREDIT SYSTEM (CBCS)

Framed According to the National Educational Policy (NEP 2020)

I – II SEMESTERS

To implement from the academic year 2021-22

Syllabus for B.Sc., Hons. in Forensic Science

Name of the Degree Program: **B. Sc., Hons.**
Discipline Core: **Forensic Science**
Total Credits for the Program: **52/102/147/187**
Starting year of implementation: **2021-22**

Progressive Certificate, Diploma, Bachelor Degree or Bachelor Degree with Honours Provided at the End of Each Year of Exit of the Four-year Undergraduate Programme/ Five-year Integrated Master's Degree Programme

Introduction

The NEP-2020 offers an opportunity to effect paradigm shift from a teacher-centric to student-centric higher education system in India. It aims to increase the focus on strengthen training, and reform the existing exam system, and also helps in restructuring regulatory framework of education. It caters skill based education where the graduate attributes are first kept in mind to design programs/ courses and supplementary activities to attain the graduate attributes and learning attributes. The learning outcomes-based curriculum framework for a degree in B.Sc. (Honours) forensic sciences intended to provide a comprehensive foundation to the subject and to help students to develop ability which leads to further studies and research in the subject. Effort has been made to integrate use of recent technology and use of MOOCs to assist teaching-learning process among students. The framework is designed to equip students with valuable cognitive abilities and skills to meet diverse needs of professional careers in a developing and knowledge-based society. The curriculum framework takes into account the need to maintain globally competitive standards of achievement in terms of the knowledge and skills in forensic science and allied courses, as well develop scientific orientation, spirit of enquiry problem, solving skills and, professional values which foster rational and critical thinking in the students.

In brief, forensic science, is any kind of science used in the legal or justice system to support and uphold the law. When a crime has been committed and evidence is collected at the scene, scientists analyse it, arrive at scientific results and give expert court testimony about their findings. Forensic science concentrates on facts that prove something did or did not happen in a criminal or civil case.

GRADUATE ATTRIBUTES IN B.Sc. (Hons.) Forensic Science

Some of the characteristic attributes a graduate in Forensic Science should possess are:

- Develop the essential and fundamental skills required to enter the professional world of forensics. Tasks, including DNA analysis and trace evidence examination.
- Skilled communication:
- Critical thinking and problem solving capacity:
- Logical thinking and reasoning:
- Team Spirit & Leadership Quality:
- Digital efficiency:
- Ethical awareness / reasoning:
- National and international perspective:
- Developing scientific knowledge.

Flexibility

- The programs are flexible enough to allow liberty to students in designing them according to their requirements. Students may choose a single Major, one Major or two Majors during third year (5th semester onwards). Teacher Education or Vocational courses may be chosen in place of Minor/s. Below listed are the various options students may choose from.

- One discipline, Two Languages, Generic Electives, Ability Enhancement, Skill Development and Vocational courses including Extracurricular Activities.
- One discipline along with Languages, Generic Electives, Ability Enhancement, Skill Development and Vocational courses including Extracurricular Activities

AIMS AND OBJECTIVES OF UG PROGRAM IN Forensic Science

- Forensic science is a critical element of the criminal justice system.
- Forensic Scientists analyze physical evidence (fingerprints, blood, hair etc.) collected from the incident scene to identify suspects.
- Forensic professionals use image modification tools to search for criminals absconding from the law for a long time.
- The uniform grading system will benefit the students to move across institutions within India to begin with and across countries.
- It will also enable potential employers in assessing the performance of the candidates across the world.

Weightage for assessments

Type of Course	Formative Assessment / IA Marks	Summative Assessment Marks
Theory	30	45
Practical	25	25
Internship	45	105
Experiential Learning (Internships etc.)		

*In lieu of the research Project, two additional elective papers/ Internship may be offered

Credit distribution for the course

Proposed Curriculum Frame Work -4 Years BSc Programme -Forensic Sciences
Proposed CBCS Scheme for the Four Years UG Honours Programme:
B.Sc. (Honours) Forensic Science

Sem	Discipline Specific Core Course	Discipline Specific Elective Course	Open Elective	AECC		SEC Skill based	Value Based	Total Credits
1	1. Introduction to Forensic Science (3+2) 2. Basic Forensic Chemistry (3+2) 3. Criminology (3)	-	Generic Elective from the Bank (3)	English I (3) Language I (3)		Digital Fluency (2)	1. Physical Education (Yoga) (1) 2. Health and Wellness(1)	26
2	4. Crime Scene Management (3+2) 5. Basic Forensic Biology (3+2) 6. Criminal Law (3)	-	Generic Elective from the Bank (3)	English I (3) Language I (3)	Environmental Studies (2)		1. Physical Education (Sports) (1) 2. NCC/NSS/Cultural (1)	26
Exit option with Certificate (52 credits)								
3	7. Forensic Dermatoglyphics (3+2) 8. Advanced Forensic Chemistry (3+2) 9. Technological Methods in Forensic Science(3+2)	-		1. English I (3) 2. Language I (3)		Artificial Intelligence (2)	1. Physical Education (Sports) (1) 2. NCC/NSS/Cultural (1)	25
4	10. Questioned Documents (3+2) 11. Advanced Forensic Biology (3+2) 12. Forensic Psychology(3+2)	-		3. English I (3) 4. Language I (3)	Constitution of India (2)		2. Physical Education (Sports) (1) 3. NCC/NSS/Cultural (1)	25
Exit option with Diploma in Science (102 credits)								
5	13. Forensic Toxicology (3+2) 14. Forensic Computing and Cyber Crime (3+2) 15. Forensic Physics (3+2)	1. Economic Offences/ Arson and Explosives (3)	-	-	-	Cyber Security (2)	1. Physical Education (Sports) (1) 2. NCC/NSS/Cultural (1)	22
6	16. Forensic Serology (3+2) 17. Digital Forensics (3+2) 18. Forensic Ballistics (3+2) Internship (2)	2. Forensic Engineering/Narcotic Drugs and Psychotropic Substances (3)	-	-	-	Professional Communication (2)	1. Physical Education (Sports) (1) 2. NCC/NSS/Cultural (1)	23
Exit option with Bachelor of Science Degree in Forensic science (147 credits)								
7	19. Forensic Psychology (3+2) 20. Forensic Anthropology (3+2)	1. Forensic Audio video and Speaker Identification/ Wildlife Forensics and Forensic Entomology (3+2) 2. Research Methodology (3)	1. Entrepreneurship in Forensic Science (3)	-	-	-	-	21
8	21. Forensic Medicine (3+2)	1. DNA Profiling/ Mobile and Cloud Forensics (3+2) 2. Research Project (6)	1. Forensic Accounting and Fraud Examination (3)	-	-	-	-	19
Award of Bachelor of Science Honors Degree, B.Sc.(Hons.) Degree in Forensic Science (187 credits)								

