First Semester:

Maximum Marks = 100 per paper (80 marks external and 20 marks internal)

Paper PGDFS101: General Forensic Science

Unit I:

1. History and Development of Forensic Science
2. Definition, Scope and Need of Forensic Science
3. Basic Principles of Forensic Science
4. Ethics in Forensic Science
5. Duties of a Forensic Scientist

Unit II:

1. Organizational setup of Forensic Science Laboratories: CFSL, FSL, GEQD, FPB, NICFS
2. Central Detective Training School, NCRB (Maintenance of Crime Records)
3. Mobile Forensic Science Laboratory and its working
4. Branches of Forensic Science and their roles

Unit III:

2. Brain fingerprinting: Concepts, history, significance, method, future perspective of the technique and limitations
3. Various Police Organizations; Organization of Police Station.
4. Evolution of Police as an Institution; Role & Functions of Police

Unit IV:

1. History and Development of Finger Print as Science for Personal Identification; Type of Finger Prints; Classification of Finger Prints; Latent Finger Print
2. Causes of Formation of Scene of Crime Finger Prints; Comparison of Finger Prints, ridge details
3. Presentation of Expert Evidence: Data, Reports, Evidence in the Court
4. Foot Prints- Importance, Gait Pattern. Casting of foot prints in different media, Electrostatic lifting of latent foot prints
5. General Introduction to forensic anthropology: Definition, scope and problems; various personnel identification techniques and their importance in determination of age and sex; Forensic odontology: development and scope

Books:
Paper PGDFS102: Questioned documents, Criminalistics and Forensic Ballistics

Unit I:
1. Document in general: Importance, Classification and Preliminary Examination
2. Handwriting: General Characteristics, Individual Characteristics, Development of Individuality in Handwriting

Unit II:
1. Photography for Documents: Basic principles and techniques of photography
2. Modern Developments in Photography: Digital Photography, Videography/ High speed videography, Crime scene and Laboratory photography
3. Crime Scene Investigation: Protection of crime scene, Documentation (including photography and sketching), nature, location, collection and preservation of evidences.
4. Physical evidence: their types, significance, classification and stages in physical evidence analysis
5. Miscellaneous Clue Materials- Examination of strings/ropes, fibers, threads and fabrics, wires/cables, seals, counterfeit coins, etc.

Unit III:
1. Road Accidents: Examination of scene, Victim and the vehicle, Collection of the evidence, Filaments examination, Examination of skid marks, Head light bulb filaments
2. Forensic Psychology: Truth and Deception, Psychology of lying, various methods of lie detection, Principles of Polygraph, Legal ascepts
3. Gun Shot Residues (GSR): Mechanism of formation of GSR, modern methods of analysis of GSR from the shooting hand and target with special reference to clothings
4. Determination of Range of fire, time of fire. Visual and Chemical, instrumental methods with special reference to the applications of Neutron activation analysis, Atomic absorptions, Scanning Electron microscopy and other miscellaneous methods

Unit IV:

1. Classification, Characteristics and firing mechanisms of smooth bored firearms (M. L., B. L.), Rifled firearms (Pistol, Revolver, Rifles, Machine Guns), Classification, Nomenclature and construction of country made firearms

2. Ammunition: Types, Cartridge Components (Cartridge case primer propellant, Bullets, Pellets and wads)

3. Matching of crime and test bullets and cartridge cases in regular firearms; Identification of Bullets, pellets and wads fired from improvised country made firearms. Automated method of cartridge case and bullet comparison


Books:
Unit I:

1. Biological evidence: Importance, nature, location, collection and evaluation of Hair, Fibres
2. Botanical evidences (Pollen grains, wood, leaves and seeds).
3. Human Blood groups: General principles and theory of inheritance, Blood group determination from fresh and dried blood, Titer, Raulax formation and Bombay blood group.
4. Polymorphic enzymes: Forensic significance, identification from fresh blood and stains.
5. Semen: Composition, functions and morphology of spermatozoa, forensic significance, location, collection, evaluation and tests for identification

Unit II:

6. Immunology: Introduction to immune system, immune response, antigens, haptens and adjuvants. Lectins: Forensic significance.
7. Immunoglobulin: Types, physio-chemical properties and functions; Raising of Antisera.
8. Antigen-Antibody Reactions: Various Antigen-antibody agglutination and precipitation reactions, Immunofluorescence, Immunodiffusion and Immunoelectrophoresis
9. HLA system and its applications in paternity testing; Pitfalls of HLA system
10. Composition, functions and forensic significance of saliva, sweat, milk, urine, faecal matter, vaginal secretions and tests for their identification, including presence of blood group specific ABH substances

Unit III:

11. Concept of Heredity: Mendelian principles and their applications in human
12. Population genetics (Hardy-Weinberg Equilibrium of gene and genotype frequencies and causes of deviations)
13. The genetic material: DNA and RNA: Chemical structure and properties; Unique (coding) and non-coding sequences (repetitive): molecular characteristics, properties and significance in forensic analysis
14. Mitochondrial genome: Structure, properties and functions; Mitochondrial genes in inheritance of human traits; Significance in forensic analysis
Unit IV:

15. DNA typing systems: History of DNA Typing, RFLP analysis, PCR amplifications, sequence polymorphism. Analysis of SNP and Y-STR; DNA chip

16. Forensic Significance of DNA profiling: Applications in disputed paternity cases, child swapping, missing person’s identity- civil immigration, veterinary, wildlife and agriculture cases; limitations of DNA profiling

17. Legal perspectives of DNA profiling: legal standards for admissibility of DNA profiling, procedural and ethical concerns, status of development of DNA profiling in India and abroad.

18. Lab accreditation, Certification, reputation and facilities

19. DNA Databases; Power of discrimination; Mixtures and statistics; Probability of exclusion; The Likelihood ratio (LR); Paternity determination

Books:
Paper PGDFS104: Criminology and Law

Unit I  Crime and Criminal Behavior

1. Crime: Definition, causes and types.

2. Criminal Profiling: Meaning and importance

3. Modus Operandi & its role in criminal investigation.

4. Relation of Forensic science and law.

Unit II  Substantive Laws


3. Indian Penal code-ii: Offences against Property - 378,383,390,391,405,415,420 [Theft, Extortion, Robbery, Dacoity, Cheating, Forgery]

Unit III  Procedural Laws

1. Criminal Procedure code: Hierarchy of courts & their powers; Role of police officers in criminal Investigation & Trial; Inquest Report

2. Role of Forensic Experts in Investigation; Section 291,292,293; Meaning of Investigation, Enquiry & Trial

3. Indian Evidence Act: Meaning and Types of evidence; Relevance of Expert opinion (Relevant Provisions); Examination of Witnesses, Hostile witness

5. Medico-Legal aspect of Sexual offences -- examination of Victim & Accused;

Collection of evidence

Unit IV - Object and Significance of Related laws


3. Related Laws: General overview of object of Arms Act 1950 and Cyber Laws and wild life Protection Act

4. Education of forensic science, Role of Media, Human rights and Criminal Justice System.

Books: