SYLLABUS for Forensic Science

PhD Entrance

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 (Poly graphy), Narcoanalysis, 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, Immuno electrophoresis
- Immunoassays: Principle, Types, Techniques and applications

Unit–III

- Detection and Identification of Bloodstains
- 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

- Firearms: 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 fire arm cases
- Examination of Country made fire arms
- 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

- Finger prints: History, Characteristics, Types, Classification, Preservation, Development, Lifting and Comparison, Examination of Chance Prints, Computerization of Finger prints, 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 Type scripts, Printed matter including currency notes and lottery tickets. Mechanical impressions
- Handwritings: Class and Individual characteristics of Handwritings, Factors affecting handwritings, Standard samples for comparison, Comparison of hand-written texts
- Anonymous and disguised writings
- Identification of handwritings, signatures, detection of forged signature and forgeries
- Examination of Credit Cards and Similar materials

Unit–X

- Modes & Manner of deaths, Sexual offences and its medico legal importance
- Post – mortem examination and Post – mortem changes, Estimation of times Ince death

- Injuries & Wounds: Types, Medico legal 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