	SPECIALIZATIONS	Forensic Chemistry and Toxicology	Forensic Biology and Serology	Forensic Physics	Forensic Ballistics	Questioned Documents & Fingerprints	Digital Forensics		Credits
9 (M.Sc.)	Theory Paper (4) Practical Paper (2) + Open Elective Paper (4)	<ol style="list-style-type: none"> 1. Analysis of Essential Commodities, Fire, Arson and Explosives 2. Pharmacology of Poisons 3. Forensic Analysis of Drugs 4. Instrumentation in Forensic Chemistry and Toxicology 5. Analysis of Essential Commodities, Fire, Arson and Explosives Practical 6. Pharmacology of Poisons Practical 7. Forensic Analysis of Drugs Practical 	<ol style="list-style-type: none"> 1. Forensic Genetics 2. Extraction of DNA from Samples 3. Advanced Forensic DNA Profiling 4. Forensic Bioinformatics 5. Forensic Genetics Practical 6. Extraction of DNA from Samples Practical 7. Forensic DNA Profiling Practical 	<ol style="list-style-type: none"> 1. Advanced Forensic Voice Authentication 2. Advanced Forensic Video Analysis 3. Criminalistics and Forensic Engineering 4. Pattern and Impression evidence 5. Forensic Audio Analysis Practical 6. Forensic Video Analysis Practical 7. Criminalistics and Forensic Engineering Practical 	<ol style="list-style-type: none"> 1. Identification of Firearms, and ammunition, Range of Firing & Chemical Tests 2. Internal, External Ballistics & Gun-shot Residue 3. Wound Ballistics, Reconstruction & Report Writing 4. Instrumentation in Forensic Ballistics 5. Applications of Instrumentation Techniques in Forensic Ballistics 6. Identification of Firearms, Range of Firing, Chemical Tests Practical 7. Documentation of Crime Scene involving Firearm, handling of Evidentiary Clues Practical 	<ol style="list-style-type: none"> 1. Handwriting and Signature Analysis 2. Fingerprint Development and Comparison 3. Electronically Printed and Security Documents 4. Bank Frauds 5. Handwriting and Signature Analysis Practical 6. Fingerprint Development and Comparison Practical 7. Electronically Printed and Security Documents Practical 	<ol style="list-style-type: none"> 1. Advanced Digital Forensics 2. Network Forensics 3. Mobile and Wireless Device Forensics 4. Social Media Forensics and Cryptography 5. Advanced Digital Forensics Practical 6. Network Forensics Practical 7. Mobile and Wireless Device Forensics Practical 		26
10	Research Writing (5) Dissertation (20) Internship (5)								30

Semester I- Forensic Science
Core Course I Content:
INTRODUCTION TO FORENSIC SCIENCE

Credits: 3

Hours: 45

Semester: I Semester, B. Sc., (Hons) Forensic Science

Course Title: Introduction to Forensic Science	Course Code: FS-101
Course Type: Discipline Core Theory, L-T-P: 3-0-0	Course Credits: 3
Total Contact Hours: 45	Duration of ESA: 3 Hrs.
Formative Assessment Marks: 30	Summative Assessment Marks: 45

Course Outcomes (COs):

At the end of the course the student should be able to:

1. Learn the basic concepts of forensic science
2. To Study of history of forensic science
3. To understand the organization of forensic laboratory
4. To acquire knowledge on agencies involved in crime detection and investigation.

Semester I- Forensic Science
Core Course I Content:
INTRODUCTION TO FORENSIC SCIENCE

Credits: 3

Hours: 45

Unit 1: Concepts in forensic science

15 hours

Definition of forensic science; scope and need of forensic science; Functions of Forensic Science; Evidence; classification of evidence: according to Indian Evidence Act, based on nature of evidence, class and individual evidence; Principles of forensic science; Frye Rule; Daubert Standards; Terminologies in forensic science: First responder, chain of custody, mahazaar; Code of conduct for forensic scientists; Qualifications of forensic scientists; Duties of forensic scientists; Data depiction; Report writing. Ethics in Forensic Science.

Unit 2: History of Forensic Science

10 hours

Pioneers in Forensic Sciences: History and development of branches of forensic science: forensic biology, forensic chemistry and toxicology, forensic anthropology, fingerprints, questioned document examination, forensic ballistics, digital and cyber forensics, forensic audio analysis, forensic psychology; Contribution of Sir Edgar Hoover through the FBI.

Unit 3: Organization of Forensic Science Laboratory

10 hours

Forensic Science Laboratories in India: history, development and hierarchical set up; Directorate of Forensic Science Services, Central, State and Regional Forensic Science Laboratories; Mobile Crime Laboratories; Branches of Forensic Science Laboratories (definition and functions): Forensic Biology, DNA, Forensic Chemistry, Forensic Toxicology, Narcotics Unit, Forensic Physics, Forensic Ballistics, Forensic Psychology, Questioned Documents, Computer Forensics, Forensic Audio Analysis.

Unit 4: Agencies involved in crime detection and investigation**10 hours**

Functions and hierarchical set up of Law enforcement agencies: civil police, reserve police; Government Examiners of Questioned Documents; Fingerprint Bureaus; National Crime Records Bureau; Police & Detective Training Schools; Bureau of Police Research & Development; National and State Police Academies,; Police Training Schools/Colleges, Dog Squad, Bomb Detection and Defusal Squad; RAW, CBI, INTERPOL and FBI.

