



AVS

COLLEGE OF ARTS & SCIENCE (AUTONOMOUS)

Attur Main Road, Ramalingapuram, Salem - 106.

(Recognized under section 2(f) & 12(B) of UGC Act 1956 and
Accredited by NAAC with 'A' Grade)

(Co - Educational Institution | Affiliated to Periyar University, Salem
ISO 9001 : 2015 Certified Institution)

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Syllabus for

B. Sc FORENSIC SCIENCE

CHOICE BASED CREDIT SYSTEM –

LEARNING OUTCOMES BASED CURRICULUM FRAMEWORK

(CBCS – LOCF)

(Applicable to the Candidates admitted from 2023-24 onwards)

VISION

- To attain excellence in the field of education by creating competent scholars with a touch of human values.

MISSION

- To accomplish eminence in the academic domain.
- To provide updated infrastructure.
- To educate value based education.
- To impart skills through efficient training programs.
- To cultivate culture and tradition with discipline and determination.

REGULATIONS

1. Eligibility for Admission:

Candidate seeking admission to the first year degree of Bachelor of Science in Forensic Science shall be required to have passed the Higher Secondary Examination conducted by the Government of Tamil Nadu or any other examination accepted by the syndicate of Periyar University, subject to such condition as, may be prescribed thereto, are permitted to appear and Qualify for B. Sc, Degree of this University after a course of three academic years.

2. Duration:

Bachelor Degree courses – Three year (six semester)

3. Eligibility for award of degree:

A Candidate shall be eligible for the award of degree only if he/she has undergone, the prescribed course of study in a college affiliated to the University for a period not less than three academics years, comprising six Semester and passed the examination prescribed and full filled such condition as have been prescribed there for

4. Course of Study:

The course of study shall comprise instruction in the following subjects according to the syllabus and books prescribed from time to time.

5. Scheme of Examination:

The scheme of examination of the different semester shall be as follows;

Total Marks:4700 Part I: 400 Part II: 400 Part III: 2800 Part IV: 1100

Total Credits: 140 Part I: 12 Part II:12 Part III: 92 Part IV: 24

6. Passing Rules:

The Candidates shall be declared to have passed the examination if he/she

i) Theory

Secures not less than 40 marks in total (CIA mark + Theory Exam mark) with minimum of 30 marks in the Theory Exam conducted by the University.

ii) Practical

Secures not less than 40 marks in total (CIA mark + Practical Exam mark) with minimum of 18 marks out of 45 marks in the Practical Exam conducted by the University

| Programme Outcomes (POs) | |
|--|--|
| On successful completion of the B. Sc Forensic science | |
| PO1 | Exhibit good domain knowledge and completes the assigned responsibilities effectively and efficiently in par with the expected quality standards. |
| PO2 | Apply analytical and critical thinking to identify, formulate, analyze, and solve complex problems in order to reach authenticated conclusions |
| PO3 | Design and develop research based solutions for complex problems with specified needs through appropriate consideration for the public health, safety, cultural, societal, and environmental concerns. |
| PO4 | Establish the ability to Listen, read, proficiently communicate and articulate complex ideas with respect to the needs and abilities of diverse audiences. |
| PO5 | Deliver innovative ideas to instigate new business ventures and possess the qualities of a good entrepreneur |
| PO6 | Acquire the qualities of a good leader and engage in efficient decision-making. |
| PO7 | Graduates will be able to undertake any responsibility as an individual/member of multidisciplinary teams and have an understanding of team leadership |
| PO8 | Function as socially responsible individual with ethical values and accountable to ethically validate any actions or decisions before proceeding and actively contribute to the societal concerns. |
| PO9 | Identify and address own educational needs in a changing world in ways sufficient to maintain the competence and to allow them to contribute to the advancement of knowledge |
| PO10 | Demonstrate knowledge and understanding of management principles and apply these to one own work to manage projects and in multidisciplinary environment. |

Program Specific Outcomes (PSOs)

After the successful completion of B. Sc Forensic science programme the students are expected to

| | |
|-------------|---|
| PSO1 | Impart education with domain knowledge effectively and efficiently in par with the expected quality standards for forensic science professional. |
| PSO2 | Ability to apply the mathematical, technical and critical thinking skills in the forensic investigations |
| PSO3 | Ability to involve in life-long learning and adopt fast changing technology to prepare for professional development. |
| PSO4 | Expose the students to learn the important of forensic science and criminology such as basic for forensic psychology, forensic chemistry, forensic toxicology, and forensic anthropology. |
| PSO5 | Inculcate effective communication skills combined with professional & ethical attitude. |

Programme Educational Objectives (PEOs)

The B.Sc. Forensic science programme describe accomplishments that graduates are expected to attain within five to seven years after graduation.

| | |
|-------------|--|
| PEO1 | Expertise with the knowledge forensic activities. |
| PEO2 | Handle forensic laboratory methodologies with respect to the examination and analysis of evidence. |
| PEO3 | Develop oral communication skills for discussing the scientific method in a laboratory setting and effectively testifying in a court of law. |
| PEO4 | To analytically educate the necessity to understand the impact of cybercrimes and threats with solutions in a global context. |

CREDIT DISTRIBUTION FOR 3 YEARS B. Sc. FORENSIC SCIENCE PROGRAMME

| Part | Course Type | Credits per Course | No. of Papers | Total Credits |
|----------------------|--|--------------------|---------------|---------------|
| Part I | Language – I (Tamil/Hindi/French) | 3 | 4 | 12 |
| Part II | Language – II (English) | 3 | 4 | 12 |
| Part III | Core Courses- Theory | 5 | 7 | 35 |
| | Core Courses- Theory | 4 | 5 | 20 |
| | Core Courses- Practical | 4 | 2 | 8 |
| | Core Courses- Practical | 3 | 1 | 3 |
| | Major Elective Courses- Theory | 4 | 1 | 4 |
| | Major Elective Courses- Theory | 3 | 6 | 18 |
| | Major Elective Courses- Practical | 3 | 1 | 3 |
| Total | | | | 91 |
| Part IV | Non Major Elective Courses | 2 | 1 | 2 |
| | Skill Enhancement Courses | 2 | 7 | 14 |
| | Professional Competency Skill Enhancement Course | 2 | 1 | 2 |
| | EVS (Environmental Studies) | 2 | 1 | 2 |
| | Foundation Course | 2 | 1 | 2 |
| | Internship | 2 | 1 | 2 |
| | Extension Activity (NSS/NCC/Physical Education) | 1 | 1 | 1 |
| Total | | | | 25 |
| Total Credits | | | | 140 |

CONSOLIDATED SEMESTER WISE AND COMPONENT WISE CREDIT DISTRIBUTION
FOR 3 YEARS B. Sc FORENSIC SCIENCE PROGRAMME

| Parts | Semester I | Semester II | Semester III | Semester IV | Semester V | Semester VI | Total Credits |
|--------------|------------|-------------|--------------|-------------|------------|-------------|---------------|
| Part I | 3 | 3 | 3 | 3 | - | - | 12 |
| Part II | 3 | 3 | 3 | 3 | - | - | 12 |
| Part III | 13 | 13 | 12 | 13 | 22 | 18 | 91 |
| Part IV | 4 | 4 | 4 | 6 | 4 | 3 | 25 |
| Part V | - | - | - | - | - | - | - |
| Total | 23 | 23 | 22 | 25 | 26 | 21 | 140 |

*Part I, II and Part III components will be separately taken into account for CGPA calculation and classification for the under graduate programmes and the other components IV and V have to completed during the duration of the programmes as per the norms, to be eligible for obtaining the UG degree.

METHOD OF EVALUATION

| Evaluation | Components | Marks |
|---------------------|---|------------------|
| Internal Evaluation | Continuous Internal Assessment Test | 15 |
| | Assignments | 3 |
| | Class Participation | 2 |
| | Distribution of marks for Attendance (in percentage) 96 – 100: 5 Marks 91 – 95: 4 Marks 86 – 90: 3 Marks 81 – 85: 2 Marks | 5 |
| External Evaluation | End Semester Examination | 75 Marks |
| Total | | 100 Marks |

Note: 1.UG Programmes- A candidate must score minimum 10 marks in Internal and 30 marks in External Evaluation.

2. PG Programmes- A candidate must score minimum 13 marks in Internal and 38 marks in External Evaluation.

CONTINUOUS INTERNAL ASSESSMENT

Categorizing Outcome Assessment Levels Using Bloom's Taxonomy

| level | Cognitive Domain | Description |
|-------|------------------|--|
| K1 | Remember | It is the ability to remember the previously learned concepts or ideas. |
| K2 | Understand | The learner explains concepts or ideas. |
| K3 | Apply | The learner uses existing knowledge in new contexts. |
| K4 | Analyze | The learner is expected to draw relations among ideas and to compare and contrast. |
| K5 | Evaluate | The learner makes judgments based on sound analysis. |
| K6 | Create | The learner creates something unique or original. |

Question Paper Blue Print for Continuous Internal Assessment- I & II

| Duration: 2 Hours | | Maximum: 50 marks | | | | | |
|----------------------|---------|-------------------|----|----|----|----|-------------|
| Section | K level | | | | | | Marks |
| | K1 | K2 | K3 | K4 | K5 | K6 | |
| A (no choice) | 10 | | | | | | 10 X 1 =10 |
| B (no choice) | | 1 | 1 | | | | 2 X 5 =10 |
| C (either or choice) | | | | 3 | | | 3 x 10 = 30 |
| Total | | | | | | | 50 marks |

Note: K4 and K5 levels will be assessed in the Model Examination whereas K5 and K6 Levels will be assessed in the End Semester Examinations.

