FORENSIC SCIENCE

DEPARTMENT OF CHEMISTRY
UNIVERSITY COLLEGE OF SCIENCE
OSMANIA UNIVERSITY
HYDERABAD

LESSON PLANS
FOR THE ACADEMIC YEAR
2024-2025

M.Sc. FORENSIC SCIENCE
Semester III
(CCE Syllabus)

FORENSIC SCIENCE, DEPARTMENT OF CHEMISTRY, UCS, OU
LESSON PLAN FOR THE ACADEMIC YEAR 2024-2025 - CCE (Semester III)

Class: M.Sc. Forensic Science **Section:** Semester III
COURSE/ Paper: I/FS301T(*): Forensic Examination of Questioned Documents

Unit I: Introduction to questioned documents and handwriting examination

No. of hours allotted: 15

Lecture No.	Topics to be covered
1	Document and Questioned document: Legal definition of document and classification
2	Questioned document, Handling and marking, preliminary examination
3	Nature and problems of questioned document examination
4	Basics of Handwriting identification: Development of handwriting, principles in handwriting examination
5	Factors influencing handwriting
6	Individuality of handwriting, Natural variations
7	Procurement of Admitted/ Specimen writings
8	Various writing features and their estimation
9	General and individual characteristics of handwriting
10	Disguised writing, modes of disguise
11	Anonymous letter; Classification
12	Identification of the writer
13	Systematic examination of inks
14	Types of pens and their specific functioning
15	Examination of paper

FORENSIC SCIENCE, DEPARTMENT OF CHEMISTRY, UCS, OU
LESSON PLAN FOR THE ACADEMIC YEAR 2024-2025 - CCE (Semester III)

Class: M.Sc. Forensic Science **Section:** Semester III
COURSE/ Paper: I/FS301T(*): Forensic Examination of Questioned Documents

Unit II: Examination of document frauds

No. of hours allotted: 15

Lecture No.	Topics to be covered
1	Examination of signature
2	Characteristics of genuine and & charred documents
3	Forgery, Types of forgeries and their detection
4	Examination of alterations, erasures, over writings, additions & obliterations
5	Decipherment of secret writings
6	Examination of indented writings
7	Class and individual characteristics of typewriting
8	Identification of typewriter writings and printed matter
9	Identification of typewriter machine
10	Identifying features of various printers from computer printouts
11	Identifying features of photocopier machines
12	Examination of fax messages
13	Various types of conventional printing processes and their identifying features
14	Identification of source of printed material
15	Examination of built up documents

FORENSIC SCIENCE, DEPARTMENT OF CHEMISTRY, UCS, OU
LESSON PLAN FOR THE ACADEMIC YEAR 2024-2025 - CCE (Semester III)

Class: M.Sc. Forensic Science **Section:** Semester III
COURSE/ Paper: I/FS301T(*): Forensic Examination of Questioned Documents

Unit III: Security documents, analytical instrumentation and legal aspects of document examination

No. of hours allotted: 15

Lecture No.	Topics to be covered
1	Examination of genuine and counterfeit Indian currency notes
2	Examination of Indian passports
3	Counterfeiting passports
4	Security features of plastic currency
5	Plastic currency frauds, prevention and detection
6	Examination of plastic currency in forensic lab
7	Determination of age of document
8	Digital signature, Cryptography and types
9	Determination of sequence of strokes, Examination of rubber stamp, seal impressions and other mechanical impressions
10	Basic tools for forensic document examination
11	VSC, ESDA and Raman Spectroscopy in document examination
12	Application of microscopy, chromatography and fluorimetry in document examination
13	Opinion writing, Reasons for opinion, Court Testimony
14	IPC sections relevant to document examination: IPC – 29, 29A, 409, 467, 468, 470, 471, 489 (A to E)
15	IEA sections relevant to document examination: IEA – Sec 3, 45, 47 and 73

FORENSIC SCIENCE, DEPARTMENT OF CHEMISTRY, UCS, OU
LESSON PLAN FOR THE ACADEMIC YEAR 2024-2025 - CCE (Semester III)

Class: M.Sc. Forensic Science **Section:** Semester III
COURSE/ Paper: II/FS302T(*): Forensic Toxicology

Unit I: General principles of Toxicology

No. of hours allotted: 15

Lecture No.	Topics to be covered
1	Introduction, History, Scope and Areas of Toxicology
2	Role of Forensic Toxicologist
3	Laws related to Forensic Toxicology
4	Introduction and Classification of poisons
5	Classification of poisoning; Types of poisoning
6	Factors affecting intensity of poisoning
7	Introduction to pharmacokinetics, Methods of transportation of toxicant
8	Absorption, Distribution, Storage of toxicants, Redistribution, Metabolism and Other routes of elimination
9	Toxicokinetics: one and two compartmental model
10	Spectrum of undesired (toxic) effects
11	Interaction of chemicals
12	Tolerance and dose response relationship
13	Introduction, methods of toxicity testing
14	Mutagenicity and carcinogenicity
15	Developmental and reproductive toxicity

FORENSIC SCIENCE, DEPARTMENT OF CHEMISTRY, UCS, OU
LESSON PLAN FOR THE ACADEMIC YEAR 2024-2025 - CCE (Semester III)

Class: M.Sc. Forensic Science **Section:** Semester III
COURSE/ Paper: II/FS302T(*): Forensic Toxicology

Unit II: Clinical Toxicology

No. of hours allotted: 15

Lecture No.	Topics to be covered
1	Introduction, Maintenance of vital functions, Assessment of consciousness of poisoned patient
2	Clinical evaluation of poisoned patient
3	Diagnosis of signs and symptoms of poisoning
4	Poison information centre
5	Measures to enhance elimination of poisons
6	Removal of unabsorbed poisons
7	Introduction, Classification of antidotes
8	Mechanism of action of antidote (cyanide, methanol, arsenic, opiate, carbon monoxide, nitrite, acetaminophen and pesticides)
9	Recovery and after care of patients
10	Examination of poisoned death
11	Identifying route of administration of poison
12	Estimation of time and dose after administration of poison
13	Therapeutic drug monitoring: Introduction
14	Analytical techniques for therapeutic drug monitoring
15	Challenges and future directions

FORENSIC SCIENCE, DEPARTMENT OF CHEMISTRY, UCS, OU
LESSON PLAN FOR THE ACADEMIC YEAR 2024-2025 - CCE (Semester III)

Class: M.Sc. Forensic Science **Section:** Semester III
COURSE/ Paper: II/FS302T(*): Forensic Toxicology

Unit III: Forensic Toxicology

No. of hours allotted: 15

Lecture No.	Topics to be covered
1	Collection methods of toxicological samples in fatal and survival cases
2	Preservation methods of toxicological samples in fatal and survival cases
3	Storage of toxicological exhibits in fatal and survival cases
4	Introduction and Sample preparation in toxicological analysis
5	Extraction methods
6	Isolation and Clean-up procedures in toxicological analysis
7	Identification and quantitation of volatile poisons
8	Identification and quantitation of volatile gases
9	Identification and quantitation of miscellaneous poisons
10	Identification and quantitation of metals and anions
11	Identification and quantitation of drugs
12	Identification and quantitation of pesticides
13	Interpretation of toxicological data
14	Courtroom testimony in toxicological cases
15	Case studies