Books for Reference

- Brenner, J. C. (2004). *Forensic Science: an Illustrated Dictionary*. CRC Press.
- Eckert, W. G. (1997). *Introduction to Forensic Sciences (2nd Edition)*. CRC Press.
- James, S. H., Nordby, J. J., Bell, S. (2014). *Forensic Science: An Introduction to Scientific and Investigative Techniques (4th Edition)*. CRC Press.
- Nabar, B. (2017). *Forensic Science in Crime Investigation*. Asia Law House.
- S Nath, R. C. (2013). *Forensic Science and Crime Investigation*: Abhijeet Publications.
- Saferstein, R. (2017). *Criminalistics: An Introduction to Forensic Science*. Pearson.
- Sharma, B. R. (2019). *Forensic Science in Criminal Investigation & Trails*. Universal Law Publishing Company.
- Yount, L. (2006). *Forensic Science: From Fibers to Fingerprints (Milestones in Discovery and Invention)*. Chelsea House publications.

Pedagogy: Written Assignment/Presentation/Project / Term Papers/Seminar

Formative Assessment	
Assessment Occasion	Weightage in
House Examination/Test	15
Written Assignment/Presentation/Project / Term	10
Class performance/Participation	05
Total	30

Semester I- Forensic Science

Core Course I Content:

INTRODUCTION TO FORENSIC SCIENCE

Credits: 02

Hours: 60

Course Title: Forensic Science Lab	Course Credits: 02
Course Type: Core Practical, L-T-P: 0-0-4	Course Code: FS-104
Total Contact Hours: 60	Duration of ESA: 4 Hours
Formative Assessment Marks: 25	Summative Assessment Marks: 25
Model Syllabus Authors:	

Course Outcomes (COs):

At the end of the course the student should be able to:

1. Understand crime cases and their components
2. Learn the preparation of crime reports
3. Acquire knowledge on fingerprint evidences
4. To Know hierarchical set up of different forensic science establishments
5. To understand code of conduct prescribed by different establishments for forensic scientists

Semester I- Forensic Science

Core Course I Content:

INTRODUCTION TO FORENSIC SCIENCE PRACTICAL

Lab course content

Credits: 02

Hours: 60

1. Identifying and classifying evidence from a given case study.
2. Using the principle of probability on a case study with respect to one evidence
3. Tracing the use of forensic science from any one of the following:
 - a. Aarushi Talwar Case
 - b. Nirbhaya
4. Tracing the use of forensic science from any one of the following:
 - a. Ted Bundy
 - b. The Lindberg Kidnapping
5. Analysis of Daubert vs Merrell Dow Pharmaceuticals case study
6. Identifying evidence and relating the branch of forensic science that it should be sent to from a case study.
7. Writing a forensic report on a crime case from a case study.
8. Using a case study identify the agencies that need to be involved in the process of investigation with proper justification.
9. Examine the latest report of NCRB and study the data pertaining to murder cases in India using digital pie charts and graphs for depiction.
10. Understanding the hierarchical set up of different forensic science establishments and suggest improvements.

Pedagogy: Written Assignment/Presentation/Project / Term Papers/Seminar

Formative Assessment	
Assessment Occasion	Weightage in
House Examination/Test	05
Written Assignment/Presentation/Project /Term papers/Seminar	05
Viva on Project/Seminar/Assignments	05
Practical Record(s)	05
Class performance/Participation	05
Total	25

Semester I- Forensic Science
Core Course I Content:
BASIC FORENSIC CHEMISTRY

Course Title: Basic Forensic chemistry	Course Code: FS-102
Course Type: Discipline Core Theory, L-T-P: 3-0-0	Course Credits: 3
Total Contact Hours: 45	Duration of ESA: 3 Hrs.
Formative Assessment Marks: 30	Summative Assessment Marks: 45

Course Outcomes (COs):

At the end of the course the student should be able to:

1. Learn the basic concepts of chemistry
2. Study of periodic Table-Columns (groups) and rows (periods)
3. To understand the essential of chemistry for forensics.
4. Enhancement of research skills like critical thinking.

Semester I- Forensic Science
Core Course I Content:

BASIC FORENSIC CHEMISTRY

Credits: 3

Hours: 45

Unit 1: Concepts of Chemistry

15 hours

Matter; States of matter; Concept of atom, molecule, element and compound. Chemical compound formation, chemical bonding, ionic bonding; Covalent bonding; general characteristics, sigma and pi bonds, bond length, bond order, formal charge; Hydrogen bond (theories of hydrogen bonding, valence bond treatment); Metallic bond;. Molecular mass, mole concept, equivalent weight, normality, molality, percentage composition; Density; pH and buffers; Serial dilutions.

Unit 2: Inorganic Chemistry

12 hours

Periodic table; Chemistry of s, p, d, block elements: introduction, properties. Chemical properties of Noble gases, chemistry lanthanides and actinides. Thermochemistry: Enthalpy, Entropy, Internal Energy, Bond Energy and Kinetics; Simple chemical reactions, zero order, first order, second order, and pseudo-order reaction, Half-life and mean life. General characteristics of Isotopes, and its types & Property. Definitions of Isotones & Isobars. Corrosive acids and bases.

Unit 3: Organic Chemistry

8 hours

Tetravalency of Carbon; Hybridization molecules; Classification & nomenclature of organic compounds; Isomerism; Organic reactions; Hydrocarbons; Organic compounds containing halogens, oxygen and nitrogen; Polymers.

Unit 4: Basic Analytical Chemistry in Forensic Science

10 hours

Introduction to quantitative and qualitative analysis. Introduction to separation techniques: solvent extraction, solid phase extraction, ion exchange separation, crystallization and precipitation; titrimetric

analysis: classification, neutralization, oxidation and reduction, complexation; gravimetric analysis: electrogravimetry, coulometry. Distillation and Fractional Distillation.