Question Paper Blue Print for Continuous Internal Assessment- I

Time: 2 Hours

Total Marks: 50 Marks

Minimum Pass: 20 Marks

| Unit | Section - A | Section - B | Section - C |
|---------|---------------------|-------------|-----------------|
| I | Q.N. 1, 2, 3, 4, 5 | Q.N. 11 | Q.N. 13 A, 13 B |
| I or II | - | - | Q.N. 14 A, 14 B |
| II | Q.N. 6, 7, 8, 9, 10 | Q.N. 12 | Q.N. 15 A, 15 B |

SECTION – A (10 X 1 = 10 Marks)

ANSWER ALL THE QUESTIONS

SECTION – B (2 X 5 = 10 Marks)

ANSWER ALL THE QUESTIONS

SECTION – C (3 X 10 = 30 Marks)

ANSWER ALL THE QUESTIONS (Either or Choice)

Question Paper Blue Print for Continuous Internal Assessment- II

Time: 2 Hours

Total Marks: 50 Marks

Minimum Pass: 20 Marks

| Unit | Section - A | Section - B | Section - C |
|-----------|---------------------|-------------|-----------------|
| III | Q.N. 1, 2, 3, 4, 5 | Q.N. 11 | Q.N. 13 A, 13 B |
| III or IV | - | - | Q.N. 14 A, 14 B |
| IV | Q.N. 6, 7, 8, 9, 10 | Q.N. 12 | Q.N. 15 A, 15 B |

SECTION – A (10 X 1 = 10 Marks)

ANSWER ALL THE QUESTIONS

SECTION – B (2 X 5 = 10 Marks)

ANSWER ALL THE QUESTIONS

SECTION – C (3 X 10 = 30 Marks)

ANSWER ALL THE QUESTIONS (Either or Choice)

Question Paper Blue Print for Model Examination & End Semester Examination

| Duration: 3 Hours | | Maximum: 75 marks | | | | | | |
|---|--|-------------------|----|----|----|----|----|-----------------|
| Section | | K level | | | | | | Marks |
| | | K1 | K2 | K3 | K4 | K5 | K6 | |
| A (no choice, three questions from each unit) | | 15 | | | | | | 15 X 1 =15 |
| B (choice, one question from each unit) | | | 1 | 1 | | | | 2 X 5 =10 |
| C (either or choice & two questions from each unit) | <i>Courses with K4 as the highest cognitive level</i> | | | | 4 | 1 | | 5 x 10 = 50 |
| | <i>Course with K5 as the highest cognitive level wherein three K4 questions and two K5 questions are compulsory.</i> | | | | 3 | 2 | | |
| | <i>Course with K6 as the highest cognitive level wherein two questions each on K4, K5 and one question on K6 are compulsory.</i> | | | | 2 | 2 | 1 | |
| Total | | | | | | | | 75 marks |

Question Paper Blue Print for Model Examination & End Semester Examination

Time: 2 Hours

Total Marks: 75 Marks

Minimum Pass: 30 Marks

| Unit | Section - A | Section - B | Section - C |
|------|-----------------|-------------|-----------------|
| I | Q.N. 1, 2, 3 | Q.N. 16 | Q.N. 21 A, 21 B |
| II | Q.N. 4, 5, 6 | Q.N. 17 | Q.N. 22 A, 22 B |
| III | Q.N. 7, 8, 9 | Q.N. 18 | Q.N. 23 A, 23 B |
| IV | Q.N. 10, 11, 12 | Q.N. 19 | Q.N. 24 A, 24 B |
| V | Q.N. 13, 14, 15 | Q.N. 20 | Q.N. 25 A, 25 B |

SECTION – A (15 X 1 = 15 Marks)

ANSWER ALL THE QUESTIONS

SECTION – B (2 X 5 = 10 Marks)

ANSWER ANY TWO QUESTIONS

SECTION – C (5 X 10 = 50 Marks)

ANSWER ALL THE QUESTIONS (Either or Choice)

Question Paper Blue Print for Model Practical Examination & End Semester Examination (Practical)

Time: 3 Hours

Total Marks: 60 Marks

Minimum Pass: 24 Marks

| Practical Marks | Maximum Mark | Minimum Mark |
|------------------------|---------------------|---------------------|
| Internal | 40 | 16 |
| External | 60 | 24 |
| Total | 100 | 40 |

Evaluation for End Semester Examinations (Practical)

| | |
|------------------------|-----------------|
| Record | 10 marks |
| Formula with expansion | 05 marks |
| Observation with data | 20 marks |
| Viva-voce | 05 marks |
| Calculation | 15 marks |
| Result with units | 05 marks |
| TOTAL | 60 MARKS |

*Submission of record with due certification is a must for external practical examinations.

**A student should complete all requires experiments to get 10 marks for the record.

Scheme of Examination for B. Sc Forensic Science

First Year – Semester - I

| Part | Course Code | Course Title | Ins. Hrs | Credit | CIA | ESE | Total |
|--------------|-------------|---|-----------|-----------|-----|-----|-------|
| I | 23UFTA01 | Podhu Tamil - I | 3 | 3 | 25 | 75 | 100 |
| II | 23UFEN01 | General English - I | 3 | 3 | 25 | 75 | 100 |
| III | 23UFS01 | Core Course I - Basics Of Forensic Science | 5 | 5 | 25 | 75 | 100 |
| III | 23UFS02 | Core Course II - Basics Of Physics In Forensic | 5 | 5 | 25 | 75 | 100 |
| III | 23UFSE01 | Elective I - Basics Of Physics Lab | 4 | 3 | 30 | 45 | 75 |
| IV | 23UFSFC01 | Foundation Course – Basics of Event Management | 2 | 2 | 25 | 75 | 100 |
| IV | 23UFSSE01 | Skill Enhancement Course I - Crime And Society | 3 | 2 | 25 | 75 | 100 |
| Total | | | 25 | 23 | | | |

First Year – Semester - II

| Part | Course Code | Course Title | Ins. Hrs | Credit | CIA | ESE | Total |
|--------------|-------------|---|-----------|-----------|-----|-----|-------|
| I | 23UFTA02 | Podhu Tamil - II | 3 | 3 | 25 | 75 | 100 |
| II | 23UFEN02 | General English - II | 3 | 3 | 25 | 75 | 100 |
| III | 23UFS03 | Core Course III - Forensic Psychology | 5 | 5 | 25 | 75 | 100 |
| III | 23UFS04 | Core Course IV - Forensic Anthropology And Entomology | 5 | 5 | 25 | 75 | 100 |
| III | 23UFSE02 | Elective II - Forensic Anthropology And Entomology Lab | 4 | 3 | 30 | 45 | 75 |
| IV | 23UFSSE02 | Skill Enhancement Course II - Basics Of Computer Science | 3 | 2 | 25 | 75 | 100 |
| IV | 23UFSSE03 | Skill Enhancement Course III - Guidance And Counseling | 2 | 2 | 25 | 75 | 100 |
| Total | | | 25 | 23 | | | |

Second Year – Semester - III

| Part | Course Code | Course Title | Ins. Hrs | Credit | CIA | ESE | Total |
|--------------|-------------|--|-----------|-----------|-----|-----|-------|
| I | 23UFTA03 | Podhu Tamil - III | 3 | 3 | 25 | 75 | 100 |
| II | 23UFEN03 | General English - III | 3 | 3 | 25 | 75 | 100 |
| III | 23UFS05 | Core Course V - Forensic Chemistry | 5 | 5 | 25 | 75 | 100 |
| III | 23UFSE03 | Core Course VI - Forensic Chemistry Lab | 5 | 3 | 25 | 75 | 100 |
| III | 23UFSE03 | Elective III - Human Rights And Criminal Justice Administration | 4 | 4 | 30 | 45 | 75 |
| IV | 23UFSSE04 | Skill Enhancement Course IV- Introduction To Biometry | 3 | 2 | 25 | 75 | 100 |
| IV | 23UFSSE05 | Skill Enhancement Course V- Cybercrime And Cyber Law | 2 | 2 | 25 | 75 | 100 |
| Total | | | 25 | 22 | | | |

Second Year – Semester - IV

| Part | Course Code | Course Title | Ins. Hrs | Credit | CIA | ESE | Total |
|--------------|-------------|--|-----------|-----------|-----|-----|-------|
| I | 23UFTA04 | Podhu Tamil - IV | 3 | 3 | 25 | 75 | 100 |
| II | 23UFEN04 | General English - IV | 3 | 3 | 25 | 75 | 100 |
| III | 23UFS07 | Core Course VII - Forensic Dermatoglyphics | 5 | 5 | 25 | 75 | 100 |
| III | 23UFS08 | Core Course VIII - Forensic Medicine | 5 | 5 | 25 | 75 | 100 |
| III | 23UFSE04 | Elective IV - Forensic Medicine Lab | 4 | 3 | 30 | 45 | 100 |
| IV | 23UFSSE06 | Skill Enhancement Course VI - Instrumentation | 2 | 2 | 25 | 75 | 100 |
| IV | 23UFSSE07 | Skill Enhancement Course VII - Computer Forensics Lab | 2 | 2 | 25 | 75 | 100 |
| IV | 23UES01 | Environmental Studies | 1 | 2 | 25 | 75 | 100 |
| Total | | | 25 | 25 | | | |

Third Year – Semester - V

| Part | Course Code | Course Title | Ins. Hrs | Credit | CIA | ESE | Total |
|--------------|-------------|--|-----------|-----------|-----|-----|-------|
| III | 23UFS09 | Core Course IX - Forensic Biology And Serology | 5 | 4 | 25 | 75 | 100 |
| III | 23UFS10 | Core Course X -Forensic Biology And Serology Lab | 4 | 4 | 25 | 75 | 100 |
| III | 23UFS11 | Core Course XI - Accident Investigation | 4 | 4 | 25 | 75 | 100 |
| III | 23UFS12 | Core Course XII - Project With Viva-Voce | 4 | 4 | 25 | 75 | 100 |
| III | 23UFSE05 | Elective V - Criminal Law And Special Law | 4 | 3 | 30 | 45 | 75 |
| III | 23UFSE06 | Elective VI - Introduction To Research Methodology | 2 | 3 | 25 | 75 | 100 |
| IV | 23UVE01 | Non Major Elective II- General Awareness | 2 | 2 | 25 | 75 | 100 |
| IV | 23UFSSE07 | Internships/Field Visit - Crime Scene Investigation With Police Department | - | 2 | - | - | - |
| Total | | | 25 | 26 | | | |

Third Year – Semester - VI

| Part | Course Code | Course Title | Ins. Hrs | Credit | CIA | ESE | Total |
|--------------|-------------|---|-----------|-----------|-----|-----|-------|
| III | 23UFS13 | Core Course XIII - Handwriting Identification And Recognition | 5 | 4 | 25 | 75 | 100 |
| III | 23UFS14 | Core Course XIV- Forensic Toxicology | 5 | 4 | 25 | 75 | 100 |
| III | 23UFS15 | Core Course XV - Forensic Ballistics | 5 | 4 | 25 | 75 | 100 |
| III | 23UFSE07 | Elective VII - Criminal Procedure And Evidence | 4 | 3 | 30 | 45 | 75 |
| III | 23UFSE08 | Elective VIII - Technological Methods In Forensic Science | 4 | 3 | 25 | 75 | 100 |
| IV | 23UEX01 | Core Elective III - Extension Activity | - | 1 | 25 | 75 | 100 |
| IV | 23UFSPC07 | Professional Competency Skill - Research Methodology Lab | 2 | 2 | 30 | 45 | 75 |
| Total | | | 25 | 21 | | | |

****Ins. Hrs** – Instructional Hours, **CIA**- Continuous Internal Assessment, **ESE**- End Semester Examination

| | | | |
|--|-----------------------------|----------------------|------------------|
| Semester: I | Course Code: 23UFS01 | Hours/Week: 5 | Credit: 5 |
| COURSE TITLE: CORE COURSE I: BASICS OF FORENSIC SCIENCE | | | |

Course Overview:

1. The students can understand History and Development of Forensic science
2. Students can understand Importance of forensic science in criminal investigations
3. To understand Techniques for securing and documenting crime scenes.
4. Understand the application of Collection and preservation of physical evidence.