FORENSIC SCIENCE, DEPARTMENT OF CHEMISTRY, UCS, OU
LESSON PLAN FOR THE ACADEMIC YEAR 2024-2025 - CCE (Semester III)

Class: M.Sc. Forensic Science **Section:** Semester III
COURSE/ Paper: IIIA/FS303T(Elective III A): Forensic Nanotechnology

Unit I: Basics of Nanotechnology

No. of hours allotted: 15

Lecture No.	Topics to be covered
1	Introduction to nanotechnology, Definition of terms: Nanomaterials, Nanoscience and Nanotechnology, Nanoscale and its features
2	Applications of nanotechnology
3	Challenges and future scope of nanotechnology, Nanotechnology in India
4	Ethical issues in nanotechnology
5	Economic impact of nanotechnology
6	Societal acceptance of nanotechnology
7	Classification of nanomaterials based on origin
8	Classification of nanomaterials based on dimension
9	Classification of nanomaterials based on structural configuration
10	Mechanical and Structural properties, Melting
11	Electrical and Optical properties
12	Magnetic and Chemical properties
13	Clusters, Semiconductor nanoparticles, Metal nanoparticles, Plasmonic materials, Types of Magnetic nanomaterials
14	Some special nanomaterials: Carbon nanomaterials, Porous material, Aerogels, Zeolites Aerogels, Zeolites
15	MOFs, Core-shell particles, Meta materials, Bio-inspired materials

FORENSIC SCIENCE, DEPARTMENT OF CHEMISTRY, UCS, OU
LESSON PLAN FOR THE ACADEMIC YEAR 2024-2025 - CCE (Semester III)

Class: M.Sc. Forensic Science **Section:** Semester III
COURSE/ Paper: IIIA/FS303T(Elective III A): Forensic Nanotechnology

UNIT II: Synthesis and characterization of nanomaterials

No. of hours allotted: 15

Lecture No.	Topics to be covered
1	Top down approach and Bottom up approach
2	Physical methods of nanomaterial synthesis: Mechanical methods, Methods based on evaporation
3	Sputter deposition, Chemical Vapour deposition, Electric arc deposition, Ion implantation, Nanolithography
4	Introduction, Colloids, Nucleation and growth of nanoparticles, synthesis of metal and semiconductor nanoparticles by colloidal route
5	Langmuir Blodgett method, Micro emulsion method, Sol gel method
6	Hydrothermal synthesis, Sonochemical synthesis, Microwave synthesis, Synthesis using lab-on-chip
7	Principles of green chemistry, synthesis of nanomaterials using plant extracts and microbial organisms
8	Synthesis of nanomaterials using proteins, DNA and surface layers of bacterial cell walls
9	Mechanism of Self-assembly
10	Characterization of nanomaterials using Optical and Confocal microscope
11	Characterization of nanomaterials using SEM and TEM
12	Characterization of nanomaterials using STM, AFM, SNOM
13	Characterization of nanomaterials by spectroscopic techniques such as UV-Visible spectroscopy, Photoluminescence spectroscopy and FTIR
14	Characterization of nanomaterials by X-ray diffraction and dynamic light scattering techniques
15	Characterization of nanomaterials by thermal methods of analysis and Vibrating Sample Magnetometer

FORENSIC SCIENCE, DEPARTMENT OF CHEMISTRY, UCS, OU
LESSON PLAN FOR THE ACADEMIC YEAR 2024-2025 - CCE (Semester III)

Class: M.Sc. Forensic Science **Section:** Semester III
COURSE/ Paper: IIIA/FS303T(Elective III A): Forensic Nanotechnology

UNIT III: Forensic applications of nanotechnology

No. of hours allotted: 15

Lecture No.	Topics to be covered
1	Introduction to Forensic nanotechnology
2	Scope and importance
3	Recent advancements and applications of nanotechnology in Forensic Science
4	Application of nanomaterials in explosive detection
5	Detection of illicit drugs and poisons
6	Identification of food adulterants
7	Preventive aspect and Investigative aspect
8	Nanomaterials as formulation of inks, security features and security tags in documents
9	Application of nanomaterials in analysis of inks, Nano trackers
10	Nanosensors Working and types
11	Identification of body fluids using nanotechnology, estimation of age of bloodstain, estimation of time since death
12	Use of nanotechnology for enhancement of PCR efficiency
13	Application of nanotechnology in latent fingerprint development
14	Detection of trace evidences, GSR
15	Applications of nanotechnology in detection of biological and chemical threats, weapons and nerve agents

FORENSIC SCIENCE, DEPARTMENT OF CHEMISTRY, UCS, OU
LESSON PLAN FOR THE ACADEMIC YEAR 2024-2025 - CCE (Semester III)

Class: M.Sc. Forensic Science **Section:** Semester III
COURSE/ Paper: IIIB/ FS303T(Elective III B): Microbial Forensics

UNIT I: Basics of Microbiology

No. of hours allotted: 15

Lecture No.	Topics to be covered
1	Introduction, history of microbiology
2	Branches of microbiology
3	Scope and importance of microbiology
4	Definition, characteristics of microorganisms
5	Classification, nomenclature of microorganisms
6	Role of microorganisms in environment, industry, causing diseases and bioterrorism
7	Common nutritional requirements of microbial metabolism
8	Nutritional types of microorganisms
9	Transport mechanisms for nutrient absorption
10	Microbial growth: Culture media
11	Isolation and preservation of pure cultures
12	Kinetics and measurement of microbial growth
13	Kinetics of microbial death
14	Physical and chemical methods of microbial control
15	Evaluation of antimicrobial agent effectiveness

FORENSIC SCIENCE, DEPARTMENT OF CHEMISTRY, UCS, OU
LESSON PLAN FOR THE ACADEMIC YEAR 2024-2025 - CCE (Semester III)

Class: M.Sc. Forensic Science **Section:** Semester III
COURSE/ Paper: IIIB/ FS303T(Elective III B): Microbial Forensics

UNIT II: Basics of Forensic Microbiology

No. of hours allotted: 15

Lecture No.	Topics to be covered
1	Concept of Forensic microbiology
2	History, introduction to epidemiology
3	Microbial Forensic program (SWGMGF) and CDC
4	Bacteria of forensic importance
5	Fungi of forensic importance
6	Virus of forensic importance
7	Biological toxins of forensic importance: Introduction
8	Plant and animal toxins
9	Microbial toxins
10	Introduction to bioterrorism and types of biological agents (Category A, B, C)
11	Planning and response to bioterrorism
12	Epidemiology and punishments for Bioterrorism under Prevention of Terrorism Act, 2002
13	Estimation of post-mortem interval (PMI) and cause of death
14	Microbial outbreak investigation
15	Other medico legal aspects (sexual assault, medical malpractice, food safety and environmental contamination)

