


**Syllabus**  
**For**  
**COURSE-B.SC.**  
**SUBJECT-FORENSIC SCIENCE**  
**(THREE YEARS COURSE)**

**ACADEMIC SESSION – 2017-2020**

  
28/4/17

## Scheme of Examination

### First Year

No. of papers	Name of papers	Max. Marks	Theory	CCE	Minimum pass marks in each theory paper
FS: 101	Introduction to Forensic Science	100	42.5	15	
FS: 102	Crime Investigation		42.5		
FS: 103	Practical	50	-	-	
	Total	150	85	15	

### Second Year

No. of papers	Name of papers	Max. Marks	Theory	CCE	Minimum pass marks in each theory paper
FS: 201	Detective Tools and Techniques	100	42.5	15	
FS: 202	Examination of Physical Evidences and Forensic Ballistics		42.5		
FS: 203	Practical	50	-	-	-
	Total	150	85	15	-

### Third Year

No. of papers	Name of papers	Max. Marks	Theory	CCE	Minimum pass marks in each theory paper
FS: 301	Forensic Medicine and Toxicology	100	42.5	15	
FS: 302	Police, Indian Penal code and Criminal Procedure code		42.5		
FS: 303	Practical	50	-	-	-
FS: 304	Project (1 month)	50	-	-	-
	Total	200	85	15	-

# First Year

## **FS 101: INTRODUCTION TO FORENSIC SCIENCE**

### **Unit-I Basics of Forensic science (12 Lec.)**

1. An overview; History & Development of forensic science in India.
2. Contribution of various scientists in the field of forensic Science.
3. Principles of forensic science
4. Ethical issues in forensic science.
5. Duties of Forensic Scientist

### **Unit-II Domains of Forensic science (14 Lec.)**

1. Introduction to Forensic Biology, Forensic medicine & toxicology
2. Forensic Physics, Forensic chemistry.
3. Forensic Photography & computer forensic.
4. Ballistics, and Fingerprints.

### **Unit-III Crime & Criminal (12 Lec.)**

1. Definition and history of crime
2. Classification of crime and criminals.
3. Sociological aspects of crime and criminals in society.
4. Criminal behavior - Theories and literature studies.

### **Unit-IV Criminology and Law (12 Lec.)**

1. Definition and scope of criminology.
2. Administrative steps towards crime prevention.
3. Different agencies involved in crime detection and prevention.
4. Indian Police System – State & Central level.

### **Unit-V Forensic science laboratories (10 Lec.)**

1. Introduction to State and central forensic science laboratories in India.
2. Organization and set up of forensic science laboratory; structure and functions.
3. Role of Forensic Scientist & Police officers.
4. Role of Judicial Officers and Medico legal expert.



## FS 102: CRIME INVESTIGATION

### Unit-I Crime Scenario in India

(10 Lec.)

1. Definition and classification of crime.
2. Types of crime and its causes – property crimes, public order crimes & violent crimes.
3. Society-Criminal interaction.
4. Present scenario of crimes in India.

### Unit-II Crime Scene management

(14 Lec.)

1. Introduction to crime scene management, duties of crime scene investigator.
2. Classification of crime scene-biological or chemical terrorist crime scene.
3. Processing of scene of crime: plan of action, protection of scene of crime.
4. Documentation of crime scene.

### Unit-III Crime scene investigation

(12 Lec.)

1. Definition and Classification of crime scene.
2. Significance of crime scene, argument and ethics of crime scene.
3. Study of some special crime scene such as mass disaster & terror attack.
4. Linkage between crime scene, victim and criminal.

### Unit-IV Physical evidences and their handling

(14 Lec.)

1. Definition, types and individual characteristics of physical evidences.
2. Different search methods for locating physical evidences at scene of crime.
3. Preservation, Packing, labeling and transportation of the physical; Biological (Blood, hair & Tissue), and Toxicological samples.
4. Preservation, Packing, labeling, transportation and forwarding of the; Chemical & Ballistics evidences.

### Unit-V Crime detection agencies

(10 Lec.)

1. Central Forensic laboratories, National Crime record Bureau.
2. Crime Investigation department, Central Bureau of Investigation.
3. National Drug Testing Laboratory, Intelligence Bureau. Bureau of Police Research & Development.
4. Fingerprint Bureau Investigation.



**FS103: Practicals**

5

1. Mobile unit functioning: Spot visit and working
2. Scene of crime investigation
3. Finger print analysis
4. Foot print analysis
5. Handwriting analysis, Indentation
6. Photography
7. Gun shot tests (Dents on various surfaces caused by bullets, etc.)