Learning Objectives:

1. To understand the basic concepts of forensic science and activities
2. To understand the nature of crime and forensic science
3. To understand the crime and physical evidence in crime spot.

| | | |
|-----------------|---------------------------------|-----------------|
| Unit - I | Basic Knowledge in Crime | 09 Hours |
|-----------------|---------------------------------|-----------------|

Definition of crime, characteristics of crime, classification of crimes, A brief ideas about White collar crime, professional crime, organized crime, present scenario of crime in India

| | | |
|------------------|--|-----------------|
| Unit - II | Investigation and Physical Evidence | 10 Hours |
|------------------|--|-----------------|

Crime scene Investigation: Definition of Crime Scene. Classification of crime Scene: indoor & Outdoor, primary & secondary, macroscopic & microscopic crime scene. Significance of crime Scene, argument and ethics of crime scene. Physical evidence: Definition, classification of physical evidence, types of physical evidences, sources of physical evidence, signification and value of physical evidence, linkage between crime scene, victim and criminal, study of some special crime scene such as mass disaster, terror attack, geological scene and explosive etc.

| | | |
|-------------------|-----------------------------------|-----------------|
| Unit - III | Basics of Forensic Science | 10 Hours |
|-------------------|-----------------------------------|-----------------|

Introduction Global History and Scope, Need and Development Principles, emphasizing on Specific contribution of Scientists in the field of Forensic Science.

| | | |
|------------------|------------------------------------|-----------------|
| Unit - IV | Domains in Forensic Science | 09 Hours |
|------------------|------------------------------------|-----------------|

Branches of Forensic Science, Police officers, Prosecution, Judicial Officers and Medico legal Expert etc. Role and Qualifications of forensic scientists. Code of conduct for forensic scientists, Ethical issue in Forensic Science, professional standards for practice of Criminalistics, sanction Against expert for unethical conduct.

| | | |
|-----------------|------------------------------------|-----------------|
| Unit - V | Forensic Science Laboratory | 10 Hours |
|-----------------|------------------------------------|-----------------|

Structure and function of State and regional Forensic Science Laboratory, Central Forensic Science Laboratory and facility provided, Mobile Forensic Science Laboratory. Directorate of Forensic Science Service. Police and Forensic scientist relationship, role of FSL in criminal investigation, Relationship between forensic expert and judiciary officer, Importance of FSL, National and International scenario of FSL, facilities provided in forensic science laboratory.

Text Book(s):

1. B.B. Nanda and R.K. Tiwari, Forensic Science in India: A Vision for the Twenty First Century, Select Publishers, New Delhi (2001).
2. Suzanne Bell, Forensic Science: An Introduction to Scientific and Investigative Techniques, Fifth Edition, (2019)

Reference Books:

1. Forensic Science in Crime Investigation in written by B.S. Nabar, Asia Law House Hyderabad Edition,(2018)
2. M.K. Bhasin and S. Nath, Role of Forensic Science in the New Millennium, University of Delhi, Delhi (2002).

Web Resources:

1. <http://onlinecourses.swayam2.ac.in/cec20ge10/preview>
2. <http://www.coursera.org/learn/forensic-science>

Teaching Methodology: Videos, Audios, PPT, Role Play, Field Visit, Seminar, Chalk & Talk, Lecturing, Case Study, Demonstration, Problem Solving, Group Discussion, Flipped Learning

Learning Outcomes:

Upon successful completion of this course, the student will be able to

| COs | Statements | Bloom's Level |
|-----|---|---------------|
| CO1 | Understand the need and nature of forensic science | K1 |
| CO2 | Classify the crime and crime spot physical evidence by a crime investigator | K2 |
| CO3 | Discuss the role of a forensic scientist. | K3 |
| CO4 | Familiarize oneself with the organization of a forensic science laboratory and equipment. | K4 |
| CO5 | Review the history and development of the forensic science sub-disciplines | K5 |

K1 – Remember, K2 – Understand, K3 – Apply, K4 – Analyze, K5 – Evaluate, K6 – Create

| Mapping (COs vs POs) | | | | | | | | | |
|----------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 |
| CO1 | S | S | S | M | M | L | L | L | L |
| CO2 | S | S | S | M | M | L | L | L | L |
| CO3 | S | S | S | M | M | M | M | L | L |
| CO4 | S | S | M | M | M | M | M | L | L |
| CO5 | S | S | M | M | M | M | M | L | L |

S - Strong, M – Medium, L – Low

| | | | |
|--|-----------------------------|----------------------|------------------|
| Semester: I | Course Code: 23UFS02 | Hours/Week: 5 | Credit: 5 |
| COURSE TITLE: CORE COURSE II: BASICS OF PHYSICS IN FORENSIC | | | |

Course Overview:

1. Overview of the role of physics in forensic science.
2. Understanding the fundamental principles of physics applied in forensics.
3. Examination of various types of physical evidence encountered in forensic investigations

Learning Objectives:

1. To understand the basic law in physics
2. To understand thermal physics and electromagnetic concepts
3. To understand the nuclear physics and its reactions.

| | | |
|-----------------|------------------|-----------------|
| Unit - I | Mechanics | 09 Hours |
|-----------------|------------------|-----------------|

Mechanics: Force, conservative and non - conservative force, rotational motion of inertia, Expression of M.I. of regular shaped bodies. Kepler's law. Acceleration due to gravity. Simple Harmonic motion and compound pendulum. Newton's law of motion.

| | | |
|------------------|------------------------|-----------------|
| Unit - II | Thermal Physics | 10 Hours |
|------------------|------------------------|-----------------|

Thermal Physics: concept of temperature, ideal gas equation and its law. Vander Waal's

equation, reversible and irreversible process, Zeroth law, first, second and third law of Thermodynamics. Carnot's cycle.

| | | |
|-------------------|-------------------------|-----------------|
| Unit - III | Electromagnetism | 09 Hours |
|-------------------|-------------------------|-----------------|

Electromagnetism: Coulomb's law. Electric field, Magnetic field due to current, Gauss's Theorem and its application, Ampere's law, Kirchoff's law and their applications.

| | | |
|------------------|----------------------------|-----------------|
| Unit - IV | Wheat- Stone Bridge | 09 Hours |
|------------------|----------------------------|-----------------|

Wheat-stone bridge and its sensitivity. Rectifiers, Amplifiers, semiconductor and its type of Junction. Paramagnetic, diamagnetic, ferromagnetic materials and properties.

| | | |
|-----------------|------------------------|-----------------|
| Unit - V | Nuclear Physics | 11 Hours |
|-----------------|------------------------|-----------------|

Nuclear Physics: Nuclear forces, nuclear models (elementary idea): Concept of nuclear quantum Number, magic numbers. Nuclear Reactions: Artificial radioactivity, transmutation of elements, Fission, fusion Radio Activity Half-life Period, Nuclear Reactor.

Text Book(s):

1. Engineering Physics Seventh Enlarged, Revised Edition 2004, M.N. Avadhanulu and P.G. Kshirsagar, S. Chand and Company Ltd. ISBN 81-219-0817-5
2. Modern Physics Concept and Applications – Sanjeev Puri, Narosa Publication

Reference Books:

1. Optics – Ajoy Ghatak (3rd Edition) Mc. Graw Hill Co
2. William H. Hayt & John. A. Buck, Engineering Electromagnetic, Mc. Graw-Hill Companies, 7th Edition, 2009.

Web Resources:

1. https://onlinecourses.swayam2.ac.in./nce19_sc05/preview

Teaching Methodology: Videos, Audios, PPT, Role Play, Field Visit, Seminar, Chalk & Talk, Lecturing, Case Study, Demonstration, Problem Solving, Group Discussion, Flipped Learning

Learning Outcomes:

Upon successful completion of this course, the student will be able to

| COs | Statements | Bloom's Level |
|-----|---|---------------|
| CO1 | Understand principles of mechanics for analyzing forensic evidence involving motion and forces. | K1 |
| CO2 | Apply thermal physics concepts to analyze temperature-related evidence in forensic investigations. | K2 |
| CO3 | Analyze electromagnetic phenomena to interpret forensic evidence involving electric and magnetic fields | K3 |
| CO4 | Utilize Wheatstone bridge and semiconductor principles for forensic analysis of electronic device. | K4 |
| CO5 | Interpret nuclear physics principles for analyzing radioactive materials and nuclear reactions in forensic contexts | K5 |

K1 – Remember, K2 – Understand, K3 – Apply, K4 – Analyze, K5 – Evaluate, K6 – Create

Mapping (COs vs POs)

| | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| CO1 | S | S | S | L | M | S | L | L | L |
| CO2 | S | S | S | L | M | S | L | L | L |
| CO3 | S | S | S | L | M | M | M | L | L |
| CO4 | S | S | M | L | M | M | M | L | L |
| CO5 | S | S | L | M | L | M | M | L | L |

S - Strong, M – Medium, L – Low

| | | | |
|--|------------------------------|----------------------|------------------|
| Semester: I | Course Code: 23UFSE01 | Hours/Week: 4 | Credit: 3 |
| COURSE TITLE: ELECTIVE 1: BASICS OF PHYSICS LAB | | | |

Course Overview:

1. Provide hands-on experience with essential forensic physics laboratory techniques
2. Explore the use of advanced instrumentation in forensic physics

Learning Objectives:

1. Demonstrate the basic law in physics
2. To understand the working of instruments in the physics laboratory.
 1. Standard operating procedures for using Vernier Caliper, Micrometer Screw Gauge, Travelling Microscope.
 2. To determine the value of 'g' by a compound pendulum.
 3. To determine the value of 'g' by a Katter's pendulum.
 4. To find the Moment of Inertia of a fly wheel about its own axis of rotation OR.
 5. Acceleration of a fly wheel.
 6. To verify Newton's law of cooling.
 7. To determine the Moment of Inertia of a given irregular body using a Torson pendulum.
 8. To demonstrate gravity of the Newton's law.

Text Book(s):

1. Engineering Physics Seventh Enlarged, Revised Edition 2004, M.N. Avadhanulu and P.G. Kshirsagar, S. Chand and Company Ltd. ISBN 81-219-0817-5

Reference Books:

1. Optics – Ajoy Ghatak (3rd Edition) Mc. Graw Hill Co

Web Resources:

1. https://onlinecourses.swayam2.ac.in/nce19_sc05/preview
2. <https://www.mooc-list.com/course/basic-physics-open2study>

Teaching Methodology: Videos, Audios, PPT, Role Play, Field Visit, Seminar, Chalk & Talk, Lecturing, Case Study, Demonstration, Problem Solving, Group Discussion, Flipped Learning

| Learning Outcomes: Upon successful completion of this course, the student will be able to | | |
|---|---|----------------------|
| COs | Statements | Bloom's Level |
| CO1 | Apply standard procedures for precise measurements using various instruments in physics experiments. | K1 |
| CO2 | Understand principles underlying compound and Kater's pendulum experiments to determine gravitational acceleration. | K2 |
| CO3 | Analyze and calculate the moment of inertia for rotating bodies using different experimental setups. | K3 |
| CO4 | Verify Newton's law of cooling and its implications in thermal dynamics through experimental observations. | K4 |
| CO5 | Demonstrate understanding of gravitational force and its impact on objects through experimental validations. | K5 |
| K1 – Remember, K2 – Understand, K3 – Apply, K4 – Analyze, K5 – Evaluate, K6 – Create | | |

| Mapping (COs vs POs) | | | | | | | | | |
|-----------------------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|
| | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 |
| CO1 | S | S | S | L | M | M | L | L | L |
| CO2 | S | S | S | L | S | M | L | L | L |
| CO3 | S | S | S | L | M | M | M | L | L |
| CO4 | S | S | M | L | S | M | M | L | L |
| CO5 | S | S | S | M | L | M | L | L | L |

S - Strong, M – Medium, L – Low

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|--|-------------------------------|----------------------|------------------|
| Semester: I | Course Code: 23UFSSE01 | Hours/Week: 3 | Credit: 2 |
| COURSE TITLE: SKILL ENHANCEMENT COURSE I: CRIME AND SOCIETY | | | |

Course Overview:

1. Explore the historical and theoretical foundations of criminology.
2. Analyze the impact of social structures, inequality, and institutions on criminal behavior.
3. Investigate how factors like poverty, race, gender, and education contribute to the understanding of crime with in society

Learning Objectives:

1. To learn about the basic of crime activities.
2. To learn about the justice system in the crime.
3. Examine the role of institutions, such as the criminal justice system, in shaping responses to crime.
4. Explore contemporary issues in crime, including cybercrime, white-collar crime, and global perspectives on criminality.

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| Unit - I | Understand the sociological perspectives on crime and its impact on society. | 12 Hours |
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Basics of Criminology: Introduction Criminology - definitions and historical perspective - Social concept of Crime - Crime and deviance – Crime and society - Criminology as a social science - Criminology and medicine – Criminology and law - Crimes in changing society -Why crime is committed/ reasons, Characteristics, Crime and culture – Community - Social Context – Socio Cultural disparity. Socio economic disparity like unemployment, poverty, no proper distribution Of wealth etc. Desire/ moral, exposure to crime, drugs and liquors etc, psychiatry enjoying others Suffering.

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| Unit - II | Crime Typology | 12 Hours |
|------------------|-----------------------|-----------------|

Crime and Criminal Typology - crimes against persons and crimes against property; Adult and Juvenile –Habitual offenders, Professional offenders, and violent offenders Crimes against Nature and natural resources - Crime against community (caste, race etc). Crime against nation (Counterfeit currency, spread of disease, hazardous waste disposal etc). Crimes against humanity (Weapons of war, religious fanatics etc).

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|-------------------|--------------------------------------|-----------------|
| Unit - III | Economic and Financial Crimes | 12 Hours |
|-------------------|--------------------------------------|-----------------|

White Collar Crime – Nature, Meaning & forms, Import /Export violations, insider trading, labor racketeering, Embezzlement, Land hijacking/ Real estate fraud; Corporate crimes - Tax Evasion, Counterfeiting; Bank Frauds– Credit card frauds, Money Laundering, Insurance Frauds, Frauds by non-banking institutions - Corruption, Street crime: The Economic Context, Capitalist Development and Urbanization, The Illegal Economy - Teenage Thievery, Street Robbery, Urban Gangs- Gangs in Historical and Contemporary Context.

| | | |
|------------------|------------------------|-----------------|
| Unit - IV | Organized Crime | 12 Hours |
|------------------|------------------------|-----------------|

Nature, Meaning and forms – Criminal syndicates – Organized crimes: Regional and international linkages – Transnational Organized Crime – Drug smuggling, Human Trafficking, Problems of identification, investigation and prosecution – Prevention and control strategies.

| | | |
|-----------------|--|-----------------|
| Unit - V | Political Crimes: Terrorism and Communal Violence | 12 Hours |
|-----------------|--|-----------------|

Terrorism: Nature, meaning and forms; Types of terrorism; Contemporary forms of terrorism. Communal Violence: Historical Perspectives - Communal Violence in post- independence India – Recent Terrorist attacks in India.

Text Book(s):

1. S.H. James and J.J. Nordby, Forensic Science: An Introduction to Scientific and Investigative Techniques, 2nd Edition, CRC Press, Boca Raton (2005).
2. Crime, Justice, and Society: An Introduction to Criminology FOURTH EDITION Ronald J. Berger, Marvin D. Free, Jr., Melissa Deller, and Patrick K. O’Brien, 2015

Reference Books:

1. R. Saferstein, Criminalistics, 8th Edition, Prentice Hall, New Jersey (2004).
2. R. Gupta, Sexual Harassment at Workplace, LexisNexis, Gurgaon (2014).

Web Resources:

1. <https://www.my-mooc.com/en/mooc/crime-justice-society/>
2. <https://www.futurelearn.com/courses/crime-justice-society>

Teaching Methodology: Videos, Audios, PPT, Role Play, Field Visit, Seminar, Chalk & Talk, Lecturing, Case Study, Demonstration, Problem Solving, Group Discussion, Flipped Learning

Learning Outcomes:

Upon successful completion of this course, the student will be able to

| COs | Statements | Bloom's Level |
|-----|---|---------------|
| CO1 | Understand the historical evolution of criminology and its role in shaping societal perceptions of crime. | K1 |
| CO2 | Identify various types of crime and criminals, including economic, organized, and political offenders. | K2 |
| CO3 | Analyze the socioeconomic factors contributing to criminal behavior, such as poverty and inequality | K3 |
| CO4 | Evaluate the impact of white-collar crimes on society and the economy, including fraud and corruption | K4 |
| CO5 | Demonstrate knowledge of counterterrorism strategies and measures to address communal violence effectively. | K5 |

K1 – Remember, K2 – Understand, K3 – Apply, K4 – Analyze, K5 – Evaluate, K6 – Create

Mapping (COs vs POs)

| | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 |
|------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| CO1 | S | S | M | M | M | M | M | M | L |
| CO2 | S | S | M | M | M | M | L | L | L |
| CO3 | S | S | S | L | M | M | M | L | L |
| CO4 | S | S | M | L | M | M | M | L | L |
| CO5 | S | S | L | M | M | L | M | L | L |

S - Strong, M – Medium, L – Low

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|--|-----------------------------|----------------------|------------------|
| Semester: II | Course Code: 23UFS03 | Hours/Week: 5 | Credit: 5 |
| COURSE TITLE: CORE COURSE III - FORENSIC PSYCHOLOGY | | | |

Course Overview:

1. Explains Historical development and Legal and ethical considerations
2. Understand Preparation and presentation of expert testimony and its Legal challenges and responsibilities
3. Explain Psychology of interrogation, Ethics and best practices in interviewing
4. Applicable for Case studies and real-world applications

Learning Objectives:

1. The basic concepts of Psychology and its scope
2. The various perspectives of Psychology
3. The elements of brain and nervous system

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|-----------------|-----------------------------|-----------------|
| Unit - I | Basics of Psychology | 12 Hours |
|-----------------|-----------------------------|-----------------|

Definition, goals and scope of psychology. Role of psychologist in society . Perspectives - Biological psychodynamic, Behavioristic, Humanistic, Evolutionary and Cognitive. Subfields of Psychology. Scope of Forensic Psychology. Duties and responsibilities of Forensic Psychologist

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| Unit - II | Nervous System | 12 Hours |
|------------------|-----------------------|-----------------|

Nervous system - Introduction, Classification. Structure of brain and its parts. Significance of left And right brain. Structure and psychological importance in thought and language. Neurons Structure, Neural impulse generation and transmission, neurotransmitters and their function.

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| Unit - III | Cognition | 12 Hours |
|-------------------|------------------|-----------------|

Introduction to cognition. Sensation Processes in sensation, types - receptors involved in each of The sensory modalities i.e., visual, auditory, gustatory, olfactory, tactile and others. Sensory Adaptation. Sensory threshold, Absolute threshold, Weber's Law.

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| Unit - IV | Psychology and Criminal Behaviour | 12 Hours |
|------------------|--|-----------------|

Psychopathology and personality disorder. Psychological assessment and its importance Serial murderers. Psychology of terrorism. Biological factors and crime – social learning Theories, psycho-social factors, abuse. Child abuse (physical, sexual, emotional), juvenile Juvenile sex offenders, legal controversies.

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| Unit - V | Detection of Deception | 12 Hours |
|-----------------|-------------------------------|-----------------|

Tools for detection of deception – interviews, non-verbal detection, statement analysis, Voice stress analyzer, hypnosis. Polygraphy – operational and question formulation techniques, Ethical and legal aspects the guilty knowledge test. Narco analysis and brain electrical oscillation Signatures – principle and theory, ethical and legal issues.