FORENSIC SCIENCE, DEPARTMENT OF CHEMISTRY, UCS, OU
LESSON PLAN FOR THE ACADEMIC YEAR 2024-2025 - CCE (Semester III)

Class: M.Sc. Forensic Science **Section:** Semester III
COURSE/ Paper: IIIB/ FS303T(Elective III B): Microbial Forensics

UNIT III: Microbial Forensic Investigation

No. of hours allotted: 15

Lecture No.	Topics to be covered
1	Sampling and collection methods of microbes
2	Legal concerns for sample handling and data records
3	Safety issues and regulations of handling and transportation of microbial evidence
4	Morphological and physiological characterization and identification of microbes: Introduction
5	Classical methods of microbial characterization
6	Microbial culture and its impact on microbial identification and attribution elements
7	Genetic analysis for microbial characterization: Introduction
8	PCR (dendrograms and phylogenetic trees)
9	Molecular genetic techniques for strain typing
10	Identification of microbes by analysis of fats and lipids: Introduction
11	Methods for extraction and detection of fatty acids and lipids
12	Investigative applications of fatty acids and lipids
13	Instrumental methods for microbial characterization and identification: Introduction
14	Characterization and identification of microbes by instrumental techniques (SEM- EDX, AFM, Raman spectroscopy, mass spectrometry, nuclear microscopy, ICP-OES, ICP-MS)
15	Analysis of elemental signatures of microbes

FORENSIC SCIENCE, DEPARTMENT OF CHEMISTRY, UCS, OU
LESSON PLAN FOR THE ACADEMIC YEAR 2024-2025 - CCE (Semester III)

Class: M.Sc. Forensic Science **Section:** Semester III
COURSE/ Paper: IVA/FS304T(Elective IV A): Research methodology, Statistics and IPR

UNIT I: Concept of Research Methodology

No. of hours allotted: 15

Lecture No.	Topics to be covered
1	Introduction to research
2	Types of research and research approaches
3	Research process, criteria of good research, problems encountered by researchers in India
4	Defining research problem
5	Research design: Meaning, need, types and features of good design
6	Sample design: Steps involved, selecting sampling procedure, characteristics of good sample design, types
7	Important scaling techniques and scale construction techniques
8	Collection of primary data and secondary data, case study method
9	Concept of population, sample, sample size, Types of sampling, determining sample size, data editing and coding
10	Measures of Central tendency: Mean, median and mode
11	Measures of dispersion and asymmetry: Range, Mean deviation and Standard deviation, Skewness and Kurtosis
12	Simple and multiple correlation and regression
13	Concept of probability: Random variable: discrete and continuous
14	Addition, multiplication and Bayes theorem
15	Concept of Probability distribution: Binomial, Poisson, Normal distribution

FORENSIC SCIENCE, DEPARTMENT OF CHEMISTRY, UCS, OU
LESSON PLAN FOR THE ACADEMIC YEAR 2024-2025 - CCE (Semester III)

Class: M.Sc. Forensic Science **Section:** Semester III
COURSE/ Paper: IVA/FS304T(Elective IV A): Research methodology, Statistics and IPR

UNIT II: Statistics in Research

No. of hours allotted: 15

Lecture No.	Topics to be covered
1	Hypothesis and its characteristics
2	Null hypothesis and alternative hypothesis, Level of significance, Critical region, Type I and II errors
3	Procedure for hypothesis testing
4	Concept of analysis of variance
5	Computational procedure for ANOVA one way and two-way classification
6	Examples
7	Large sample test: Test for single mean, Difference of means, Single proportion and difference of proportion with examples
8	Chi square test for goodness of fit
9	Test for independence of attributes, examples
10	Student t-test, t-test for simple mean and difference of means
11	Fisher's exact test: Analysis of variance and multiple comparison tests
12	F-test for equality of variance
13	Statistical approach to DNA fingerprinting, simple case of genotypic and allelic frequencies, Hardy Weinberg equilibrium, Paternity cases and evaluation of blood group frequencies
14	Clothing fibres, Shoe types, Air weapon projectiles, Height identification from eye witness
15	Uncertainty in scientific experimentation, Determination of uncertainty

FORENSIC SCIENCE, DEPARTMENT OF CHEMISTRY, UCS, OU
LESSON PLAN FOR THE ACADEMIC YEAR 2024-2025 - CCE (Semester III)

Class: M.Sc. Forensic Science **Section:** Semester III
COURSE/ Paper: IVA/FS304T(Elective IV A): Research methodology, Statistics and IPR

UNIT III: Publishing research and Intellectual Property Rights

No. of hours allotted: 15

Lecture No.	Topics to be covered
1	Research paper layout, Impact factor of journals, Plagiarism and Self-plagiarism
2	Academic databases, Methods to search required literature effectively
3	Reference Management, Paper formatting and plagiarism detection softwares
4	Meaning, Evolution, Nature and characteristics of IPR
5	Classification and forms, Rationale for protection of IPRs
6	Importance of IPRs in the fields of science and technology
7	Concept and principles of patenting an invention
8	Patentable subject matter, Inventions not patentable, Procedure of obtaining patents in India
9	Infringement of patent rights, Remedies for infringement of patent rights, Case studies, The Patents Act, 1970
10	Subject matter and need of copyright
11	Authorship & ownership of copyright, Exclusive copyright rights of owner, Term of Copyright
12	Copyright registration in India, Copyright infringement, remedies and case studies, Copyright Act, 1957
13	Trademark
14	Industrial design, Geographical indication
15	Trade secrets, plant varieties and semiconductor integrated circuits layout design and related laws

FORENSIC SCIENCE, DEPARTMENT OF CHEMISTRY, UCS, OU
LESSON PLAN FOR THE ACADEMIC YEAR 2024-2025 - CCE (Semester III)

Class: M.Sc. Forensic Science **Section:** Semester III
COURSE/ Paper: IV B/FS304T(Elective IV B): Quality Management, Laboratory Management & Laboratory Safety

UNIT I: Quality Management

No. of hours allotted: 15

Lecture No.	Topics to be covered
1	Quality, Quality system, Quality plan, Inspection and testing of products, Control of inspection, measuring and test equipment, Control of nonconforming product, Corrective and Preventive action
2	Handling, storage, packaging, preservation and delivery of product, Control of quality records
3	Internal quality audits, training and product evaluation
4	Proficiency testing programs: Introduction, Components of Laboratory quality assurance system: Internal quality control, laboratory accreditation, proficiency testing
5	Proficiency testing programs: types, designing and running of proficiency testing program, Red Carpet Syndrome
6	Dealing with extremes, Confidentiality, Dividends of participation
7	Laboratory Accreditation: Introduction, ISO 9000 series of standards
8	ISO 14000 and 17000 series of standards
9	NABL Guidelines for laboratory accreditation in India, GMP and GLP
10	Total Quality Management: Introduction, evolution of TQM
11	Essentials of TQM, quality costs and quality circles
12	QC audit, reliability, implementation of TQM and TQM standard
13	Organization and management of laboratory, Quality system, audit and review
14	Accommodation and environment, Laboratory equipment and reference material
15	Calibration and test methods, handling of calibration and test items, records, certificates and reports, sub-contracting of testing, external services, Grievance committee