Books for reference:

Bahl, B. S., Bahl, A. (2017). *A textbook of organic chemistry*. S. Chand Publishing.

Glasstone, S. (2007). *Thermodynamics For Chemists*. Narahari Press.

Khopkar, S. M. (2008). *Basic concepts of analytical chemistry*. New Age International.

Lee, J. D. (2008). *Concise inorganic chemistry*. John Wiley & Sons. Chapman and Hall.

Prof. Radha Raman Gupta, D. M. (1997). *Heterocyclic Chemistry: Volume II*. Springer-Verlag Berlin Heidelberg.

Rosenberg, R. M. (1977). *Principles of physical chemistry*. Oxford and IBH Publishing.

Sherwood, D., Dalby, P. (2018). *Modern thermodynamics for chemists and biochemists*. Oxford University Press.

Skoog, D. A., Holler, F. J., & Crouch, S. R. (2017). *Principles of instrumental analysis*. Cengage learning.

Vogel, A. I., & Jeffery, G. H. (2009). *Vogel's textbook of quantitative chemical analysis*. Wiley.

Pedagogy: Written Assignment/Presentation/Project / Term Papers/Seminar

Formative Assessment	
Assessment Occasion	Weightage in
House Examination/Test	15
Written Assignment/Presentation/Project / Term	10
Class performance/Participation	05
Total	30

Semester I- Forensic Science
Core Course I Content:
BASIC FORENSIC CHEMISTRY PRACTICAL

Credits: 2

Hours: 60

Course Title: Basic Forensic Chemistry Lab	Course Credits: 02
Course Type: Core Practical, L-T-P: 0-0-4	Course Code: FS-105
Total Contact Hours: 60	Duration of ESA: 4 Hours
Formative Assessment Marks: 25	Summative Assessment Marks: 25
Model Syllabus Authors:	

At the end of the course the student should be able to:

1. Understand basics of principles of liquids and solids
2. Learn the preparation of standard solutions
3. Acquire knowledge on titrimetric analysis
4. To Know adulteration of different essential compounds.
5. Enhancement of basic laboratory skill like keen observation and analysis

Course Outcomes (COs):

Lab Course Content

Credits: 2

Hours: 60

List of experiments to be conducted

1. Determination of boiling point of given liquid
2. Preparation of the Normal, Molar and Standard & buffer solutions.
3. Determine the density of alcohol by using pycnometer.
4. Separation of components of sample by liquid-liquid extraction.
5. Examination of various anions and cations.
6. Examination of corrosive chemicals in crime exhibits of acid/alkali in vitriolage cases.
7. To separate the dyes and inks/plant pigments.
8. Preliminary test for explosives by color test.
9. Examination of phenolphthalein in Trap Cases
10. Testing purity of water samples.
11. Determination of pH of a solution using pH meter.
12. To perform distillation of Organic Solvent.

Pedagogy: Written Assignment/Presentation/Project / Term Papers/Seminar

Formative Assessment	
Assessment Occasion	Weightage in
House Examination/Test	05
Written Assignment/Presentation/Project /Term papers/Seminar	05
Viva on Project/Seminar/Assignments	05
Practical Record(s)	05
Class performance/Participation	05
Total	25

**Semester I- Forensic Science
Core Course I Content:
CRIMINOLOGY**

Credits: 3

Hours: 45

Course Title/Code: CRIMINOLOGY	Course Credits: 3
Course Code: FS-103	L-T-P per week: 3-0-0
Total Contact Hours: 45	Duration of ESA: 3 Hours
Formative Assessment Marks: 30	Summative Assessment Marks: 45
Model Syllabus Authors:	

Core Course prerequisite: To study Forensic Science in undergraduate, student must have studied Physics/Chemistry/Biology or equivalent subject in Class 12.

Course Outcomes (COs):

At the end of the course the student should be able to understand:

1. The basic concepts of criminology.
2. The causes and types of crime and criminals.
3. Historical development of Indian Prisons.
4. Historical Development of Victimology
5. Crime victim - Victim genesis.

**Semester I- Forensic Science
Core Course I Content:
CRIMINOLOGY**

Credits: 3

Hours: 45

Unit 1: Concepts of Criminology

15 hours

Crime: definition, characteristics of crime, elements of crime, and crime triangle;

Criminology – definitions, historical perspectives, nature, origin, and scope.

Theories of Criminology: Pre-Classical, Classical, Neo-Classical, Positivist, Biological, Social Learning Theory, Differential Association theory, Labelling Theory, Containment theory and Routine Activity Theory

Unit 2: Causes and Types of Crime and Criminals

10 hours

Causes of crime: Social, Economic, Political and Psychological; Social Problems and crime: Juvenile Delinquency, Prostitution, Dowry, drug abuse, and child labour.

Types of Crime: Crimes against persons, violent crimes, sexual offences, crimes against property, cyber-crime, hate crimes and public disorder, emerging crimes.

Types of Criminals: Habitual, Professional and White-Collar criminals.

Unit 3: Penology

10 hours

Historical Development of Penology and definitions of punishment, Concepts of correctional administration and types of punishments, Theories of punishment: Retributive, Prevention, Deterrence and Reformative.

Prisons: Historical development of Indian Prisons, Correctional Administration: Classification of Prisons and Prisoners, Non-Institutional Programmes- Probation, Parole, and After-Care. Unusual Problems in Correctional Institutions.

Unit 4: Victimology

10 hours

Introduction to victimology: Meaning of victimology, Historical Development of Victimology; Victim and Victimization: Concept, Nature and Related Issues.

Key Concepts in Victimology: Victim - Crime victim - Victim genesis -Victim Precipitation- General Victim- Victimization Proneness, Victim Responsiveness.

Victim Psychology, Psychodynamics of Victimization- Primary Victimization, Secondary Victimization, Tertiary Victimization, Victim Vulnerability and Victimless Crimes.

Books for Reference

Brown, S. E., Esbensen, F. A., Geis, G. (2015). *Criminology: explaining crime and its context [8th Edition]*. Elsevier Science;Routledge.