Text Book(s):

1. Robert A. Baron, Girishwar Misra, Psychology, fifth edition, By Person 2000
2. Robert S Feldman, Understanding Psychology, McGraw Hill 2008

Reference Books:

1. Wayne Weiten, Psychology – Themes and variations, Brooke/Cole Publishing Co.
2. J. Niehaus, Investigative Forensic Hypnosis, CRC Press, Boca Raton (1999).
3. R. Saferstein, Criminalistics, 8th Edition, Prentice Hall, New Jersey (2004).

Web Resources:

1. https://onlinecourses.swayam2.ac.in/cec19_cs03/preview
2. https://onlinecourses.swayam2.ac.in/nos19_hs02/preview

Teaching Methodology: Videos, Audios, PPT, Role Play, Field Visit, Seminar, Chalk & Talk, Lecturing, Case Study, Demonstration, Problem Solving, Group Discussion, Flipped Learning

Learning Outcomes:

Upon successful completion of this course, the student will be able to

| COs | Statements | Bloom's Level |
|--|---|---------------|
| CO1 | Understand the diverse perspectives in psychology and their application to forensic settings. | K1 |
| CO2 | Explain the structure and function of the nervous system and its relevance to behavior. | K2 |
| CO3 | Analyze sensory processes and their implications for forensic investigations. | K3 |
| CO4 | Evaluate psychopathology, personality disorders, and their role in criminal behavior. | K4 |
| CO5 | Demonstrate proficiency in deception detection techniques and understand their ethical and legal considerations | K5 |
| K1 – Remember, K2 – Understand, K3 – Apply, K4 – Analyze, K5 – Evaluate, K6 – Create | | |

| Mapping (COs vs POs) | | | | | | | | | |
|----------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 |
| CO1 | S | S | S | M | M | M | M | S | L |
| CO2 | S | S | S | M | M | M | L | L | L |
| CO3 | S | S | S | L | M | M | S | L | L |
| CO4 | S | S | M | L | M | M | L | L | L |
| CO5 | S | S | L | M | L | M | M | L | L |

S - Strong, M – Medium, L - Low

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|--|----------------------|---------------|-----------|
| Semester: II | Course Code: 23UFS04 | Hours/Week: 5 | Credit: 5 |
| COURSE: CORE COURSE IV - FORENSIC ANTHROPOLOGY AND ENTOMOLOGY | | | |

Course Overview:

1. Students will attain a solid foundation in insect biology.
2. Students will develop the ability to read and interpret scientific papers in entomology and critically analyze the content.
3. Students will have working knowledge of the biology of bone and its association with forensic anthropology.
4. Students will be able to communicate effectively about topics in anthropology.

Learning Objectives:

1. Students will be able to identify the bones and specific features of various. Skeletal Elements of the adult and subadult human skeleton in class, and on exams and quizzes.
2. Students will analyze individual skeletons to determine sex, age, stature, and ancestry From bones in a laboratory setting.
3. Students will demonstrate how osteological techniques are used to create a Biological profile and to identify cause and manner of death in assignments.
4. Students will be able to apply forensic field methods in a mock excavation

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| Unit - I | Genesis and Development | 10 Hours |
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Genesis and development of forensic anthropology, Typical skeletal terminology used in Forensic reports - skeletal direction. Histology and Chemistry of bones. Human skeleton - Axial and Appendicular Skeletal system, along with their anatomy. Applications of Forensic Anthropology.

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|------------------|-----------------------------|----------------|
| Unit - II | Introduction to Bone | 8 Hours |
|------------------|-----------------------------|----------------|

Bones: Osteology; Definition, different types of bone cells, structure of bone. Anatomical Terminology of Human body, Skull. Sexing skeletal remains: General consideration and age factors. Sex differences in skull, Pelvis and long bones. Calculation of stature of long bones: Studies on stature reconstruction in various population action groups, Estimation of race from bones. Time since death from bones- by clinical analysis.

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|-------------------|--------------------------------------|-----------------|
| Unit - III | Cranial Facial Reconstruction | 10 Hours |
|-------------------|--------------------------------------|-----------------|

Craniometry and Cranial facial reconstruction: Forensic facial reconstruction Human facial anatomy including bones and muscles anatomy of the facial features, facial tissue thickness With MRI and other methods, two- and three-dimensional method of facial reconstruction. Cranial facial superimposition: Anthropological study of skull, comparison of the facial Features of the human skull and the ante mortem photograph. Methods of Superimposition: Still photographic method, Video superimposition, and computerized technique General Entomology and insect biology - introduction, external anatomy, body regions, insect growth and development. Insects of forensic importance - introduction; flies- blow flies, hairy maggot blow fly, blue bottle fly, green bottle fly, flesh fly, house fly, cheese fly.

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| Unit - IV | Importance of Insects | 10 Hours |
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Beetles and their types - Carrion beetles, Skin beetles, Rove beetles, Checkered beetles, Hide beetles, Scab beetles, Sap Beetles, clown beetles. Other arthropods of forensic importance- Introduction; Venomous arthropods, blood feeding arthropods; Scavengers. Collection of entomological evidence during legal investigations - introduction, entomological collection procedures at the scene, death scene, collection of specimens before, Body removal. collection of species away from the body. The role of aquatic insects in forensic investigation- introduction, decomposition in aquatic, ecosystem, marine ecosystem, case history.

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| Unit - V | Entomotoxicology | 10 Hours |
|-----------------|-------------------------|-----------------|

Estimating post mortem intervals - introduction and estimating the postmortem interval. The soil environment- introduction; human decomposition; soil environment - as a matrix, affecting decomposition, microbial community in decomposition; soil fauna. Entomotoxicology - introduction; detection of drugs; impact of drug in insects. Forensic entomologist as forensic experts.

Text Book(s):

1. Introduction To Forensic Sciences
2. Forensic entomology: an introduction. John Wiley & Sons.

Reference Books:

1. D. Ubelaker and H. Scammell, Bones, M. Evans & Co., New York (2000).
2. S. Rhine, Bone Voyage: A Journey in Forensic Anthropology, University of Mexico Press, Mexico (1998)

Web Resources:

1. The Dirt on Forensic Anthropology Blog
2. <https://fac.utk.edu/what-is-forensic-anthropology-2/>
3. <https://anthropology4u.com/category/forensic-anthropology/>
4. The Forensic Anthropology Society of Europe (FASE)

Teaching Methodology: Videos, Audios, PPT, Role Play, Field Visit, Seminar, Chalk & Talk, Lecturing, Case Study, Demonstration, Problem Solving, Group Discussion, Flipped Learning

Learning Outcomes:

Upon successful completion of this course, the student will be able to

| COs | Statements | Bloom's Level |
|-----|--|---------------|
| CO1 | Understand the genesis and evolution of forensic anthropology and entomology for criminal investigations. | K1 |
| CO2 | Identify and interpret skeletal terminology, anatomy, and histology crucial for forensic analysis | K2 |
| CO3 | Apply methods for sexing skeletal remains, estimating stature, race, and time since death | K3 |
| CO4 | Master techniques for cranial facial reconstruction using various anthropological and technological methods. | K4 |
| CO5 | Demonstrate expertise in insect biology, collection, and analysis for forensic entomology investigations. | K5 |

K1 – Remember, K2 – Understand, K3 – Apply, K4 – Analyze, K5 – Evaluate, K6 – Create

| Mapping (COs vs POs) | | | | | | | | | |
|----------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 |
| CO1 | S | S | S | M | M | M | M | L | L |
| CO2 | S | S | M | M | M | M | L | L | L |
| CO3 | S | S | S | M | M | S | M | L | L |
| CO4 | S | S | S | M | M | M | L | L | L |
| CO5 | S | S | S | M | M | S | M | L | L |

S - Strong, M – Medium, L – Low

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|---|-----------------------|---------------|-----------|
| Semester: III | Course Code: 23UFSE02 | Hours/Week: 4 | Credit: 3 |
| COURSE TITLE: ELECTIVE II - FORENSIC ANTHROPOLOGY AND ENTOMOLOGY LAB | | | |

Course Overview:

1. Students will understand how Human remains helps in investigation

Learning Objectives:

1. Able to find Height of a person by using long bones
 2. To understand types of bones that helpful for sex determination.
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1. Guidelines, Collection and packaging of Skeleton remains
 2. Sex determination using skull.
 3. Sex determination using Pelvis.
 4. To estimate the stature by using long bones
 5. Demonstrate steps of facial reconstruction
 6. Demonstrate steps of facial Superimposition
 7. Guidelines, Collection and Preservation of entomological evidence
 8. To analyze different types of insects, present in dead bodies.

Text Book(s)

1. Introduction To Forensic Anthropology
2. The Human Bone Manual
3. Corpses and Skeletons

Reference Books:

1. D. Ubelaker and H. Scammell, Bones, M. Evans & Co., New York (2000).
2. S. Rhine, Bone Voyage: A Journey in Forensic Anthropology, University of Mexico Press, Mexico (1998)

Web Resources:

1. "Bodies" Podcast: Episode on forensic anthropology and its role in solving crimes.
2. "Sword and Scale" Podcast: Includes episodes on forensic anthropology cases.
3. The Forensic Anthropology Society of Europe (FASE)
4. The Dirt on Forensic Anthropology Blog.

Teaching Methodology: Videos, Audios, PPT, Role Play, Field Visit, Seminar, Chalk & Talk, Lecturing, Case Study, Demonstration, Problem Solving, Group Discussion, Flipped Learning

Learning Outcomes:

Upon successful completion of this course, the student will be able to

| COs | Statements | Bloom's Level |
|-----|---|---------------|
| CO1 | Identify skeletal remains and apply appropriate collection and packaging techniques for forensic analysis | K1 |
| CO2 | Utilize skull morphology for accurate sex determination in forensic contexts. | K2 |
| CO3 | Employ pelvic features to determine the sex of skeletal remains in forensic investigations. | K3 |
| CO4 | Apply methods using long bones to estimate stature accurately in forensic anthropology | K4 |
| CO5 | Demonstrate proficiency in facial reconstruction and superimposition techniques for forensic identification purposes. | K5 |

K1 – Remember, K2 – Understand, K3 – Apply, K4 – Analyze, K5 – Evaluate, K6 – Create

Mapping (COs vs POs)

| | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| CO1 | S | S | S | S | M | M | L | L | L |
| CO2 | S | S | M | M | M | M | M | L | L |
| CO3 | S | S | S | M | M | M | M | M | L |
| CO4 | S | S | S | S | M | M | M | L | L |
| CO5 | S | S | S | M | M | L | M | L | L |

S - Strong, M – Medium, L - Low

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|---|-------------------------------|----------------------|------------------|
| Semester: II | Course Code: 23UFSSE02 | Hours/Week: 3 | Credit: 2 |
| COURSE TITLE: SKILL ENHANCEMENT COURSE II - BASICS OF COMPUTER SCIENCE | | | |

Course Overview:

1. To provide basic knowledge about computer components.
2. To provide a skills in software and hardware with objectives
3. To create platform for learning complex techniques.