FORENSIC SCIENCE, DEPARTMENT OF CHEMISTRY, UCS, OU
LESSON PLAN FOR THE ACADEMIC YEAR 2024-2025 - CCE (Semester III)

Class: M.Sc. Forensic Science **Section:** Semester III
COURSE/ Paper: IV B/FS304T(Elective IV B): Quality Management, Laboratory Management & Laboratory Safety

UNIT II: Laboratory Management

No. of hours allotted: 15

Lecture No.	Topics to be covered
1	Administration of Laboratories, Geographical location, Types of laboratories
2	Connection between field work and laboratory, Educational requirements of laboratory personnel
3	Routine laboratory work, Research and development
4	Lab space, Design of labs, architectural requirements, floor area, furniture design, physical aspects of lab premises and rooms
5	Design, importance and requirements of preparation room
6	Arrangement of stores
7	Routine inspection and maintenance of lab, equipment, apparatus and furniture, cleanliness in lab
8	Stock control and purchase procedure
9	Filing systems, Record management, information about equipment, miscellaneous records
10	Efficient communication (Memoranda, letters, reports)
11	Writing up an experiment, recording and presentation of results
12	Information distribution
13	Classification of LIMS functions, Sub-division by functional area, Definition of LIMS, Strategic design of LIMS
14	System development life cycle: Review of the laboratory, Project proposal, Definition of system requirements, Specifications
15	Evaluation, Purchase, installation, Demonstration, Validation, User training and implementation of commercial or bespoke LIMS

FORENSIC SCIENCE, DEPARTMENT OF CHEMISTRY, UCS, OU
LESSON PLAN FOR THE ACADEMIC YEAR 2024-2025 - CCE (Semester III)

Class: M.Sc. Forensic Science **Section:** Semester III
COURSE/ Paper: IV B/FS304T(Elective IV B): Quality Management, Laboratory Management & Laboratory Safety

UNIT III: Laboratory Safety

No. of hours allotted: 15

Lecture No.	Topics to be covered
1	Written safety plan, safety policies, Role of head of the institution and lab staff, Code of behaviour for lab staff
2	Personal protective devices
3	Check-in and shut down sequences, shifting loads
4	Disposal of unserviceable non-consumable items and obsolete instruments
5	Disposal of chemical wastes
6	Disposal of biological wastes
7	Radiation and chemical hazards
8	Biological hazards
9	Physical hazards, electrical, fire and gas hazards
10	Need and procedure for accident reporting
11	Placement and contents of first aid box, General features of first aid
12	First aid procedure for electric shock, unconscious casualties, chemical accidents, localized injuries, bleeding and shock
13	Case studies of laboratory accidents, Laboratory construction standards set by BIS, Regulations concerning safety and health of workers in industrial labs
14	Regulations regarding electricity, fire, alcohol purchase and storage, hazardous substances and experiments on animals
15	Legal liability for laboratory accidents in educational institutions

FORENSIC SCIENCE, DEPARTMENT OF CHEMISTRY, UCS, OU
LESSON PLAN FOR THE ACADEMIC YEAR 2024-2025 - CCE (Semester III)

Class: M.Sc. Forensic Science **Section:** Semester III
COURSE/ Paper: I/FS351P(*): Forensic Examination of Questioned documents Lab
No. of Sessions Allotted: 15 (Each 4 hours)

Session No.	Topics to be covered
1	Identification and comparison of general and individual characteristics of handwriting
2	Identification and examination of disguised writing
3	Forensic analysis of ink by TLC/Spectrophotometry
4	Forensic examination and detection of Simulated forgery
5	Forensic examination and detection of Traced forgery
6	Forensic examination and detection of Freehand forgery
7	Examination of alterations, additions, overwriting and obliterations in documents
8	Examination of erasures (mechanical and chemical)
9	Preparation and decipherment of secret writings
10	Decipherment and examination of indented writings
11	Examination of type scripts and computer printouts
12	Examination of rubber stamps and seal impressions
13	Examination and identification of genuine and counterfeit Indian currency notes
14	Examination of security features of Indian Passports
15	Examination of security features of plastic currency

FORENSIC SCIENCE, DEPARTMENT OF CHEMISTRY, UCS, OU
LESSON PLAN FOR THE ACADEMIC YEAR 2024-2025 - CCE (Semester III)

Class: M.Sc. Forensic Science **Section:** Semester III
COURSE/ Paper: II/FS352P(*): Forensic Toxicology Lab
No. of Sessions Allotted: 15 (Each 4 hours)

Session No.	Topics to be covered
1	Preliminary tests on blood / urine / vomitus / tissues for heavy metals and toxic anions
2	Preliminary tests on blood / urine / vomitus / tissues for phenolic compounds and alcohol
3	Detection and determination of ethanol in toxicological samples by Kozelka & Hine method
4	Systematic extraction of basic substances from viscera
5	Identification of basic drugs by preliminary tests and TLC
6	Systematic extraction of acidic substances from viscera
7	Identification of acidic drugs by preliminary tests and TLC
8	Systematic extraction of neutral substances from viscera
9	Identification of plant alkaloids by preliminary tests and TLC
10	Identification of pesticides by TLC
11	Determination of a drug in toxicological specimen by Visible / UV spectrophotometry
12	Identification of heavy metals by TLC
13	Determination of a drug / pesticide in toxicological specimen by HPLC/GC (Demo only)
14	GC-MS / LC-MS of a poison of forensic interest (Demo only)
15	Detection and determination of ethyl alcohol in blood / urine / visceral tissue by gas chromatography (Demo only)

FORENSIC SCIENCE, DEPARTMENT OF CHEMISTRY, UCS, OU
LESSON PLAN FOR THE ACADEMIC YEAR 2024-2025 - CCE (Semester III)

Class: M.Sc. Forensic Science **Section:** Semester III
COURSE/ Paper: IIIA/FS353P(Elective III A): Forensic Nanotechnology Lab
No. of Sessions Allotted: 15 (Each 2 hours)

Session No.	Topics to be covered
1	Synthesis of nanoparticles by chemical method - I
2	Synthesis of nanoparticles by chemical method - II
3	Synthesis of nanoparticles by physical method - I
4	Synthesis of nanoparticles by physical method - II
5	Green synthesis of nanoparticles using a plant extract - I
6	Green synthesis of nanoparticles using a plant extract – II
7	Characterization of nanoparticles by microscopic techniques
8	Characterization of nanoparticles by UV-Visible Spectroscopy
9	Characterization of nanoparticles by FTIR
10	Characterization of nanoparticles by XRD
11	Forensic application of nanoparticles in fingerprint development
12	Forensic application of nanoparticles in identification of drugs - I
13	Forensic application of nanoparticles in identification of drugs - II
14	Forensic application of nanoparticles in identification of poisons - I
15	Forensic application of nanoparticles in identification of poisons - II