Clevenger, S., Higgins, G. E., Marcum, C. D., Navarro, J. N. (2020). *Understanding Victimology : an Active-Learning Approach*. Taylor and Francis.

Doerner, W. and Lab, S. (2012). *Victimology*. Amsterdam: Elsevier.

EI-Dakkak, P. D. (2014). *Criminology and penology*. Abu Dhabi: The Judicial Department.

Gillin, J. L. *Criminology and Penology- Volume 1*.

Lab, S. P. (2016). *Crime Prevention: Approaches, Practices, and Evaluations*. Routledge.

Pamela Davies, P. F. (2007). *Victims, crime and society*. SAGE.

Paranjepe, N.V. (2016). *Criminology and Penology*. Central Law Publications, Allahabad.

Shahidullah, S. M. (2017). *Crime, Criminal Justice, and the Evolving Science of Criminology in South Asia: India, Pakistan, and Bangladesh*. Palgrave Macmillan UK.

Thilagaraj, R. (2013). Criminal Justice System in India. In J. Liu, B. Heberton, S. Jou, *Handbook of Asian Criminology* (pp. 199-211). New York: Springer-Verlag.

Turvey, B. E. (2014). *Forensic Victimology: Examining Violent Crime Victims in Investigative and Legal Contexts*. Elsevier, Turvey and Furguson.

Williams, K. S. (2012). *Textbook on criminology*. Oxford University Press, USA.

Pedagogy: Written Assignment/Presentation/Project / Term Papers/Seminar

Formative Assessment	
Assessment Occasion	Weightage in
House Examination/Test	15
Written Assignment/Presentation/Project / Term	10
Class performance/Participation	05
Total	30

**Semester II- Forensic Science
Core Course I Content:
CRIME SCENE MANAGEMENT**

Credits: 3

Hours: 45

Semester: II Semester, B. Sc., (Hons) Forensic Science

Course Title: Crime Scene Management	Course Code: FS-201
Course Type: Discipline Core Theory, L-T-P: 3-0-0	Course Credits: 3
Total Contact Hours: 45	Duration of ESA: 3 Hrs.
Formative Assessment Marks: 30	Summative Assessment Marks: 45

Course Outcomes (COs):

At the end of the course the student should be able to:

1. Learn the basic concepts of crime scene
2. To Study of types of evidences found in crime scenes
3. To understand the safety considerations while handling evidences
4. To acquire knowledge on agencies involved in crime detection and investigation.

**Semester II- Forensic Science
Core Course I Content:
CRIME SCENE MANAGEMENT**

Credits: 3

Hours: 45

Unit 1: Introduction to Crime Scene

15 hours

Crime scene: Definition; Types of crime scenes: Primary, Secondary, Indoor, Outdoor, based on manner of crime: homicide, suicide, accidental; Actions of first responding officer: emergency care, secure and control, Statements of victim, witness, suspects, databases and records, officer safety, release scene to appropriate authorities.

Types of evidence found in the crime scene: physical evidence, biological evidence, digital evidence, individual evidence, class evidence. The evaluation of 5Ws (who?, what?, when?, where?, why?) and 1H (how).

Role of different agencies involved in crime scene management: Police, Forensic Science Laboratories, Medico legal experts, Judicial officers.

Unit 2: Crime Scene Investigation

10 hours

Securing the crime scene; Evaluating the crime scene; Preliminary walk-through and documentation of the crime scene; Search and seizure of the crime scene Crime scene search patterns: strip method, grid method, zone/quadrant method, spiral method (inward and outward), wheel, and random; Documenting the crime scene: Photography of the crime scene: Wide range, mid-range and close up photography; Sketching: Rough and final sketch (Triangulation, Baseline, and polar coordinate methods), Videography, 3D Crime Scene Mapping, contemporaneous notes. Identifying and listing evidence along with their evidentiary value.

Unit 3: Collection and preservation of evidence**10 hours**

Collection and preservation of evidence along with control samples and standards: blood, urine, saliva, semen, tissue, hair, soil, paint, glass, bullet, cartridge case, clothing, weapons (knife, firearm), documents, drugs, fingerprints, tool marks, explosive material, bite marks; General safety considerations while handling evidence in the crime scene; Forwarding evidence to the Forensic Science Laboratory; Chain of custody.

Unit 4: Special Crime Scenes and Crime Scene Reconstruction**10 hours**

Arson, mass disasters, road traffic accidents, wildlife crime scene: their scene management and evidence collection for identification; Crime scene reconstruction: Introduction, importance, nature; Principles; Stages: data collection, conjecture, hypothesis formulation, testing, theory formation. Crime Scene Investigation Kit, Alternate Light Source, ABFO Scales, Placards, Finger Print Detection kit, Barricading Equipments, Evidence Tags, Sniffer Dogs, Packaging Equipments. ESDA, GPR (Ground Penetrating Radar), RUVIS HAZMAT Suits, Personal Protective Equipments. Product Safety Equipments.

Books for Reference

- Cooper, J. E., Cooper, M. E. (2013). *Wildlife forensic investigation: principles and practice*. CRC Press.
- Everett, J. B. (2015). *Complete Crime Scene Investigation Handbook*. CRC Press.
- Fisher, B. A., Fisher, D. (2012). *Techniques of Crime Scene Investigation, (8th Edition)*. CRC Press.
- Huffman, J. E., Wallace, J. R. (2012). *Wildlife forensics: methods and applications (Vol. 6)*. Wiley-Blackwell.
- James, S. H., Nordby, J. J., Bell, S. (2014). *Forensic Science: An Introduction to Scientific and Investigative Techniques (4th Edition)*. CRC Press.
- Linacre, A. (2009). *Forensic Science in Wildlife Investigations*. Taylor & Francis.
- Robert R. Ogle, S. L. (2017). *Crime Scene Investigation and Reconstruction*. Pearson.
- Shaler, R. C. (2011). *Crime Scene Forensics: A Scientific Method Approach*. CRC Press.
- Tom Bevel, R. M. (2012). *Bloodstain Pattern Analysis with an Introduction to Crime Scene Reconstruction*. CRC Press.
- Turvey, B. E. (2011). *Criminal Profiling, Fourth Edition: An Introduction to Behavioural Evidence Analysis*. Academic Press.
- Turvey, B. E. (2014). *Forensic Victimology. Examining Violent Crime Victims in Investigative and Legal Contexts*. Elsevier.

