SYLLABUS for Forensic Science

PhD Entrance

Unit –I

- **Forensic Science:** Definition, History & Development, Scope, Ethicsin Forensic Science
- **PhysicalEvidence:**Nature,Types,Searchmethods,Collection,Preservation, Packing & Forwarding of Physical & Trace evidence forforensicanalyses,Chain of Custody
- **CrimeScene:**Nature,Types, PreservationofSceneofCrime
- **CriminalInvestigations:**Unnaturaldeaths,Criminalassaults,Sexualoffences,Poisoning, Vehicularaccidents
- **Courts:** Types, powers and jurisdiction, Admissibility of evidence inCourts,Definition ofExperts,ProvisionsinCr.P.C.,1973& IndianEvidence Actrelating to experts & their reports;Court ProcedurespertainingtoExpertTestimony&Witness
- **OrganizationofForensicScienceLaboratoriesofCentreandState**,NCRBandNICFS
- **Fundamental Rights:** Right of Equality **(**Articles 14 to 18) and Rightof Freedom**(**Articles19to22) asperConstitutionofIndia
- **CriminalProfiling:**Profileofvictimandculprit,itsroleincrimeinvestigation,Liedetection(Polygraphy),Narcoanalysis,Brainmapping,scopeandlimitations
- **ConceptofqualitycontrolmanagementinForensicinstitutions**

Unit–II

- **Microscopy:**Polarizing,Comparison,Stereoscopic,FluorescentandEle ctronMicroscopes
- **Spectrophotometry:** UV,Visible,IR,Raman,Atomicabsorption,Emission
- **NeutronActivationAnalysis**
- **X –raysandx-raybasedtechniques**suchasXRD,XRF
- **MassSpectroscopy**
- **ChromatographicTechniques:**TLC,GLC,HPLC,HPTLC
- **HyphenatedTechniques:**GC-MS,LC-MS,IR-MSandICP-MS
- **Electrophoresis:**High and Low voltage electrophoresis,Immunoelectrophoresis
- **Immunoassays:**Principle,Types,Techniquesandapplications

Unit–III

- **DetectionandIdentificationofBloodstains**
- **DeterminationofSpeciesof Origin**
- **BloodGroupSystems**
- **TechniquesofDeterminationofBloodgroups ofBloodStains**
- **DetectionofSeminalandotherbodyfluidsandtheirBloodGrouping**, RedcellsEnzymes,SerumProteinsofforensicsignificance
- **DisputedPaternity&Maternity**
- **DNA:** Structure, DNA as genetic marker, DNA Extraction andProfilingTechniques
- **DNAPhenotyping**and **RNAProfiling**&theirapplications
- **Wild life Forensics:** Wild life (Protection) Act,1972, Scope,Evidences and Identification

Unit–IV

- **AnalysisofEthylalcohol**inbeverages,liquors,biologicalfluidsand breath
- **AnalysisofMethanolandDenaturants**
- **Illicitliquors**
- **AnalysisofChemicalsinTrapCases**
- **MetabolismandChemicalexaminationof**: Insecticides&Pesticides,Tranquillizers&Sedatives,HypnoticsStimulants, Narcotics, Opiates, Drugs of abuse; Analyses of aboveand theirToxicity
- **Plantpoisons**
- **MetallicPoisons**
- **Extraction,Isolation&Clean-upprocedures,Identificationofcommonpoisonsfrom viscera, tissuesandbodyfluids**

Unit –V

- **Firearms**:Types, Classification,AmmunitionandtheirCompositions
- **Forensic examination** of Firearms, Ammunition, Firearms'projectiles(Bullets,Shots, Slugetc.),Shellcase
- **Gunshotresiduesanalysis**
- **Conceptof** Velocity,Penetration,Dispersion,Ricochet,AccidentalDischarge,DeterminationofRangeinfirearmcases
- **Examination**of Countrymadefirearms
- **BasicsofInternal,ExternalandTerminalBallistics**
- **Toolmarks:Meaning, TypesandExamination**
- **RestorationofErasedMarkings onMetalSurfaces**

Unit –VI

- **Fire and Arson:** Analyses of Petroleum Products and otherincendiarymaterials
- **Explosives:**Definition,Types andAnalyses

- **Bombs**:Countrymadebombs,ImprovisedExplosiveDevices(IEDs)and theirexamination
- **Investigation**inExplosionandArsonrelatedcases
- **Photography: Types, applicationin criminalinvestigation &Forensic evidenceexamination**

Unit –VII

- **Hair&Fibers**:Nature,Types,StructureandExamination
- **PollensandDiatoms:**Their applicationinForensicinvestigation
- **Dust&Soil:**Nature**,** Types,ForensicExamination
- **Paint,Lacquer&Varnishes**:Nature,compositionandforensicexaminati on
- **Glass:**Composition,Types,Fractures,Examination
- **Cement, Mortarand Concrete**:GeneralComposition,ForensicAnalysis
- **ComputerForensics:Introduction,TypesofComputercrimes,Digita levidence-Seizure, AcquisitionandForensicexamination**
- **MobilePhoneForensics**

Unit –VIII

- **Fingerprints:**History,Characteristics,Types,Classification,Preservatio n, Development, Lifting and Comparison, Examination ofChancePrints,Computerizationof Fingerprints,AFIS
- **TrackMarks:**FootPrints,ShoePrints,TireMarks,TheirPreservation& Casting,Comparison,Skidmarks.Gaitpattern
- **BiometricSystemsofIdentificationanditsrelevance**
- **Voice Analysis:** Introduction, Significance, Structure of Human Voiceapparatus, Voice spectrography, Voice analysis, Legal aspects andlimitations

Unit–IX

- **Documents:** Definition, Types, Preliminary examination ofdocuments
- **Reproduction**ofdocumentsthroughphotographicandmechanicalmeans andtheirexamination
- **Examination** of Alterations such as Erasures, Obliterations &Additions
- **Indentations,SecretwritingsandCharreddocuments**
- **Inks,Papers**andtheirscientificexaminationswithmodernmethods
- **Ageofdocuments**
- **Examination** of Typescripts, Printed matter including currency notesandlotterytickets. Mechanicalimpressions
- **Hand writings**: Class and Individual characteristics of Handwritings,Factorsaffectinghandwritings,Standardsamplesforcomparison,Comparisonof hand-writtentexts
- **Anonymousanddisguisedwritings**
- **Identification**ofhandwritings,signatures,detectionofforgedsignatureandforgeries
- **ExaminationofCreditCardsandSimilarmaterials**

Unit–X

- **Modes&Mannerofdeaths,Sexualoffencesandits medicolegalimportance**
- **Post – mortem examination and Post – mortem changes,Estimationoftimesincedeath**
- **Injuries&Wounds:Types,Medicolegalimportance,Gunshotwounds**
- **Determinationof Species ofOrigin,Sex, Age,Stature,andindividualidentificationthroughskeletal remains**
- **Identification through Skull superimposition and facialreconstruction**
- **Humandentition,Typeofteeth,determinationofAge,Bitemarks**
- **Forensic Entomology: Introduction, Insects of forensicimportance,Insects onCarrion,Forensic applications**