FORENSIC SCIENCE, DEPARTMENT OF CHEMISTRY, UCS, OU
LESSON PLAN FOR THE ACADEMIC YEAR 2024-2025 - CCE (Semester III)

Class: M.Sc. Forensic Science **Section:** Semester III
COURSE/ Paper: IIIB/FS353P(Elective III B): Microbial Forensics Lab
No. of Sessions Allotted: 15 (Each 2 hours)

Session No.	Topics to be covered
1	Principles of Microscopy
2	Sterilization of microorganisms by physical methods
3	Sterilization of microorganisms by physical methods
4	Sterilization of microorganisms by chemical methods
5	Sterilization of microorganisms by chemical methods
6	Preparation of culture media
7	Preparation of culture media
8	Isolation of pure cultures
9	Isolation of microorganisms from various sources
10	Measurement of bacterial growth
11	Measurement of bacterial growth
12	Characterization of microorganisms by physicochemical characteristics
13	Characterization of microorganisms by genetic characteristics
14	Characterization of microorganisms by instrumental methods
15	Identification of microorganisms from databases

FORENSIC SCIENCE, DEPARTMENT OF CHEMISTRY, UCS, OU
LESSON PLAN FOR THE ACADEMIC YEAR 2024-2025 - CCE (Semester III)

Class: M.Sc. Forensic Science **Section:** Semester III
COURSE/ Paper: IVA/ FS354P(Elective IV A): Research methodology, Statistics & IPR Lab

No. of Sessions Allotted: 15 (Each 2 hours)

Session No.	Topics to be covered
1	Calculation of measures of central tendency for the given data
2	Calculation of measures of dispersion for the given data
3	Problems based on probability
4	Problems based on probability
5	Calculation of correlation coefficient & fitting the linear regression equation on given data
6	Calculation of correlation coefficient & fitting the linear regression equation on given data
7	Test of significant difference between means using t-test
8	Test of significant difference between means using t-test
9	Test of goodness of fit of distribution and association between two attributes using Chi square test
10	Test of goodness of fit of distribution and association between two attributes using Chi square test
11	Data analysis using MS Excel
12	Data analysis using SPSS
13	Data analysis using SPSS
14	Study of process for filing a patent in India and abroad
15	Study of procedure for applying for copyright for literary work

FORENSIC SCIENCE, DEPARTMENT OF CHEMISTRY, UCS, OU
LESSON PLAN FOR THE ACADEMIC YEAR 2024-2025 - CCE (Semester III)

Class: M.Sc. Forensic Science **Section:** Semester III
COURSE/ Paper: IVB/ FS354P(Elective IV B): Quality Management, Laboratory Management and Laboratory Safety Lab
No. of Sessions Allotted: 15 (Each 2 hours)

Session No.	Topics to be covered
1	Study of salient features of ISO 9000 series of standards
2	Study of salient features of ISO 14000 series of standards
3	Study of salient features of ISO 17000 series of standards
4	Study of guidelines of NABL Accreditation
5	Study of design and features of a laboratory
6	Study of purchase procedure
7	Study of stock verification procedure and maintenance of apparatus
8	Study of fire safety measures
9	Handling of hazardous chemicals
10	Sterilization of glassware
11	Disposal of unserviceable, obsolete items and chemical wastes
12	First aid procedures in laboratory
13	First aid procedures in laboratory
14	First aid procedures in laboratory
15	Study of protective equipment used in laboratory

FORENSIC SCIENCE

DEPARTMENT OF CHEMISTRY
UNIVERSITY COLLEGE OF SCIENCE
OSMANIA UNIVERSITY
HYDERABAD

LESSON PLANS
FOR THE ACADEMIC YEAR
2024-2025

M.Sc. FORENSIC SCIENCE
Semester IV
(CCE Syllabus)

FORENSIC SCIENCE, DEPARTMENT OF CHEMISTRY, UCS, OU
LESSON PLAN FOR THE ACADEMIC YEAR 2024-2025 - CCE (Semester IV)

Class: M.Sc. Forensic Science **Section:** Semester IV
COURSE/ Paper: I/FS401T(*): Forensic Serology & DNA Fingerprinting

Unit I: Forensic Serology

No. of hours allotted: 15

Lecture No.	Topics to be covered
1	Introduction to Forensic Serology, Role of Forensic Serologist, types of cases encountered, Collection and preservation of biological fluids encountered as crime scene evidence
2	Nature of blood, Bloodstain pattern interpretation and forensic significance
3	Age of bloodstain
4	Identification of blood and semen by chemical, biochemical, crystal, chromatographic and spectroscopic methods
5	Identification of by saliva, urine, faeces and human breast milk samples by chemical, biochemical, crystal, chromatographic and spectroscopic methods
6	Identification of menstrual blood, amniotic fluid and parturition stains by chemical, biochemical, crystal, chromatographic and spectroscopic methods
7	Determination of origin of species by immunological methods
8	Determination of secretor and non-secretor status
9	Methods used for grouping biological stains
10	Introduction of blood groups, History, Biochemistry and genetics of ABO, MN, Rh, Lewis, Lutheran, Kidd, Duffy and P systems
11	Serum proteins (Km, Gm, Hp, Gc, Transferrin, LDH, PCE)
12	Cellular proteins (PGM, AK, ADA, PepA, EsD, GLO, GPT, G6PD)
13	Haemoglobin variants (Hbf, Hbs, Hbc, HbA)
14	Determination of sex and race from blood
15	White blood group system HLA and its forensic significance

FORENSIC SCIENCE, DEPARTMENT OF CHEMISTRY, UCS, OU
LESSON PLAN FOR THE ACADEMIC YEAR 2024-2025 - CCE (Semester IV)

Class: M.Sc. Forensic Science **Section:** Semester IV
COURSE/ Paper: I/FS401T(*): Forensic Serology & DNA Fingerprinting

Unit II: DNA Fingerprinting

No. of hours allotted: 15

Lecture No.	Topics to be covered
1	Introduction, Forensic significance, History
2	Introduction to human genetics: Physical basis of heredity, Alleles, Population genetics
3	Molecular biology of DNA, Variation, and enzymes
4	Collection and Preservation of physical evidence for DNA typing
5	Isolation of DNA
6	Determination of quality and quantity of DNA
7	RFLP analysis: Introduction, steps in RFLP analysis and interpretation of RFLP profiles
8	PCR analysis: Introduction and steps in PCR cycle
9	Types of PCR
10	Sequence polymorphism: HLA DQA1, Polymarker Amplitype PM6
11	Mitochondrial DNA analysis
12	Length Polymorphism: STR analysis (Instrumentation for STR typing and STR Genotyping), Gender identification, D1S80
13	DNA separation: Slab gel electrophoresis (Agarose gel electrophoresis and PAGE)
14	Capillary Electrophoresis
15	DNA detection: Fluorescent dye staining and silver staining