Pedagogy: Written Assignment/Presentation/Project / Term Papers/Seminar

Formative Assessment	
Assessment Occasion	Weightage in
House Examination/Test	15
Written Assignment/Presentation/Project / Term	10
Class performance/Participation	05
Total	30

Semester II- Forensic Science
Core Course I Content:
CRIME SCENE MANAGEMENT PRACTICAL

Credits: 02

Hours: 60

Course Title: Crime Scene Management Practical	Course Credits: 02
Course Type: Core Practical, L-T-P: 0-0-4	Course Code: FS-204
Total Contact Hours: 60	Duration of ESA: 4 Hours
Formative Assessment Marks: 25	Summative Assessment Marks: 25
Model Syllabus Authors:	

Course Objective:

To ensure students understand the techniques of securing and searching the scene of crime and collection and preservation of evidence.

Course Outcomes:

After completing this course, the student will be able to:

- demonstrate the techniques of securing and searching of indoor and outdoor crime scenes
- sketch crime scenes using baseline and triangulation techniques
- use the best technique for the collection and preservation of evidence from the scene of crime
- predict the series of events of a simulated crime by performing crime scene reconstruction

Semester II- Forensic Science
Core Course I Content:
CRIME SCENE MANAGEMENT PRACTICAL

Credits: 02

Hours: 60

1. Securing and evaluating indoor and outdoor scene of crime.
2. Searching indoor scene of crime using spiral technique and listing evidence.
3. Searching outdoor scene of crime using grid search technique
4. Photographing scene of crime with at least five evidence.
5. Sketching of indoor crime scene using base line method.
6. Sketching of outdoor crime scene using triangulation method.
7. Making contemporaneous notes while investigating a scene of crime.
8. Collection, preservation, sealing and forwarding of soil sample from crime scene.
9. Collection, preservation, sealing and forwarding of blood sample from crime scene.
10. Crime scene reconstruction of a simulated scene of murder/burglary.

Pedagogy: Written Assignment/Presentation/Project / Term Papers/Seminar

Formative Assessment	
Assessment Occasion	Weightage in Marks
House Examination/Test	05
Written Assignment/Presentation/Project /Term papers/Seminar	05
Viva on Project/Seminar/Assignments	05
Practical Record(s)	05
Class performance/Participation	05
Total	25

**Semester II- Forensic Science
Core Course I Content:
BASIC FORENSIC BIOLOGY**

Credits: 3

Hours: 45

Semester: **I Semester, B. Sc., (Hons) Forensic Science**

Course Title: Basic Forensic Biology	Course Code: FS-202
Course Type: Discipline Core Theory, L-T-P: 3-0-0	Course Credits: 3
Total Contact Hours: 45	Duration of ESA: 3 Hrs.
Formative Assessment Marks: 30	Summative Assessment Marks: 45

Course Outcomes (COs):

At the end of the course the student should be able to:

1. To understand the differences in plant and animal cells.
2. To study the classification of kingdom plantae and kingdom Animalia
3. To be familiar with organs and tissues of human body
4. To learn the basics and essentials of microbiology.
5. To understand the concept of inheritance, chromosomal karyotyping, types of mutations.

**Semester II- Forensic Science
Core Course I Content:
BASIC FORENSIC BIOLOGY**

Credits: 3

Hours: 45

Unit 1: Plant and Animal Biology

10 hours

Cell: Organelles and their Functions, Difference between Eukaryotic and Prokaryotic Cell, Difference between Plant and Animal Cell. Cell Division: Definition, Types, Difference between Somatic and Germinal Cell and Totipotency and Apoptosis. Meiosis and Mitosis.

Plants: Algae, Bryophyta, Pteridophyta and Gymnospermae; Animals: Non-chordates, chordates; Forensic aspects of Botany: Palynology and Limnology; Forensic aspects of entomology; Post Mortem Interval.

Unit 2: Human Biology

15 hours

Elementary tissues of the body: epithelial, muscular; Integumentary System: definition and formation of skin. Layers of skin (overall anatomy), glands associated with skin; Organization of Organs and systems in the human body: Digestive, Circulatory, Respiratory, Excretory, Nervous, Skeletal and Reproductive systems.

Unit 3: Microbiology

10 hours

Microbes; Bacteria: Classification; gram staining; diseases and prevention; Antibiotics; Virus: Classification; diseases and prevention; Fungi: Classification; diseases and prevention; Parasites: Classification; diseases and prevention; Beneficial microbes; Forensic aspects of Microbiology; Biological warfare.

Unit 4: Genetics and Inheritance**10 hours**

Heredity and variation; Mendelian inheritance; Chromosomes and genes; Karyotyping: Banding techniques; DNA and RNA Mt DNA: structure, types, replication and Eukaryotic Gene expression- Central Dogma; Mutations- Polymorphism Significance in Forensic.

Books for Reference

- Agarwal (2018). *Modern textbook of Botany*, Universal Publication.
- Ananthanarayanan (2017). *A textbook of Microbiology*, The Orient Blackswan.
- Gennard, D. (2013). *Forensic entomology: an introduction*. Wiley.
- Gunn, A (2006). *Essentials of Forensic Biology*, Chichester: John Wiley & Sons, Ltd.
- Gunn, A. (2011). *Essential forensic biology*. John Wiley & Sons.
- Pelczar. M, (2001). *Microbiology*, McGraw Hill Education.
- Saferstein, R (2004). *Forensic Science Handbook*; Vol; III; New Jersey; Prentice Hall.
- Talwar. G. P (2002). *Textbook of Biochemistry and Human Biology*, Prentice Hall India Learning Private Limited.
- Verma. P. S (2004). *Cell Biology Genetics Molecular Biology Evolution and Ecology*, S Chand.

