UNIVERSITY GRANTS COMMISSION

NET BUREAU

Subject: Forensic Science  Code No.: 82

SYLLABUS

Unit – I

- **Forensic Science**: Definition, History & Development, Scope, Ethics in Forensic Science
- **Physical Evidence**: Nature, Types, Search methods, Collection, Preservation, Packing & Forwarding of Physical & Trace evidence for forensic analyses, Chain of Custody
- **Crime Scene**: Nature, Types, Preservation of Scene of Crime
- **Criminal Investigations**: Unnatural deaths, Criminal assaults, Sexual offences, Poisoning, Vehicular accidents
- **Courts**: Types, powers and jurisdiction, Admissibility of evidence in Courts, Definition of Experts, Provisions in Cr.P.C.,1973 & Indian Evidence Act relating to experts & their reports; Court Procedures pertaining to Expert Testimony & Witness
- **Organization of Forensic Science Laboratories of Centre and State**, NCRB and NICFS
- **Fundamental Rights**: Right of Equality (Articles 14 to 18) and Right of Freedom (Articles 19 to 22) as per Constitution of India
- **Criminal Profiling**: Profile of victim and culprit, its role in crime investigation, Lie detection (Polygraphy), Narco analysis, Brain mapping, scope and limitations
- **Concept of quality control management in Forensic institutions**
Unit – II

- **Microscopy**: Polarizing, Comparison, Stereoscopic, Fluorescent and Electron Microscopes
- **Spectrophotometry**: UV, Visible, IR, Raman, Atomic absorption, Emission
- **Neutron Activation Analysis**
- **X – rays and x-ray based techniques** such as XRD, XRF
- **Mass Spectroscopy**
- **Chromatographic Techniques**: TLC, GLC, HPLC, HPTLC
- **Hyphenated Techniques**: GC-MS, LC-MS, IR-MS and ICP-MS
- **Electrophoresis**: High and Low voltage electrophoresis, Immunelectrophoresis
- **Immunooassays**: Principle, Types, Techniques and applications

Unit – III

- **Detection and Identification of Blood stains**
- **Determination of Species of Origin**
- **Blood Group Systems**
- **Techniques of Determination of Blood groups of Blood Stains**
- **Detection of Seminal and other body fluids and their Blood Grouping**, Red cells Enzymes, Serum Proteins of forensic significance
- **Disputed Paternity & Maternity**
- **DNA**: Structure, DNA as genetic marker, DNA Extraction and Profiling Techniques
- **DNA Phenotyping** and **RNA Profiling** & their applications
- **Wild life Forensics**: Wild life (Protection) Act, 1972, Scope, Evidences and Identification
Unit – IV

- **Analysis of Ethyl alcohol** in beverages, liquors, biological fluids and breath
- **Analysis of Methanol and Denaturants**
- **Illicit liquors**
- **Analysis of Chemicals in Trap Cases**
- **Metabolism and Chemical examination of:** Insecticides & Pesticides, Tranquillizers & Sedatives, Hypnotics Stimulants, Narcotics, Opiates, Drugs of abuse; Analyses of above and their Toxicity
- **Plant poisons**
- **Metallic Poisons**
- **Extraction, Isolation & Clean-up procedures, Identification of common poisons from viscera, tissues and body fluids**

Unit – V

- **Fire arms:** Types, Classification, Ammunition and their Compositions
- **Forensic examination** of Firearms, Ammunition, Firearms’ projectiles (Bullets, Shots, Slug etc.), Shell case
- **Gunshot residues analysis**
- **Concept of** Velocity, Penetration, Dispersion, Ricochet, Accidental Discharge, Determination of Range in firearm cases
- **Examination** of Country made firearms
- **Basics of Internal, External and Terminal Ballistics**
- **Tool marks:** Meaning, Types and Examination
- **Restoration of Erased Markings on Metal Surfaces**

Unit – VI

- **Fire and Arson:** Analyses of Petroleum Products and other incendiary materials
- **Explosives:** Definition, Types and Analyses
• **Bombs**: Country made bombs, Improvised Explosive Devices (IEDs) and their examination
• **Investigation** in Explosion and Arson related cases
• **Photography**: Types, application in criminal investigation & Forensic evidence examination

Unit – VII

• **Hair & Fibers**: Nature, Types, Structure and Examination
• **Pollens and Diatoms**: Their application in Forensic investigation
• **Dust & Soil**: Nature, Types, Forensic Examination
• **Paint, Lacquer & Varnishes**: Nature, composition and forensic examination
• **Glass**: Composition, Types, Fractures, Examination
• **Cement, Mortar and Concrete**: General Composition, Forensic Analysis
• **Computer Forensics**: Introduction, Types of Computer crimes, Digital evidence- Seizure, Acquisition and Forensic examination
• **Mobile Phone Forensics**

Unit – VIII

• **Fingerprints**: History, Characteristics, Types, Classification, Preservation, Development, Lifting and Comparison, Examination of Chance Prints, Computerization of Fingerprints, AFIS
• **Track Marks**: Foot Prints, Shoe Prints, Tire Marks, Their Preservation & Casting, Comparison, Skid marks. Gait pattern
• **Biometric Systems of Identification and its relevance**
• **Voice Analysis**: Introduction, Significance, Structure of Human Voice apparatus, Voice spectrography, Voice analysis, Legal aspects and limitations
Unit – IX

- **Documents**: Definition, Types, Preliminary examination of documents
- **Reproduction** of documents through photographic and mechanical means and their examination
- **Examination** of Alterations such as Erasures, Obliterations & Additions
- **Indentations, Secret writings and Charred documents**
- **Inks, Papers** and their scientific examinations with modern methods
- **Age of documents**
- **Examination** of Typescripts, Printed matter including currency notes and lottery tickets. Mechanical impressions
- **Hand writings**: Class and Individual characteristics of Handwritings, Factors affecting handwritings, Standard samples for comparison, Comparison of hand-written texts
- **Anonymous and disguised writings**
- **Identification** of hand writings, signatures, detection of forged signature and forgeries
- **Examination of Credit Cards and Similar materials**

Unit – X

- **Modes & Manner of deaths**, Sexual offences and its medicolegal importance, Amendments in law related to sexual offences
- **Post – mortem examination and Post – mortem changes**, Estimation of time since death
- **Injuries & Wounds**: Types, Medicolegal importance, Gunshot wounds
- **Determination of Species of Origin, Sex, Age, Stature, and individual identification through skeletal remains**
- **Identification through Skull superimposition and facial reconstruction**
- **Human dentition, Type of teeth, determination of Age, Bite marks**
- **Forensic Entomology**: Introduction, Insects of forensic importance, Insects on Carrion, Forensic applications