FORENSIC SCIENCE, DEPARTMENT OF CHEMISTRY, UCS, OU
LESSON PLAN FOR THE ACADEMIC YEAR 2024-2025 - CCE (Semester IV)

Class: M.Sc. Forensic Science **Section:** Semester IV
COURSE/ Paper: I/FS401T(*): Forensic Serology & DNA Fingerprinting

Unit III: Interpretation of DNA typing results, applications, future technologies & legal aspects

No. of hours allotted: 15

Lecture No.	Topics to be covered
1	Introduction to complicating factors (Multiple contributors, Degradation, Extraneous substance)
2	System specific interpretational issues of RFLP based systems (Multi banded patterns and single banded patterns)
3	System specific interpretational issues of PCR based systems
4	Determination of genetic concordance, evaluation of results
5	Bayes theorem, Hardy Weinberg law
6	Frequency estimate calculations, Population sub structure and Likelihood ratios
7	Automated analysis systems
8	DNA chips
9	SNPs and DNA Cloning
10	Applications of DNA profiling in various fields of science
11	Forensic applications of DNA profiling
12	Legal standards for admissibility of DNA profiling
13	Introduction to Bioinformatics, Genomics and Proteomics
14	DNA databank and database
15	Certification of expert and accreditation of lab, Validity of DNA analysis reports

FORENSIC SCIENCE, DEPARTMENT OF CHEMISTRY, UCS, OU
LESSON PLAN FOR THE ACADEMIC YEAR 2024-2025 - CCE (Semester IV)

Class: M.Sc. Forensic Science **Section:** Semester IV
COURSE/ Paper: II/FS402T(*): Digital Forensics and Incident Response

Unit I: Introduction to Computers, Computer crimes and Cyber Forensics

No. of hours allotted: 15

Lecture No.	Topics to be covered
1	Introduction to computers, Historical Perspective and Generations of Computers
2	Computer hardware (CPU, Computer memory, Input and output devices, Auxiliary storage devices)
3	Computer software (Operating systems and application software)
4	Introduction to cybercrime, Categories of cybercrime (Cybercrimes against person, property and Government), Worms and Viruses
5	Types of cybercrimes (Hacking, DoS attacks, Trojan attacks, credit card frauds, cyber pornography, online betting, software piracy, Email spoofing, phishing, cyber terrorism, salami attacks, cyber stalking)
6	Role of computers in crimes, Prevention of cybercrime
7	Introduction to Windows, Linux and MAC Forensics, Mobile device Forensics, Network Forensics
8	Malware Forensics, IoT Forensics, Cloud Forensics, Blockchian Forensics, ICS Forensics
9	Social Media and OSINT, CCTV Forensics, Drone Forensics, Vehicle Forensics, Multimedia Forensics
10	Introduction, Definition, history and rules of digital forensics, Digital Forensic Investigation: Goals and various DFI models, Ethical issues in digital forensics
11	Definition, Rules of digital evidence, Characteristics of digital evidence
12	Procedures and challenges in digital evidence handling, Volatile evidence, Legal principles of digital evidence, metadata
13	Introduction to hacking, types of hackers, Reason and impact of hacking, Steps performed by hackers, Prevention from hackers
14	Ethical hacking: ethical issues, process, working
15	Types of ethical hacks, Ethical hacking tools

FORENSIC SCIENCE, DEPARTMENT OF CHEMISTRY, UCS, OU
LESSON PLAN FOR THE ACADEMIC YEAR 2024-2025 - CCE (Semester IV)

Class: M.Sc. Forensic Science **Section:** Semester IV
COURSE/ Paper: II/FS402T(*): Digital Forensics and Incident Response

Unit II: Cyber Forensic investigation, E-Mail Forensics and Computer Forensic Tools

No. of hours allotted: 15

Lecture No.	Topics to be covered
1	Six stages of incident response, Incident response methodology
2	Activities in initial response, Phases after detection of an incident
3	People involved in data collection, live data collection
4	Introduction, rules, need and admissibility of forensic duplication, important terms in forensic duplicate
5	Requirements of forensic duplicate tools, creating forensic duplicate of a hard drive, creating a boot disk, creating a qualified forensic duplicate with SafeBack and EnCase
6	Preparation steps for forensic analysis, Investigating Windows systems & UNIX systems
7	Goals of report, Layout of an investigative report
8	Guidelines for writing a report
9	Incident response report
10	Importance of E-Mail as evidence, working of an email, steps in E-mail communication, E-Mail service protocols
11	Internet frauds, securing an E-mail account, IP Tracking
12	E-Mail recovery, E-Mail Forensics analysis steps, E-mail Forensic Tools
13	Introduction, Need and types of Computer Forensic tools (Hardware and Software tools), Tasks performed by Computer Forensics tools, tool comparison
14	Computer Forensics Software tools, Computer Forensics Hardware tools
15	Various Computer Forensic tools

FORENSIC SCIENCE, DEPARTMENT OF CHEMISTRY, UCS, OU
LESSON PLAN FOR THE ACADEMIC YEAR 2024-2025 - CCE (Semester IV)

Class: M.Sc. Forensic Science **Section:** Semester IV
COURSE/ Paper: II/FS402T(*): Digital Forensics and Incident Response

Unit III: Network Forensics, Mobile Phone Forensics, Social Media Forensics, Cyber security and Cyber Law

No. of hours allotted: 15

Lecture No.	Topics to be covered
1	Introduction, types and topologies of computer networks
2	Overview of TCP/IP protocol and OSI Model
3	Introduction to Mobile Technologies **(**ATM, WAP), Cellular technologies (AMPS, i-Mode, TDMA, CDMA, GSM) and relative strengths (SIM, IMEI), Understanding of the mobile phone operating systems: Android, iOS, Windows
4	Introduction to intrusion detection system, types, advantages and disadvantages of intrusion detection systems, understanding network intrusions and attacks
5	Recognizing pre-intrusion activities, port scans, address spoofing, attack with Trojan, viruses and worms
6	Understanding password cracking, understanding technical exploits, collecting network based evidence, investigating routers
7	Seizure and Preservation of mobile phones and PDA: Types of evidence present in mobile phones, files present in SIM card, external memory dump and evidences in memory card
8	Mobile phone evidence extraction process: Data acquisition methods (Physical, File System, Logical and Manual Acquisition)
9	Mobile Forensic Investigation Toolkit, Tracking of mobile phone location
10	Types of crimes of social media: Cyber bullying, Online Grooming, Cyber stalking
11	Sources for social media evidence: Types of data available on social networking sites, different evidence collection methods from social networking sites
12	Tools and techniques for intelligence gathering from social media: indirect method, direct method with login, direct method without login
13	Concept of cyber security, Issues and challenges of cyber security**,** National cyber security policy and strategy
14	Reporting of cybercrimes, Remedial and mitigation measures, Legal perspective of cybercrime, IT Act, 2000, its amendments and limitations, Cybercrime and punishments
15	Cyber Laws and Legal and ethical aspects related to new technologies: AI/ML, IoT, Blockchain, Dark net and Social media, Cyber Laws of other countries, Case Studies