Pedagogy: Written Assignment/Presentation/Project / Term Papers/Seminar

Formative Assessment	
Assessment Occasion	Weightage in
House Examination/Test	15
Written Assignment/Presentation/Project / Term	10
Class performance/Participation	05
Total	30

Semester II- Forensic Science
Core Course I Content:
BASIC FORENSIC BIOLOGY PRACTICAL

Credits: 2

Hours: 60

Course Title: Basic Forensic Biology Practical	Course Credits:2
Course Code: FS-205	L-T-P per week: 0-0-4
Total Contact Hours: 60	Duration of ESA: 4 Hours
Formative Assessment Marks: 25	Summative Assessment Marks: 25

At the end of the course the student should be able to:

1. To use simple and compound microscopes.
2. To prepare stained slides to observe the plant and animal cells.
3. To be familiar with the microbes and bacteria culture
4. To learn epithelial cells.
5. To familiarize the basic components of blood.

Course Outcomes (COs):

BASIC FORENSIC BIOLOGY PRACTICAL
Lab Course Content

List of experiments to be conducted

Credits: 2

Hours: 60

1. Microscopic examination of a Plant cell.
2. Microscopic examination of an Animal cell.
3. Examination of plant pollen.
4. Examination of bacteria using culture media.
5. Gram staining on various cultures.
6. Mounting and microscopic examination of human epithelial cell.
7. Mounting and microscopic examination of human hair.
8. Microscopic examination of blood cells.
9. Karyotype analysis using Ideograms.
10. Extraction and Examination of Diatoms.
11. Examination of plant products (flower, seed, bark, leaves).

Pedagogy: Written Assignment/Presentation/Project / Term Papers/Seminar

Formative Assessment	
Assessment Occasion	Weightage in
House Examination/Test	05
Written Assignment/Presentation/Project /Term	05
Viva on Project/Seminar/Assignments	05
Practical Record(s)	05
Class performance/Participation	05
Total	25

Semester II- Forensic Science
Core Course I Content:
CRIMINAL LAW

Credits: 3

Hours: 45

Semester: I Semester, B. Sc., (Hons) Forensic Science

Course Title: Crime law	Course Code: FS-203
Course Type: Discipline Core Theory, L-T-P: 3-0-0	Course Credits: 3
Total Contact Hours: 45	Duration of ESA: 3 Hrs.
Formative Assessment Marks: 30	Summative Assessment Marks: 45

Course Objective: To provide the students with the knowledge of important laws pertaining to forensic science and the criminal justice system

Course Outcomes:

After successful completion of the course, the student will be able to:

- describe the organizations involved in the criminal justice system
- point out the provisions of the Indian Penal Code with respect to the offences
- appraise the provisions of the Code of Criminal Procedure that apply to forensic science
- summarize the provision of the Indian Evidence Act and some minor acts

Semester II- Forensic Science
Core Course I Content:
CRIMINAL LAW

Credits: 3

Hours: 45

Unit 1: Introduction to the Criminal Justice System

08 hours

Criminal Justice System (CJS): Meaning, Purpose and Social Relevance; Legislative Process in Criminal Justice System; Adversarial and Inquisitorial Systems of Criminal Justice System; Co-ordination in CJS; Reforms in CJS (Malimath Committee Report); Fundamental Elements in Judicial Functioning: Due Process, Speedy Trials and Access to Justice; Hierarchy of courts in India; Alternative Dispute Resolution System (ADRS): Arbitration, Mediation and Counselling, LokAdalats, Mahila courts; Restorative Justice

Unit 2: Salient Features of Indian Penal Code

12 hours

Elements of Crime: Actus Reus & Mens Rea; Elements of Criminal liability; Principles of group liability (Section 149, 34, 109, 120B IPC); General Exceptions (A): Excusable defences (Sec. 76-95); General Exceptions (B): Justifiable Defences (Sec. 96-106)
 Offences against Human body: Hurt, Grievous hurt, Culpable Homicide, Murder, Dowry Death, Kidnapping, Abduction, Rape and Acid attack (Sec. 302)
 Offence against property: Theft, Robbery, Dacoity, Cheating and Criminal Breach of Trust
 Criminal Amendment Act, 2013: IPC Sec 354, Sec 326 and Sec 376

Unit 3: Criminal Procedure Code

15 hours

Constitution of Criminal Courts and Functionaries under the Code; Arrest- Meaning and purpose, arrest with/ without a warrant, arrest of a woman, arrest by a private person; Search and Seizure- with/without a warrant and general provisions; F.I.R. and procedure after the recording of the F.I.R; Bail- Concept, Purpose & Constitutional Overtones; Anticipatory bail; Charge- Framing of Charge;

Form and content of charge; Separate charges for distinct offence Trials- Trial before a court of session; of warrant cases; of summons cases; Summary trials; Judgment, Appeal, Reference, Revision and Transfer of cases. Chemical examiner's report. CrPC (1873) - 26, 27, 29, 31, 144, 154-158, 176, 291, 292, 293.

Unit 4: Law of Evidence and Minor Acts

10 hours

Indian Evidence Act: Introduction; Different types of Evidences; Burden of proof; Relevancy and admissibility of facts, admissions and confessions; Relevancy of confessions and dying declarations; Expert opinion: Appreciating expert evidence in court; Expert witness; Cross Examination and Re-examination

of Witnesses, Sections - 32, 45, 46, 47, 57, 58, 60, 73, 114(A) 135, 136, 137, 138, 141.

Protection of Children from Sexual Offences Act (POCSO Act), 2012; Protection of Women from Domestic Violence Act, 2005 and Juvenile Justice (Care and Protection of Children) Act, 2015

Books for Reference

Dhirajlal, R. A. (2020). *The Indian Penal Code*. LexisNexis.

Malimath, D. J. (2003, March). *Committee on Reforms of Criminal Justice System*.

Pillai, P. (2017). *Criminal Law*. LexisNexis.

Pillai, K. (2019). *R.v. kelkar's lectures on criminal procedure including Probation and Juvenile Justice*. EBC Eastern Book Company.