Learning Objectives:

1. Attain an in-depth knowledge of computing systems.
2. Develop problem-solving skills and use computational thinking to analyze problems.
3. Continuing to develop technical competencies

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| Unit - I | Basics of Computers | 10 Hours |
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History, Generation & Classification of Computers, Computer organization, of computer-s – input output device, CPU, memory-RAM, ROM and external storage devices

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| Unit - II | Data Representations | 09 Hours |
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Data representations: integers, real, binary, octal hexadecimal & their conversions logic gates –Negation, OR, AND, X OR etc.

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| Unit - III | Introduction to Operating System | 10 Hours |
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Introduction to Operating System: Basics of operating system, memory structure, concurrency, scheduling, file system, synchronization and memory management examples of operating systems Windows and Linux.

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| Unit - IV | Basics of Networking | 10 Hours |
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Basics of Networking- Components, Architecture, networking protocols, types of computer network, network topologies, network security- threats, vulnerabilities, Access control, virus, Trojans etc, security plan and policies.

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| Unit - V | Introduction to Internet | 09 Hours |
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Introduction to Internet: World Wide Web, E-mails, chat, search engines, connectivity. Internet Vs Intranet, virtual private network.

Text Book(s):

1. Cyber Forensic - Concepts and Approaches by Ravi Kumar & B Jain, ICFAI University Press first edition 2006
2. Cyber Forensic - Tools & Practices by Ravi Kumar & B Jain, ICFAI University Press first edition 2006

Reference Books:

1. Forensic Computing: A Practitioner's Guide by A J Sammes & Brian Jenkinson. Springer Verlag London, 2nd edition 2007

Web Resources:

1. https://onlinecourses.swayam2.ac.in/nou20_cs03/preview
2. https://www.tutorialspoint.com/basics_of_computer_science/index.htm

Teaching Methodology: Videos, Audios, PPT, Role Play, Field Visit, Seminar, Chalk & Talk, Lecturing, Case Study, Demonstration, Problem Solving, Group Discussion, Flipped Learning

Learning Outcomes:

Upon successful completion of this course, the student will be able to

| COs | Statements | Bloom's Level |
|--|--|---------------|
| CO1 | To understand number system and methods for conversion from one number system to another | K1 |
| CO2 | To understand file system, synchronization and memory management. | K2 |
| CO3 | To classify the operating system, its type, features and common components | K3 |
| CO4 | To compare the computer network, protocols and network devices | K4 |
| K1 – Remember, K2 – Understand, K3 – Apply, K4 – Analyze, K5 – Evaluate, K6 – Create | | |

Mapping (COs vs POs)

| | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| CO1 | S | S | S | M | M | M | L | L | L |
| CO2 | S | S | M | M | M | L | L | L | L |
| CO3 | S | S | S | M | M | M | L | L | L |
| CO4 | S | S | S | S | L | L | L | L | L |
| CO5 | S | S | S | S | M | M | L | L | L |

S - Strong, M – Medium, L – Low

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|---|-------------------------------|----------------------|------------------|
| Semester: II | Course Code: 23UFSSE03 | Hours/Week: 2 | Credit: 2 |
| COURSE TITLE: SKILL ENHANCEMENT COURSE III - GUIDANCE AND COUNSELING | | | |

Course Overview:

1. Understanding the purpose, goals, and principles of guidance and counseling in educational and personal development contexts.
2. Developing essential counseling skills, including active listening, empathy, rapport-building, questioning techniques, and conflict resolution
3. Facilitating group counseling sessions, understanding group dynamics, and utilizing group counseling techniques to address common issues.

Learning Objectives:

1. Identify and explain key theories and models relevant to counseling practice.
2. Develop effective counseling skills, including active listening, empathy, rapport-building, and questioning techniques.
3. Apply ethical principles, boundaries, and legal considerations in counseling practice.
4. Utilize assessment tools and techniques to identify clients' strengths, needs, and goals.
5. Facilitate group counseling sessions, understanding group dynamics, and utilizing group counseling techniques

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| Unit - I | Introduction to Guidance | 09 Hours |
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Introduction to Counseling: Meaning, Definition, Need and Importance of counseling and Professional ethics in counseling.

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| Unit - II | Principles of Counseling | 09 Hours |
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Basic Principles of Counseling: Participation, Individualization, Confidentiality, communication, acceptance, self-confidence, self-awareness and other principles governing the Counseling relationship.

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|-------------------|----------------------------|-----------------|
| Unit - III | Types of Counseling | 09 Hours |
|-------------------|----------------------------|-----------------|

Types of Counseling- Individual, Group & Family Counseling, Counseling process, Interview and its significance in counseling - Use of observation in counseling and understanding of Emotions in counseling. Qualities of a Counselor.

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| Unit - IV | Techniques of Counseling | 09 Hours |
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Opening Techniques, Reflection of feelings, Acceptance technique, structuring techniques,

silence as a technique, leading technique, interpretation technique, Techniques of group Counseling, strategies and structure - barriers to effective counseling sessions; Counseling evaluation.

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|-----------------|-------------------------------|-----------------|
| Unit - V | Specialized Counseling | 09 Hours |
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Premarital and post marital counseling, Counseling children, counseling old people, Interpersonal conflict management, counseling AIDS patients, Counseling for De-addiction - Effectiveness of counseling and guidance in the treatment of offenders and victims.

Text Book(s):

1. Beck A.T (1976) Cognitive therapy and the emotional disorders, International Universities Press, New York.
2. Corey, G. (1986) Theory and practice of counseling and psychotherapy, Monterey: Brooks/Cole

Reference Books:

1. Corsini, R.J (Ed) (1984) Current Psychotherapies, Itasca, III: Peacock
2. Davison, G.C., and Neale, J.M. (1986) Abnormal Psychology, Wiley, New York

Web Resources:

1. https://onlinecourses.swayam2.ac.in/ntr20_ed21/preview
2. <https://www.classcentral.com/course/swayam-guidance-and-counselling-20240>

Teaching Methodology: Videos, Audios, PPT, Role Play, Field Visit, Seminar, Chalk & Talk, Lecturing, Case Study, Demonstration, Problem Solving, Group Discussion, Flipped Learning

Learning Outcomes:

Upon successful completion of this course, the student will be able to

| COs | Statements | Bloom's Level |
|-----|--|---------------|
| CO1 | Understand the foundational concepts and ethical principles essential for effective counseling practice. | K1 |
| CO2 | Apply various counseling techniques and strategies to facilitate client growth and problem resolution | K2 |
| CO3 | Differentiate between different types of counseling and their respective approaches and application | K3 |
| CO4 | Demonstrate proficiency in conducting individual, group, and specialized counseling sessions. | K4 |
| CO5 | Evaluate the effectiveness of counseling interventions in addressing diverse client needs and issues | K5 |

K1 – Remember, K2 – Understand, K3 – Apply, K4 – Analyze, K5 – Evaluate, K6 – Create

| Mapping (COs vs POs) | | | | | | | | | |
|----------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 |
| CO1 | S | S | S | S | M | M | L | L | L |
| CO2 | S | S | S | S | M | L | L | L | L |
| CO3 | S | M | M | M | M | L | L | L | L |
| CO4 | S | S | S | S | M | M | L | L | L |
| CO5 | S | S | S | S | M | M | L | L | L |

S - Strong, M – Medium, L – Low

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|--|-----------------------------|----------------------|------------------|
| Semester: III | Course Code: 23UFS05 | Hours/Week: 5 | Credit: 5 |
| COURSE TITLE: CORE COURSE V- FORENSIC CHEMISTRY | | | |

Course Overview:

1. Focus on the identification and characterization of various petroleum products using forensic chemistry techniques.
2. Overview of forensic chemistry principles and applications in criminal investigations
3. Explains Narcotics, Drugs, Psychotropic Substances

Learning Objectives:

1. To Obtain a general knowledge of the basic principles and functions of inorganic, organic and physical chemistry
2. To provide an understanding of the applications of forensic chemistry.
3. To learn about the analysis of substances under forensic chemistry.
4. Analyze arson and petroleum exhibits.
5. Assess the exhibits encountered in explosion cases.

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|-----------------|-------------------------------------|-----------------|
| Unit - I | Basics of Forensic Chemistry | 14 Hours |
|-----------------|-------------------------------------|-----------------|

Definition and introduction; Types of cases and exhibits in forensic chemistry; Cement: types, adulteration and analysis; Trap cases: types and chemistry of detective dyes, detection of phenolphthalein, instrumental analysis; Analysis of adulterants in food, water, metals and non-metals. Salient features of Drug and Cosmetics Act, 1940.

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|-----------------|---|-----------------|
| Unit- II | Petroleum and Petroleum Products | 13 Hours |
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Petroleum and Petroleum Products - Distillation and fractionation of petroleum. Commercial uses of different petroleum fractions. Analysis of petroleum products. Analysis of traces of petroleum Products in forensic exhibits. Comparison of petroleum products. Adulteration of petroleum products.

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| Unit -III | Arson Investigation | 14 Hours |
|------------------|----------------------------|-----------------|

Chemistry of arson. Condition for fire. Fire scene patterns. Location of point of ignition. Recognition of types of fire. Searching the fire scene. Collection and preservation of arson Evidence. Analysis of fire debris. Analysis of ignitable residue. Post-flashover of burning. Scientific investigation and evaluation of clue materials. Information from smoke staining.

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| Unit - IV | Explosives and its Classification | 16 Hours |
|------------------|--|-----------------|

Explosives - Classification of explosives – low explosives and high explosives. Homemade explosives. Military explosives. Blasting agents. Synthesis and characteristics of TNT, PETN and RDX. Explosion process. Blast waves. Bomb scene management. Searching the scene of explosion.