FORENSIC SCIENCE, DEPARTMENT OF CHEMISTRY, UCS, OU
LESSON PLAN FOR THE ACADEMIC YEAR 2024-2025 - CCE (Semester IV)

Class: M.Sc. Forensic Science **Section:** Semester IV
COURSE/ Paper: IIIA/FS403T(Elective III A): Forensic Accounting & Fraud Investigation

Unit I: Concept of Forensic Accounting and fraud vulnerabilities

No. of hours allotted: 15

Lecture No.	Topics to be covered
1	Introduction, concept of Forensic Accounting
2	Definitions of Forensic accounting
3	Applications of Forensic Accounting
4	Definition and Classification of forensic audit, Evolution of Forensic audit in the world and in India
5	Principles of fraud auditing
6	Difference between forensic audit and other audits, Uses of Forensic auditing
7	Principal duties of a forensic auditor; Specific Assistance in Investigative Accounting and Litigation Support
8	Competencies of forensic accountant; Approach of Forensic auditor to forensic investigation
9	Advantages of engaging forensic auditors
10	Various definitions of fraud; Elements of fraud; Different types of fraudsters
11	Major corporate frauds (Satyam computers, Kingfisher airlines, PNB fraud, Jet airways, Enron)
12	Fraud origin and accounting cycles
13	Fraud triangle, Fraud diamond, Fraud pentagon
14	Fraud scale, Fraud circle, Hollinger Clark theory
15	Motivation for fraud, social consequences of economic crime

FORENSIC SCIENCE, DEPARTMENT OF CHEMISTRY, UCS, OU
LESSON PLAN FOR THE ACADEMIC YEAR 2024-2025 - CCE (Semester IV)

Class: M.Sc. Forensic Science **Section:** Semester IV
COURSE/ Paper: IIIA/FS403T(Elective III A): Forensic Accounting & Fraud Investigation

Unit II: Forensic Accounting in Fraud Investigation

No. of hours allotted: 15

Lecture No.	Topics to be covered
1	Internal, external and mixed fraud
2	Bank frauds, corporate frauds, fraud tree classification
3	Insurance frauds, cyber frauds, securities frauds, consumer frauds
4	Occupational frauds: Definition
5	Types of occupational frauds (Corruption, Asset misappropriation, fraudulent financial statements)
6	Money laundering, financial crimes in cross border transactions
7	Detecting red flags, classification of red flags (Financial Performance flags, accounting system flags, Operational flags, Behavioural flags, Structural flags and Personnel red flags)
8	Some red flags (Lack of corporate governance, questionable accounting activities, sudden losses, TGTBT syndrome, generation of orphan funds, disaster situations, missing documentation, chaotic conditions, behavioural issues, complaints)
9	Yellow flags and green flags
10	Initialization, develop plan, Obtain relevant evidence
11	Perform analysis, Reporting, Court proceedings
12	Forensic audit report
13	Interview process (Data collection, interview purpose, Setting time and place, preparation for interview, recording of interview, interview, types of questions and sequence, Note taking during interview, Concluding and documenting interview)
14	Identifying deception and techniques used to assess, Admission seeking interview
15	Barriers and safety considerations for an effective interview

FORENSIC SCIENCE, DEPARTMENT OF CHEMISTRY, UCS, OU
LESSON PLAN FOR THE ACADEMIC YEAR 2024-2025 - CCE (Semester IV)

Class: M.Sc. Forensic Science **Section:** Semester IV
COURSE/ Paper: IIIA/FS403T(Elective III A): Forensic Accounting & Fraud Investigation

Unit III: Forensic Audit techniques, Fraud prevention systems and Legal aspects

No. of hours allotted: 15

Lecture No.	Topics to be covered
1	Seven investigative tools used by fraud examiners, general audit techniques (Testing defences), Statistical and mathematical techniques (Trend analysis, ratio analysis)
2	Technology based/ Digital forensic techniques, Computer Assisted Auditing Techniques (CAATs), generalized audit software and other software related tools
3	Data mining techniques, laboratory analysis of physical and electronic evidence
4	Fraudulent financial reporting schemes
5	Improper revenue recognitions
6	Other financial reporting schemes
7	IT tools for fraud detection
8	Categorization of fraud detection methods
9	Supervised and unsupervised methods
10	Effective internal controls, audit interaction
11	Systems security audits
12	Methods for performing security audits
13	Organization to combat fraud in India and abroad
14	Applicable laws in India
15	Applicable laws abroad

FORENSIC SCIENCE, DEPARTMENT OF CHEMISTRY, UCS, OU
LESSON PLAN FOR THE ACADEMIC YEAR 2024-2025 - CCE (Semester IV)

Class: M.Sc. Forensic Science **Section:** Semester IV
COURSE/ Paper: IIIB/FS403T(Elective III B): Forensic Linguistics & Multimedia Forensics

Unit I: Forensic linguistics

No. of hours allotted: 15

Lecture No.	Topics to be covered
1	Introduction, evolution and concept of linguistics
2	Linguistics and its branches, Role of linguistics in understanding human communication
3	Application of linguistic theories in various fields, crucial role of linguistic analysis in legal settings
4	Introduction, concept, origin, development and significance of Forensic Linguistics, Language as legal evidence, interdisciplinary nature of Forensic Linguistics
5	Scrutinizing linguistic features within legal texts and documents, Authorship analysis, Discourse analysis, Threat and deception analysis and language profiling
6	Current trends, emerging areas, challenges, ethical considerations and case studies in Forensic Linguistics
7	Introduction to Stylistics and Forensic stylistics, Role of Forensic stylistics
8	Forensic stylistics analysis
9	Forensic applications and limitations of Forensic Stylistics
10	Introduction, history and branches of phonetics
11	Human voice (Nature of voice and production of speech, Perception of voice and speech)
12	Authentication of tape recordings, transcripts and Vocal behaviours (Stress, Alcohol speech relationships)
13	Speaker recognition types, procedure, methods, feature extraction and comparison, classification
14	Speaker recognition by listening, Speaker recognition by visual comparison of spectrograms (Kersta method), Automatic Speaker recognition , Interpretation of results
15	Speaker profiling, Intelligibility Enhancement of audio recording, Transcription and analysis of disputed utterances, authenticity and integrity examination of audio recordings

FORENSIC SCIENCE, DEPARTMENT OF CHEMISTRY, UCS, OU
LESSON PLAN FOR THE ACADEMIC YEAR 2024-2025 - CCE (Semester IV)

Class: M.Sc. Forensic Science **Section:** Semester IV
COURSE/ Paper: IIIB/FS403T(Elective III B): Forensic Linguistics & Multimedia Forensics