## SECOND YEAR

### FS 201: Detective tools and Techniques

#### **Unit-I Detective tools in forensic science** (12 Lec.)

1. Introduction to various detective tools used in forensic science.
2. Brief idea about Narco test, and brain mapping.
3. Spy camera, microchip and taping.
4. General idea about modern techniques in forensic science.

#### **Unit-II Microscopy & Chromatographic techniques** (10 Lec.)

1. Brief idea about principle and application of bright field, dark field and electron microscopy.
2. Comparison microscope and other modern microscope.
3. Principle and application of gel filtration, affinity, ion-exchange chromatography.
4. Gas chromatography and HPLC.

#### **Unit-III Electrophoresis and spectroscopy** (12 Lec.)

1. Electrophoresis: principle, types and applications.
2. Polyacrylamide and agarose gel electrophoresis.
3. Spectroscopy: basic principle, law of absorption and radiation.
4. Principle and application of visible & ultraviolet spectroscopy.

#### **Unit IV Centrifugation and radio-isotopic techniques** (12 Lec.)

1. Centrifugation: basic principle and application of preparative and analytical centrifuge.
2. Brief idea about radio-isotopic techniques; radioactive decay.
3. Use of radioisotopes in forensic science.
4. Autoradiography- principle and applications.

#### **Unit V Techniques of molecular biology** (14 Lec.)

1. Brief idea about principle, type and applications of PCR.
2. Methods of DNA sequencing and hybridization.
3. General idea about of RFLP & RAPD and DNA fingerprinting.
4. DNA and Protein micro-array.



7

## FS 202: Examination of Physical evidences & Forensic Ballistics

**Unit-I Fingerprints** **(12 Lec.)**

1. History, characteristics and pattern of fingerprints.
2. Classification of fingerprints: Primary and Secondary.
3. Location and Preservation of fingerprints.
4. Development of latent fingerprints. Matching and examination of fingerprints.

**Unit-II Documents & Hand writing** **(10 Lec.)**

1. Types and nature of Documents.
2. Ink, paper, writing instruments and their characteristics.
3. Characteristics and factors affecting of Hand writing.
4. Examination of Documents and hand writing.

**Unit-III Examination of biological samples** **(14 Lec.)**

1. Blood and Blood stain. Examination of blood grouping.
2. Examination of saliva, pus, semen and urine.
3. Isolation, Purification and characterization of DNA
4. Genetic marker and DNA fingerprinting.

**Unit-IV Firing Mechanisms and Firearm Injuries** **(12 Lec.)**

1. Gun Short Residues (GSR), Mechanism of formation of GSR, Modern methods of analysis of GSR from the shooting hand and target with special reference to clothing.
2. Firearm injuries: Ballistic aspect of firearm injuries.
3. Types of Rifled firearms (Pistol, Revolver, Rifles, Machine Guns)
4. Ammunition : Types, Cartridge Components (Cartridge case primer propellant, Bullets, Pellets and wads)

**Unit-V Examinations of other Physical evidences** **(12 Lec.)**

1. Examination of bullet, fire empty cartridge and gun powder.
2. Examination of Hair, fiber and cloths.
3. Analysis of glass fracture and tool marks.
4. General idea about Dop test.



## FS 203: Practical

1. Examination of blood, semen and other body fluids: Test for grouping, species, presence of spermatozoa, etc.
2. Hair examination (sectioning and morphology)
3. Immunological methods: Immunodiffusion, immunoelectrophoresis, Immunofluorescence, Agglutination and Precipitation.
4. Applications of Hardy-Weinberg principle: Calculation of allele and genotype frequencies, Chi-square test.
5. Isolation of DNA from various types of animal/human/plant materials (fresh, preserved, dried, or spoiled)

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# THIRD YEAR

## FS 301: Forensic medicine and Toxicology

### Unit-I Forensic medicine & Jurisprudence (12 Lec.)

1. Definition, history and scope of Forensic medicine.
2. Nature and Powers of criminal court in India.
3. Evidence in court, Medico Legal reports of dying declaration.
4. Medical ethics- Infamous conduct, misconduct, appeal and punishment.

### Unit-II Forensic Pathology (14 Lec.)

1. Modes of Death, Signs of Death and Post-Mortem Examination.
2. Introduction, definition and types of corpus delicti.
3. Introduction to pathophysiology; signs and symptoms.
4. Introduction definition and medico-legal aspects of trauma and injury.