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|-----------------|--|-----------------|
| Unit - V | Narcotics, Drugs, Psychotropic Substances | 15 Hours |
|-----------------|--|-----------------|

Narcotics, Drugs, Psychotropic Substances and Alcoholic Beverages – Natural and synthetic. Drug dependence. Classification of drugs of abuse – narcotics, hallucinogens, depressants, Stimulants and anabolic steroids. Withdrawal symptoms.

Text Book(s):

1. R. Saferstein, Criminalistics, 8th Edition, Prentice Hall, New Jersey (2004).
2. F.G. Hofmann, A Handbook on Drug and Alcohol Abuse, 2nd Edition, Oxford University Press, New York (1983).
3. Aggrawal, A. (2017). Textbook of Forensic Medicine and Toxicology. APC Publisher.

Reference Books:

1. A.A. Moenssens, J. Starrs, C.E. Henderson and F.E. Inbau, Scientific Evidence in Civil and Criminal Cases, 4th Edition, The Foundation Press, Inc., New York (1995).
2. DeHaan, J.D (2013). Kirk's fire investigation; 3rd Edition. New Jersey; Prentice Hall.
3. Saferstein, R (2015). Criminalistics; 8th Edition. New Jersey; Prentice Hall.
4. Crippin, J. B. (2017). Explosives and Chemical Weapons Identification. Ukraine: Taylor & Francis.
5. Meyer, R., Köhler, J., & Homburg, A. (2016). Explosives. John Wiley & Sons.

Web Resources:

1. <https://www.khanacademy.org/science/class-11-chemistry-india>
2. https://onlinecourses.swayam2.ac.in/nce19_sc15/preview

Teaching Methodology: Videos, Audios, PPT, Role Play, Field Visit, Seminar, Chalk & Talk, Lecturing, Case Study, Demonstration, Problem Solving, Group Discussion, Flipped Learning

Learning Outcomes:

Upon successful completion of this course, the student will be able to

| COs | Statements | Bloom's Level |
|-----|--|---------------|
| CO1 | Students will understand forensic chemistry basics, case types, and exhibit analysis methods. | K1 |
| CO2 | They'll learn about cement, its types, adulteration, detective dyes, and instrumental analysis. | K2 |
| CO3 | Focus will be on analyzing adulterants in various substances and understanding the Drug and Cosmetics Act. | K3 |
| CO4 | Students will grasp petroleum distillation, product analysis, and detection of traces in exhibits. | K4 |
| CO5 | They'll explore arson investigation, fire chemistry, evidence collection, and analysis of fire debris. | K5 |

K1 – Remember, K2 – Understand, K3 – Apply, K4 – Analyze, K5 – Evaluate, K6 – Create

Mapping (COs vs POs)

| | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| CO1 | S | S | S | S | M | M | L | L | L |
| CO2 | S | S | S | S | M | L | L | L | L |
| CO3 | S | M | M | M | M | L | L | L | L |
| CO4 | S | S | S | S | M | M | L | L | L |
| CO5 | S | S | S | S | M | M | L | L | L |

S - Strong, M – Medium, L – Low

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|---|-----------------------------|----------------------|------------------|
| Semester: III | Course Code: 23UFS06 | Hours/Week: 5 | Credit: 3 |
| COURSE TITLE: CORE COURSE VI: FORENSIC CHEMISTRY LAB | | | |

Course Overview:

1. Understand the Methods for analyzing diesel fuel, focusing on composition, contaminants, and quality assessment.
2. To understand Investigative methods to detect and analyze accelerants used in arson cases.
3. Explain the analytical methods for drug identification and analysis.
4. Explain Crime scene investigation and chain of custody procedures for arson cases

Learning Objectives:

1. To provide a broad foundation in chemistry that stresses scientific reasoning and analytical problem solving with a molecular perspective.
2. Perform detailed analysis of diesel samples to determine composition and detect potential contaminants.
3. Investigate kerosene oil through chemical analysis to ensure product authenticity and detect adulteration
4. Explore techniques for detecting and quantifying adulterants in petroleum products to address issues of contamination and fraud.
5. Identify and analyze accelerators used in arson cases, aiding in fire investigations.
 1. To analyze gasoline using TLC and Qualitative instrument.
 2. To carry out analysis of diesel.
 3. To carry out analysis of kerosene oil.
 4. To analyze arson accelerators.
 5. To prepare a case report on a case involving arson.
 6. To carry out analysis of explosive substances.
 7. To separate explosive substances using thin layer chromatography.
 8. To prepare a case report on bomb scene management.

Text Book(s):

1. R. Saferstein, Criminalistics, 8th Edition, Prentice Hall, New Jersey (2004).

Reference Books:

1. W.J. Tilstone, M.L. Hastrup and C. Hald, Fisher's, Techniques of Crime Scene Investigation, CRC Press, Boca Raton (2013).
2. S. Ballou, M. Houck, J.A. Siegel, C.A. Crouse, J.J. Lentini and S. Palenik in Forensic Science, D.H. Ubelaker (Ed.), Wiley-Blackwell, Chichester (2013).

Web Resources:

1. <https://ugcmoocs.inflibnet.ac.in/index.php/courses/viewpg/692>
2. https://onlinecourses.swayam2.ac.in/nce19_sc15/preview

Teaching Methodology: Videos, Audios, PPT, Role Play, Field Visit, Seminar, Chalk & Talk, Lecturing, Case Study, Demonstration, Problem Solving, Group Discussion, Flipped Learning

Learning Outcomes:

Upon successful completion of this course, the student will be able to

| COs | Statements | Bloom's Level |
|-----|--|---------------|
| CO1 | Develop skills in preparing comprehensive case reports on arson and bomb scene management | K1 |
| CO2 | Students will demonstrate proficiency in analyzing various petroleum products using TLC and qualitative instruments | K2 |
| CO3 | Learners will conduct precise analyses of diesel and kerosene oil, interpreting results accurately. | K3 |
| CO4 | Participants will identify and analyze arson accelerators, applying appropriate forensic techniques. | K4 |
| CO5 | Apply acquired knowledge to contribute effectively in forensic investigations involving petroleum products and explosives. | K5 |

K1 – Remember, K2 – Understand, K3 – Apply, K4 – Analyze, K5 – Evaluate, K6 – Create

Mapping (COs vs POs)

| | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 |
|------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| CO1 | S | S | S | S | M | M | L | L | L |
| CO2 | S | S | S | M | S | M | L | M | L |
| CO3 | S | S | S | S | S | M | L | M | L |
| CO4 | S | S | S | M | L | L | L | L | L |
| CO5 | S | S | S | M | M | L | M | L | L |

S - Strong, M – Medium, L – Low

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|---|------------------------------|----------------------|------------------|
| Semester: III | Course Code: 23UFSE03 | Hours/Week: 4 | Credit: 4 |
| COURSE TITLE: ELECTIVE 3: HUMAN RIGHTS AND CRIMINAL JUSTICE ADMINISTRATION | | | |

Course Overview:

1. Explains Fundamental principles and historical development.
2. Understanding the interplay between human rights and criminal law
3. Examining the balance between law enforcement and civil liberties.
4. Analyzing global approaches to human rights in criminal justice administration

Learning Objectives:

1. To impart knowledge and develop skills relating to application of criminological and enological thoughts in the administration of criminal justice system.
2. Understand the foundational principles of human rights and their significance in the context of criminal justice administration
3. Analyze the intersection between international human rights laws and domestic criminal justice systems.
4. Examine the impact of cultural diversity on the implementation of human rights in criminal justice practices
5. Understand the Universal Declaration of Human Rights (UDHR) principles and their implications in the context of criminal justice administration

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|-----------------|---------------------|-----------------|
| Unit - I | Introduction | 14 Hours |
|-----------------|---------------------|-----------------|

Human Rights - Definition, Theories, forms / types of Human Rights

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|------------------|---|-----------------|
| Unit - II | National and International Instruments | 13 Hours |
|------------------|---|-----------------|

UDHR (Universal Declaration of Human Rights); ICCPR (International Covenant on Civil and Political Rights);ICESCR (International Covenant on Economic, Social and Cultural Rights);
Constitution of India - Part III and Part IV; Protection of Human Rights Act 1993.

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| Unit - III | Human Rights and Criminal Justice Agencies | 14 Hours |
|-------------------|---|-----------------|

Custodial violence; Handcuffing; Rights of the accused; Rights of prisoners, Rights of victims of human rights violations

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| Unit - IV | Human Rights Violation | 15 Hours |
|------------------|-------------------------------|-----------------|

Human rights violations of Women, Children, Minorities, Refugees, SC/STs, Elderly people.

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| Unit - V | Human Rights Agencies | 16 Hours |
|-----------------|------------------------------|-----------------|

Human rights agencies- National Human Rights Commission (NHRC) and state

Human Rights Commission (SHRC) - role, structure and functioning; UN organizations

Amnesty International, Human Rights Watch.

Text Book(s):

1. Human rights: A source book, (1996) NCERT publications, New Delhi
2. Thilagaraj. R. (Ed) (2002) Human Rights and Criminal Justice Administration, APH
3. Subramanian S. (1997) Human Rights: International Challenges, Manas Publications New Delhi.

Reference Books:

1. Human rights Today – A United Nations Priority, U.N. Publications Department of Public information, United Nation, New York.