Unit II: Multimedia Forensics

No. of hours allotted: 15

Lecture No.	Topics to be covered
1	Introduction and scope of Multimedia Forensics
2	Need of Multimedia Forensics
3	Multimedia tools and their applications
4	Multimedia devices for image and video capture
5	Handling and preservation of multimedia files
6	Detection of forgeries in media files
7	Recovery of audio, video and image files, copyright infringement
8	Plagiarism and related laws
9	Admissibility of multimedia evidence in the court of law
10	Digital Signal Processing - Origin and integrity of multimedia files
11	Digital watermarking, LPC, DFT and FFT
12	Multimedia file formats, tools for analysis
13	Multimedia security (Forensic Watermarking): Introduction
14	Incorporation and working of watermarks
15	Forensic importance of digital watermarks in digital photography and video

FORENSIC SCIENCE, DEPARTMENT OF CHEMISTRY, UCS, OU
LESSON PLAN FOR THE ACADEMIC YEAR 2024-2025 - CCE (Semester IV)

Class: M.Sc. Forensic Science **Section:** Semester IV
COURSE/ Paper: IIIB/FS403T(Elective III B): Forensic Linguistics & Multimedia Forensics

Unit III: Audio, video and image analysis

No. of hours allotted: 15

Lecture No.	Topics to be covered
1	Introduction and scope, fundamentals of audio signals and systems, Analog to digital conversion, history of audio forensics, Acoustic parameters of sound
2	Forensic audio analysis: handling of forensic evidence and authenticity assessment, audio signal assessment and analysis, methods of tampering digital audio, forensic authentication of digital audio
3	Microphone forensics, enhancement of digital audio
4	Forensic Image Analysis: Introduction, scope, recovery of evidence
5	Evidence enhancement of images, Analysis and authentication of images, image source identification and image forgery detection
6	Metadata analysis, error level analysis (ELA), Noise analysis, Clone detection
7	Video forensics: Introduction, scope, standards for video transmission, Active and passive video forensics, blind and non-blind image video forensics
8	Technologies that support Video Forensics: Blurred license plate image recognition, Rotation object recognition, Translation object recognition, Scaling- invariant object recognition, Trajectory analysis on moving objects, Video inpainting
9	Techniques that promote Video Forensics (People counting in videos and recognizing video objects using features extracted from a video shot/clip), Frame rate analysis, Video quality analysis, Motion analysis, Steganalysis
10	Introduction to CCTV: Introduction
11	Role and functioning of CCTV cameras
12	Categories and types of CCTVs
13	Handling, preservation and transport of CCTV footages, Retrieving evidence from CCTV system
14	Video Management system and CCTV surveillance, Features of video analysis tools, Comparing hash values
15	Intelligent video analytics and related case studies

FORENSIC SCIENCE, DEPARTMENT OF CHEMISTRY, UCS, OU
LESSON PLAN FOR THE ACADEMIC YEAR 2024-2025 - CCE (Semester IV)

Class: M.Sc. Forensic Science **Section:** Semester IV
COURSE/ Paper: I/FS451P(*): Forensic Serology & DNA Fingerprinting Lab
No. of sessions allotted: 15 (Each 4 hours)

Session No.	Topics to be covered
1	Identification of blood and its stains by chemical and crystal tests
2	Identification of semen and its stains by chemical and crystal tests
3	Identification of saliva and its stains by chemical and crystal tests
4	Identification of urine and its stains by chemical and crystal tests
5	Microscopic identification of spermatozoa
6	Determination of origin of species of blood, semen and saliva by agar gel diffusion method
7	Grouping of dried stain of blood, semen, saliva and hair by absorption elution technique
8	Determination of secretor status from semen and saliva stains by absorption inhibition technique
9	Isolation of DNA from blood
10	PCR amplification of DNA (Demonstration only)
11	Quantitative estimation of DNA by spectrophotometry
12	Agarose gel electrophoresis of proteins
13	Quantitative estimation of proteins
14	Assay of amylase
15	Assay of urease

FORENSIC SCIENCE, DEPARTMENT OF CHEMISTRY, UCS, OU
LESSON PLAN FOR THE ACADEMIC YEAR 2024-2025 - CCE (Semester IV)

Class: M.Sc. Forensic Science **Section:** Semester IV
COURSE/ Paper: II/FS452P(*): Digital Forensics & Incident Response Lab
No. of sessions allotted: 15 (Each 4 hours)

Session No.	Topics to be covered
1	RAM capture and RAM analysis
2	Disk imaging and Content based imaging
3	Registry Analysis and Event log analysis
4	Proof of execution
5	Basic checklist, privacy and security settings for popular social media platforms
6	Reporting and redressal mechanism for violations and misuse of social media platforms
7	Platforms for reporting cybercrimes and checklist for reporting cybercrimes online
8	Preparation of password policy for computer and mobile device
9	Demonstration of FTK imager
10	Demonstration of Autopsy software
11	Demonstration of calculation of MD5 and SHA1 hashes
12	Packet Capture using WireShark
13	OSINT using MALTEGO and OSINT Framework
14	PCAP File analysis
15	Managing application permissions in mobile phone

FORENSIC SCIENCE, DEPARTMENT OF CHEMISTRY, UCS, OU
LESSON PLAN FOR THE ACADEMIC YEAR 2024-2025 - CCE (Semester IV)

Class: M.Sc. Forensic Science **Section:** Semester IV
COURSE/ Paper: IIIA/ FS453P(Elective III A): Forensic Accounting & fraud investigation Lab
No. of sessions allotted: 15 (Each 2 hours)

Session No.	Topics to be covered
1	Case study of bank fraud
2	Case study of bank fraud
3	Case study of corporate fraud
4	Case study of corporate fraud
5	Case study of insurance fraud
6	Case study of insurance fraud
7	Case study of occupational fraud
8	Case study of occupational fraud
9	Case study of securities fraud
10	Case study of securities fraud
11	Case study of consumer fraud
12	Case study of consumer fraud
13	Study of forensic audit techniques and use of AI and machine learning in fraud investigation
14	Study of salient features of laws pertaining to Forensic Accounting applicable in India
15	Record valuation

FORENSIC SCIENCE, DEPARTMENT OF CHEMISTRY, UCS, OU
LESSON PLAN FOR THE ACADEMIC YEAR 2024-2025 - CCE (Semester IV)

Class: M.Sc. Forensic Science **Section:** Semester IV
COURSE/ Paper: IIIB/FS453P(Elective III B): Forensic Linguistics & Multimedia Forensics Lab
No. of sessions allotted: 15 (Each 2 hours)

Session No.	Topics to be covered
1	Forensic text analysis
2	Forensic text analysis
3	Case studies: Role of language in legal outcomes
4	Case studies: Role of language in legal outcomes
5	Multimedia sample collection
6	Multimedia sample collection
7	Audacity based segregation of voice
8	Audacity based segregation of voice
9	Image analysis using open source software
10	Image analysis using open source software
11	Voice analysis using open source software
12	Voice analysis using open source software
13	Video analysis using open source software
14	Video analysis using open source software
15	Forensic video enhancement in CCTV footage