### Unit-III Sexual Jurisprudence, Infanticide and Forensic Psychiatry (12 Lec.)

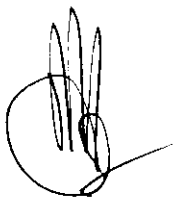
1. Explanation of virginity, pregnancy, criminal abortion and Rape.
2. Viability, Haase's Rule, cause of death: examination.
3. Battered baby syndrome, Sudden infant death syndrome.
4. Definition and brief overview of common mental illnesses.

### Unit-IV Forensic toxicology (10 Lec.)

1. Introduction, History and Definition of Forensic Toxicology.
2. Medico-legal aspects of poisons, Classification of poisons.
3. General principles of management of poisoning.
4. Corrosive poisons – sulphuric acid, phenol and oxalic acid.

### Unit-V Clinical toxicology (12 Lec.)

1. Mode of action of Common inorganic poisons  $LD_{50}$  &  $ID_{50}$ .
2. Poisonous seeds, fruits and vegetables.
3. Snake venom, composition, mode of action, effect on the body as a whole.
4. Asphyxiant poisons – carbon monoxide, carbon dioxide & hydrogen sulphide.



**FS 302: Police, Indian Penal code and Criminal Procedure code**

**Unit-I Elementary of Police Science (12 Lec.)**

- 1. Role of Police Science in criminal investigations.
- 2. General organization and role of police at district and state level.
- 3. Police organization under central government.
- 4. Introduction to international police organization: INTERPOLE.

**Unit-II Administration of justice and Punishment under code (10 Lec.)**

- 1. Difference between civil and criminal justice.
- 2. Primary and secondary function of court of law.
- 3. Rules for assessment of punishment (ss-71, 72, and 75).
- 4. Imprisonment (50, 60 73-74).

**Unit-III Offences against human body and general exceptions (12 Lec.)**

- 1. Act of Culpable homicide (ss-299, 301, 304) and murder (ss-300, 303).
- 2. Abetment to suicide (ss- 305-306), Negligence (s – 304A).
- 3. Rape (ss- 375-376),and Unnatural offence (s-377)
- 4. Absence of Criminal Intention (ss - 81-86, 92-94).

**Unit-IV Criminal procedure code 1973 (14 Lec.)**

- 1. Constitution of Criminal Courts (Ss. 6 – 25) and Power of Courts (Ss. 26 – 35).
- 2. Arrest of Persons (Ss. 41 – 60), Warrant of Arrest (Ss. 70 – 81).
- 3. Preventive Action of the Police (Ss. 149 – 153).
- 4. Evidence in Inquiries and Trials (Ss. 291 – 293).

**Unit-V Indian evidence act (12 Lec.)**

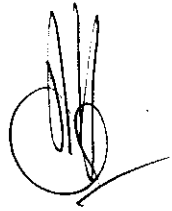
- 1. Relevancy of facts (Ss. 5 -10), Admission (Ss. 17, 22, 23, 25, 26).
- 2. Experts (Ss. 45, 46, 47, 47A) and Proof (Ss. 56 – 58).
- 3. Oral Evidence (Ss. 59 – 60) and Documentary Evidence (Ss. 61 - 65, 65B, 67, 67A, 73)
- 4. IEA Sections – 113A,B, 114A, 137 -38, 141 -43, 146, 148, 151, 159)

### **FS 303: Practical**

1. Separation of serum protein/isozymes by electrophoresis
2. Polymerase Chain Reaction (PCR)
3. PCR based methods of DNA typing profiling: RFLP, RAPD SNPs, microsatellites; Data analysis
4. Exercise related to criminal laws and legal documentation/presentation.
5. Identification of Toxic compounds.

### **FS 304: Project Work**

(One Month)

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## Books Recommended

- |     |   |                                  |
|-----|---|----------------------------------|
| 01. | Fundamental Biotechnology & Forensic Science        | Khan, Ali Irfan.: Vikash Pub     |
| 02. | Forensic science in criminal investigation & trials | Sharma, B. K.: Universal Law Pub |
| 03. | Criminology & Justice systems                       | Seomy                            |
| 04. | Criminology   | Shrivastava                      |
| 05. | Finger Print & Documents                            | Baghel                           |
| 06. | Forensic Medicine & Toxicology                      | Babel                            |
| 07. | Forensic Science                                    | Naver                            |
| 08. | Scientific investigation                            | Sharma                           |
| 09. | Hand writing Forensic                               | Sharma                           |
| 10. | Criminology & Penology                              | Siddqui                          |
| 11. | Forensic Medicine & Toxicology                      | Babel                            |
| 12. | Medical Juries prudence                             | Modi                             |
| 13. | Forensic Science and Investigations                 | Parekh                           |