Thilagaraj, R. (2013). *Criminal Justice System in India* in B. H. Jianhong Liu, Handbook of Asian Criminology (pp. 199-211). Springer-Verlag.

Report of the review committee on the recommendations of National Police Commission on Police reforms. (2005, March).

The Code of Criminal Procedure, 1973.

The Indian Evidence Act, 1872.

The Indian Penal Code, 1860.

The Juvenile Justice (Care and Protection of Children) Act, 2015.

The Protection of Children from Sexual Offences Act, 2012.

The Protection of Women from Domestic Violence Act, 2005.

Pedagogy: Written Assignment/Presentation/Project / Term Papers/Seminar

Formative Assessment	
Assessment Occasion	Weightage in
House Examination/Test	15
Written Assignment/Presentation/Project / Term	10
Class performance/Participation	05
Total	30

Course pattern and scheme of examination for B.Sc./ B.Sc. (Hons.) as per NEP (2021-22 onwards)
Subject: FORENSIC SCIENCE

SL No.	Semester	Title of the paper	Teaching hours	Hours / week		Examination Pattern Max. & Min. Marks /Paper						Duration of Exam (hours)		Total Marks / paper	Credits	
				Theory	Practical	Theory			Practical			Theory	Practical		Theory	Practical
						Max.	MIN.	IA	Max.	MIN.	IA					
1	I	CORE subject (Theory + Practical)	45	3	4	45	14	30	25	9	25	3	3	125	3	2
		CORE subject (Only Theory)	45	3	-	45	14	30	-	-	-	3	-	75	3	-
		Open elective	42	3	-	45	14	30	-	-	-	3	-	75	3	-
		AECC	42	3	-	45	14	30	-	-	-	3	-	75	3	-
			28	2	-	30	9	20	-	-	-	2	-	50	2	-
		Skill Enhancement Course	60	-	4	-	-	-	25	9	25	-	3	50	-	2
		Value Added	14	1	-	15	5	10	-	-	-	1	-	25	1	-
2	II	CORE subject (Theory + Practical)	45	3	4	45	14	30	25	9	25	3	3	125	3	2
		CORE subject (Only Theory)	45	3	-	45	14	30	-	-	-	3	-	75	3	-
		Open elective	42	3	-	45	14	30	-	-	-	3	-	75	3	-
		AECC	42	3	-	45	14	30	-	-	-	3	-	75	3	-
			28	2	-	30	9	20	-	-	-	2	-	50	2	-
		Skill Enhancement Course	60	-	4	-	-	-	25	9	25	-	3	50	-	2
		Value Added	14	1	-	15	5	10	-	-	-	1	-	25	1	-

Scheme of Internal Assessment Marks: Theory

Sl. No.	Particulars	IA Marks
1	Attendance	05
2	Internal Tests (Minimum of Two)	15
3	Assignments /Seminar / Case Study / Project work / Reports on - Field visits made for observation and collection of data etc.,	10
	TOTAL Theory IA Marks	30

Scheme of Internal Assessment: Marks Practicals

Sl. No.	Particulars	IA Marks
1	Practical Test	05
2	Submission of Project Report	05
3	Viva-voce on project report	05
4	Active participation in practical classes (Attendance)	05
5	Practical Record(s)	05
	TOTAL Theory IA Marks	25

Blue Print format (Three Credit Course)

Blue Print

Maximum Marks	: 45
Duration	: 2½ hours
Section A	: 5 Questions of 8, each carrying 2 marks (5 x 2 = 10)
Section B	: 3 Questions of 5, each carrying 4 marks (3 x 5 = 15)
Section C	: 2 Questions of 4, each carrying 10 marks (2 x 10 = 20)

Model Question Paper
Crime Scene Management (3 credit)

TIME: 2 1/2 HOURS

MAX. MARKS: 45

SECTION – A (Answer any five questions. Each question carries 2 marks.) [5 x 2 = 10]

1. Define crime scene.
2. State the principle of exchange.
3. Show inward spiral search pattern.
4. What are crime scene logs?
5. What are contemporaneous notes?
6. Define chain of custody.
7. What is a control sample?
8. Define refractive index.

SECTION – B (Answer any three questions. Each question carries 5 marks.) [3 x 5 = 15]

9. Briefly explain the safety measures to be kept at the scene of crime.
10. Write a note on videography of the scene of crime.
11. Explain crime scene reconstruction.
12. Write a short note on glass evidence.
13. Illustrate significance of fibres.

SECTION – C (Answer any two questions. Each question carries 10 marks.) [2 x 10 = 20]

14. Explain the techniques for securing a crime scene.
15. Describe the triangulation method of sketching using an illustration.
16. Discuss the methods to collect and preserve biological evidence.
17. Explain the fracture analysis of glass.

Model Question Paper

Crime Scene Management Practical (2 credit)

TIME: 3 HOURS

MAX. MARKS: 25

SECTION – A (Answer any five questions. Each question carries 2 marks.) [5 x 2 = 10]

1. Performance of practical from the practical list including procedure writing, analysis and results.
15 marks
2. Procedure writing for one practical with principle. **5 marks**
3. Viva Voce **5 marks**

Model Question Paper (Formative Assessment)

House examination Test (should be brought down to 15)

Crime Scene Management (3 credit)

Total Marks: 30

Duration: 75 Minutes

Answer any Six Questions. Each Question carries FIVE marks.

(6 x 5 = 30)

1. Briefly explain the safety measures to be kept at the scene of crime.
2. Write a note on videography of the scene of crime.
3. Explain crime scene reconstruction.
4. Write a short note on glass evidence.
5. Illustrate significance of fibres.
6. Describe forensic gemology.
7. Discuss the importance of paint in hit and run cases.
8. Describe the process of crime scene reconstruction.

Model Question Paper (Formative Assessment)

House examination Test (should be brought down to 5)

Crime Scene Management (2 credit)

Total Marks: 15

Duration: 60 Minutes

1. Performance of any one practical from the list with procedure writing, analysis and results. **10 marks**
2. Procedure writing of any one experiment. **5 marks**