Web Resources:

1. https://onlinecourses.swayam2.ac.in/cec21_hs08/preview
2. https://onlinecourses.swayam2.ac.in/cec20_hs24/preview

Teaching Methodology: Videos, Audios, PPT, Role Play, Field Visit, Seminar, Chalk & Talk, Lecturing, Case Study, Demonstration, Problem Solving, Group Discussion, Flipped Learning

| Learning Outcomes: | | |
|--|--|----------------------|
| Upon successful completion of this course, the student will be able to | | |
| COs | Statements | Bloom's Level |
| CO1 | Analyze the relevance and implementation of Human Rights in the Constitution of India, specifically focusing on Part III (Fundamental Rights) and Part IV (Directive Principles of State Policy). | K1 |
| CO2 | Explore the functions and roles of key institutions such as State Human Rights Commissions (SHRC) and the National Human Rights Commission (NHRC) in safeguarding human rights within the criminal justice system. | K2 |
| CO3 | Examine the impact of human rights violations on individuals and communities, fostering awareness of the ethical responsibilities within criminal justice administration. | K3 |
| CO4 | Evaluate case studies and legal precedents related to human rights issues, developing a nuanced understanding of the complexities in balancing justice and human rights. | K4 |
| CO5 | Apply knowledge acquired to propose effective strategies and reforms that promote the protection and enhancement of human rights in the criminal justice system. | K5 |
| K1 – Remember, K2 – Understand, K3 – Apply, K4 – Analyze, K5 – Evaluate, K6 – Create | | |

| Mapping (COs vs. POs) | | | | | | | | | |
|-----------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 |
| CO1 | S | S | S | M | M | M | L | L | L |
| CO2 | S | S | M | L | M | L | L | L | L |
| CO3 | S | S | S | S | M | M | M | L | L |
| CO4 | S | S | S | M | L | M | L | L | L |
| CO5 | S | S | L | M | M | S | L | L | L |

S - Strong, M – Medium, L – Low

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|--|-------------------------------|----------------------|------------------|
| Semester: III | Course Code: 23UFSSE04 | Hours/Week: 3 | Credit: 2 |
| COURSE TITLE: SKILL ENHANCEMENT COURSE IV: INTRODUCTION TO BIOMETRY | | | |

Course Overview:

1. Overview of biometric systems, including definition, characteristics, and operations.
2. In-depth exploration of key biometric processes: enrollment, identification, and verification.
3. Examination of types of errors that can occur after positive and negative identification.
4. In-depth study of physiological biometrics such as fingerprints, palm prints, iris, retina, and geometry of hand and face.

Learning Objectives:

1. Students should be able to articulate a clear definition of a biometric system and understand its fundamental characteristics.
2. Classify biometric systems into physiological and behavioral categories, comprehending the distinctions and applications of each.
3. Assess the strengths and weaknesses of physiological and behavioral biometrics, with a focus on the processes of enrollment, identification, and verification.
4. Examine the concept of multimodal biometrics, understanding its advantages and potential applications in enhancing security.
5. Apply performance measures (FAR, FRR, GAR, FTA, FTE, and ATV) to assess the efficiency and accuracy of biometric systems in positive and negative identifications.

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|-----------------|----------------------------|-----------------|
| Unit - I | Fundamental Aspects | 11 Hours |
|-----------------|----------------------------|-----------------|

Definition, characteristics and operation of biometric system.

Classification of biometric systems – physiological and behavioral.

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| Unit - II | Biometric Modalities and Processes | 11 Hours |
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Strength and weakness of physiological and behavioral biometrics. Multimodal

Biometrics. Key biometric processes – enrollment, identification and verification.

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| Unit - III | Introduction to Biometry | 13 Hours |
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Positive and negative identification. Types of error after positive and negative

Identification. Performance measures used in biometric systems – FAR (False Acceptance Rate),

FRR (False Rejection Rate), GAR (Genuine Accept Rate), FTA (False Touch Acceptance), FTE

(False Touch Rejection) and ATV (Attack Tolerance Value). Biometric versus traditional

Technologies.

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| Unit - IV | Physiological Biometrics | 12 Hours |
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Fingerprints, palm prints, iris, retina, geometry of hand and face.

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| Unit - V | Behavioral Biometrics | 13 Hours |
|-----------------|------------------------------|-----------------|

Handwriting, signatures, keystrokes, gait and voice.

Text Book(s):

1. S. Nanavati, M. Thieme and R. Nanavati, Biometrics, Wiley India Pvt. Ltd. (2002).
2. J.R. Vacca, Biometric Technologies and Verification Systems, Butterworth-Heinemann, Oxford (2007)

Reference Books:

1. P. Reid, Biometrics for Network Security, New Delhi (2004).

Web Resources:

1. <https://et.iupui.edu/departments/ece/courses/ece/51000>
2. <https://eunice-university.eu/course/biometrics-introduction-and-fundamentals-2/>

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| <p>Teaching Methodology: Videos, Audios, PPT, Role Play, Field Visit, Seminar, Chalk & Talk, Lecturing, Case Study, Demonstration, Problem Solving, Group Discussion, Flipped Learning</p> |
|---|

| Learning Outcomes: Upon successful completion of this course, the student will be able to | | |
|---|--|----------------------|
| COs | Statements | Bloom's Level |
| CO1 | To define and explain the fundamental aspects of biometric systems. | K1 |
| CO2 | To Classify biometric systems based on physiological and behavioral characteristics. | K2 |
| CO3 | Analyze various types of errors that can occur during identification processes. | K3 |
| CO4 | Evaluate the strengths and weaknesses of physiological and behavioral biometrics. | K4 |
| CO5 | Compare and contrast the performance of biometric systems with traditional technologies. | K5 |
| K1 – Remember, K2 – Understand, K3 – Apply, K4 – Analyze, K5 – Evaluate, K6 – Create | | |

| Mapping (COs vs. POs) | | | | | | | | | |
|------------------------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|
| | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 |
| CO1 | S | S | S | M | M | M | L | L | L |
| CO2 | S | S | S | S | M | M | L | L | L |
| CO3 | S | S | L | M | M | L | L | L | L |
| CO4 | S | S | S | M | L | M | M | L | L |
| CO5 | S | M | S | S | L | M | M | L | L |

S - Strong, M – Medium, L – Low

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|--|-------------------------------|----------------------|------------------|
| Semester: III | Course Code: 23UFSSE05 | Hours/Week: 2 | Credit: 2 |
| COURSE TITLE: SKILL ENHANCEMENT COURSE V: CYBER CRIME AND CYBER LAW | | | |

Course Overview:

1. Understand the nature of cyber-crimes, classify them into different types, and evaluate their implications on individuals and organizations.
2. Examine the historical development of the internet, define the concept of cyberspace, and analyze hacking techniques.
3. Explore the legal framework governing cyber activities, including the Information Technology Act, and grasp the ethical considerations in cyberspace.
4. Set up and manage a digital forensic lab, following standard operating procedures, and ensuring the proper handling of digital evidence.

Learning Objectives:

1. Investigate the historical development of the internet, the concept of cyberspace, and the techniques involved in hacking.
2. Learn the process of evaluating digital crime scenes, including the distinction between dead and live forensics.
3. Understand the setup and operations of a digital forensic lab, emphasizing the importance of standard operating procedures.
4. Explore different types of digital evidence, methods of collection, and the chain of custody in the context of cyber forensics.
5. Gain an overview of digital forensic tools, with a focus on their application in evidence collection and analysis.

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| Unit - I | Cyber Crime | 13 Hours |
|-----------------|--------------------|-----------------|

Cyber Crimes; Types of Cyber - crime and Financial Crimes; Hacking, Cyberspace. A Brief History of the Internet; Recognizing and Defining Computer Crimes; Contemporary Crimes; Cyber Laws and Ethics; Law Enforcement Roles And responses; Incident response; First Responder.

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| Unit - II | Digital Investigation | 15 Hours |
|------------------|------------------------------|-----------------|

Digital investigation; Digital crime scene evaluation process; Search & Seizure; Digital Forensic Lab set; Dead v/s Live Forensics; Types of Digital Evidences; Chain of Custody; Standard

Operating; Procedures of cyber - Forensics; Investigation Guidelines; overview of tools; Slack Space; Virtual paging.

| | | |
|-------------------|-------------------------|-----------------|
| Unit - III | Digital Evidence | 14 Hours |
|-------------------|-------------------------|-----------------|

Evidence collection from different devices; Write Protect, Write Blockers, Disk Imaging, Date recovery, Volatile and Non - Volatile Data Acquisition and Analysis, File Systems and Signatures, Registry Forensics, Email analysis and IP, Stenography, Cryptography, Card crimes.

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|------------------|--------------------------|-----------------|
| Unit - IV | Metadata Analysis | 15 Hours |
|------------------|--------------------------|-----------------|

Metadata Analysis; Browser Forensics; History Extraction, Integrity, Hash Value, Data tampering, File Signature Analysis. Overview of Mobile Forensics, Network Forensics, Cloud Forensics and Malware Analysis.

| | | |
|-----------------|------------------------|-----------------|
| Unit - V | IT ACT and Laws | 15 Hours |
|-----------------|------------------------|-----------------|

Introduction to IT Act 2000; Basic terms and elements of the act; Amendments made in IT Act; Electronic Governance; Certifying Authorities; Digital Signature and Electronic Signature Certificates; case study Legal Procedure to gather information from Outside India.

Text Book(s)

1. R.K. Tiwari, P.K. Sastry and K.V. Ravikumar, Computer Crimes and Computer Forensics, Select Publishers, New Delhi (2003).
2. R. Saferstein, Criminalistics, 8th Edition, Prentice Hall, New Jersey (2004)

Reference Books:

1. E. Casey, Digital Evidence and Computer Crime, Academic Press. London (2000).
2. C.B. Leshin, Internet Investigations in Criminal Justice, Prentice Hall, New Jersey (1997)

Web Resources:

1. <https://onlinecourses.swayam2.ac.in/cec20cs15/preview>
2. <https://onlinecourses.swayam2.ac.in/ugc19hs25/preview>

Teaching Methodology: Videos, Audios, PPT, Role Play, Field Visit, Seminar, Chalk & Talk, Lecturing, Case Study, Demonstration, Problem Solving, Group Discussion, Flipped Learning

| Learning Outcomes: Upon successful completion of this course, the student will be able to | | |
|---|--|----------------------|
| COs | Statements | Bloom's Level |
| CO1 | Understand the different theoretical and cross-disciplinary approaches. | K2 |
| CO2 | Examine the assumptions about the behavior and role of offenders and victims in cyberspace, and use basic web-tools to explore behavior on-line. | K4 |
| CO3 | Analyze and assess the impact of cybercrime on government, businesses, individuals and society. | K4 |
| CO4 | Evaluate the effectiveness of cyber-security, cyber-laws. | K5 |
| K1 – Remember, K2 – Understand, K3 – Apply, K4 – Analyze, K5 – Evaluate, K6 – Create | | |

| Mapping (COs vs. POs) | | | | | | | | | |
|------------------------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|
| | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 |
| CO1 | S | S | S | M | M | M | L | L | L |
| CO2 | S | S | S | M | M | S | S | M | L |
| CO3 | S | S | S | S | M | S | M | L | L |
| CO4 | S | S | S | M | M | S | S | M | L |

S - Strong, M – Medium, L - Low