PERIYAR UNIVERSITY

PERIYAR PALKALAI NAGAR

SALEM– 636011

DEGREE OF BACHELOR OF SCIENCE

CHOICE BASED CREDIT SYSTEM

Syllabus for

B.Sc., Forensic Science

(SEMESTER PATTERN)

(For Candidates admitted in the College affiliated to

Periyar University from 2023-2024 onwards)

B.Sc., Forensic Science Syllabus

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 Tamilnadu 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. 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 academic years, comprising six Semester and passed the examination prescribed and full filled such condition as have been prescribed there for

3. COURSEOFSTUDY ANDSCHEME OFEXAMINATION

The course of study shall comprise instruction in the following subjects according to the syllabus and books prescribed from time to time. The scheme of examination of the different semester shall be as follows;

Total Marks:	**4400**
Part I:	400
Part II:	400
Part III:	2300
Part IV:	1300
Total Credits:	**140**
Part I:	12
Part II:	12
Part III:	92
Part IV:	24

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 s**ocially 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 i**n 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 a**nd apply these to one own work to manage projects and in multidisciplinary environment.

- To emphasize the importance of scientific methods in crime detection.
- To disseminate information on the advancements in the field of forensic science.
- To highlight the importance of forensic science for perseverance of the society.
- To generate talented human resource, commensurate with latest requirements of forensic science.
- To review the steps necessary for achieving highest excellence in forensic science.
- To provide a platform for students and forensic scientists to exchange views, chalk-out collaborative programs and work in a holistic manner for the advancement of forensic science.

Programme Educational Objectives (PEOs)	
The B.Sc., Forensic Science program 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.

Programme Specific Outcomes (PSOs)	
After the successful completion of B.Sc forensic Science program 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.

B. SC. FORENSIC SCIENCE

FIRST YEAR – SEMESTER-I

PART	Paper Code	Subject Title	Hours / Week	Credit	CIA	ESE	Total
Part - I	23UTA01	Language – Tamil – I	6	3	25	75	100
Part - II	23UEN01	Language English – I	6	3	25	75	100
Part - III	23UFS01	Core Course – I: Basics of Forensic Science	5	5	25	75	100
	23UFS02	Core Course –II: Basics of Physics in forensic	5	5	25	75	100
	23UFSE01	Elective 1: Generic/ Discipline Specific - Basics of Physics lab	4	3	25	75	100
Part - IV	23UFSSE01	Skill Enhancement Course SEC-1: Crime and society	2	2	25	75	100
	23UFSFC01	Foundation Course - Basics of Event Management	2	2	25	75	100
		Total	**30**	**23**			

FIRST YEAR – SEMESTER-II

PART	Paper Code	Subject Title	Hours / Week	Credit	CIA	ESE	Total
Part - I	23UTA02	Language – Tamil - II	6	3	25	75	100
Part - II	23UEN02	Language English – II	4	3	25	75	100
II	NMSDC	Language Proficiency for Employability-Overview of English Communication	2	2	-	-	-
Part - III	23UFS03	Core Course – III: Forensic Psychology	5	5	25	75	100
	23UFS04	Core Course –IV: Basics of Biology - I	5	5	25	75	100
	23UFSE02	Elective 2: Generic/ Discipline Specific - Basics of Biology lab	4	3	25	75	100
Part - IV	23UFSSE02	Skill Enhancement Course SEC-2: Basic of computer science	2	2	25	75	100
	23UFSSE03	Skill Enhancement Course SEC-3: Yoga for Human Excellence	2	2	25	75	100
		Total	**30**	**25**			

SECOND YEAR – SEMESTER-III

PART	Paper Code	Subject Title	Hours / Week	Credit	CIA	ESE	Total
Part - I	23UTA03	Language – Tamil - III	6	3	25	75	100
Part - II	23UEN03	Language English - III	6	3	25	75	100
Part - III	23UFS05	Core Course - V: Basics of Chemistry	5	5	25	75	100
	23UFS06	Core Course VI Core lab 3: Chemistry lab	4	3	25	75	100
	23UFSE03	Elective 3: Generic/ Discipline Criminology and Justice	4	4	25	75	100
Part - IV	NMSDC	Digital Skills for Employability-Digital Skills	2	2	25	75	100
	23UFSSE05	Skill Enhancement Course SEC-5: Cybercrime and cyber law	2	2	25	75	100
	23UES01	Environmental Studies	1	-	-	-	-
		Total	**30**	**22**			

SECOND YEAR – SEMESTER - IV

PART	Paper Code	Subject Title	Hours / Week	Credit	CIA	ESE	Total
Part - I	23UTA04	Language – Tamil - IV	6	3	25	75	100
Part - II	23UEN04	Language English - IV	6	3	25	75	100
Part - III	23UFS07	Core Course - VII: Core Industry Module - Finger prints and Examined	5	5	25	75	100
	23UFS08	Core Course – VIII: Forensic Medicine	5	5	25	75	100
	23UFSE04	Elective 4: Generic/ Discipline - Forensic Medicine lab	3	3	25	75	100
Part - IV	23UFSSE06	Skill Enhancement Course SEC- 6: Instrumentation	2	2	25	75	100
	23UFSSE07	Skill Enhancement Course SEC-7: Computer Forensics lab	2	2	25	75	100
	23UES01	Environmental Studies	1	2	25	75	100
		Total	**30**	**25**			

THIRD YEAR – SEMESTER - V

PART	Paper Code	Subject Title	Hours / Week	Credit	CIA	ESE	Total
Part - III	23UFS09	Core Course – IX Forensic biology and serology	5	4	25	75	100
	23UFS10	Core Course – X: Forensic biology and serology lab	5	4	25	75	100
	23UFS11	Core Course – XI: Digital and Cyber forensic	5	4	25	75	100
	23UFS12	Core Course – XII: Project with viva - voce	5	4	25	75	100
	23UFSE05	Elective V Core Elective – I	4	3	25	75	100
	23UFSE06	Elective VI: Generic/ Discipline : Introduction to Research Methodology	4	3	25	75	100
Part - IV	23UVE01	Non-major elective – II (General Awareness)	2	2	25	75	100
	23UFSSE07	Internship/Field visit:- Crime scene investigation with police department	-	2	-	-	-
		Total	**30**	**26**			

THIRD YEAR – SEMESTER - VI

PART	Paper Code	Subject Title	Hours / Week	Credit	CIA	ESE	Total
Part - III	23UFS13	Core Course - XIII: Victimology	6	4	25	75	100
	23UFS14	Core Course – XIV: DNA typing in forensic	6	4	25	75	100
	23UFS15	Core Course – XV: Wildlife Forensic	6	4	25	75	100
	23UFSE07	Elective VII Core Elective – I	5	3	25	75	100
	23UFSE08	Elective VIII Core Elective – II	5	3	25	75	100
Part - IV	23UEX01	Core Elective – III Extension Activity	-	1	25	75	100
	23UFSPC07	Professional Competency Skill: Research Methodology lab	2	2	25	75	100
		Total	**30**	**21**			

Note:

1. **Skill enhancer**: **Internship 1 and 2**student will be complete the internship in the summer vacation. The report should be submit as per format and review will be conducted the end of the third and fifth semester respectively.
2. **Field visit:** students to visit the crime investigation department and have to collect the investigation procedure and submit the report.

Core Elective: I (any one)

1. Anthropology
2. Criminal law and special law
3. Criminal procedure and evidence

Core Elective: II (any one)

1. Accident investigation
2. Contemporary Crimes
3. Technological methods in Forensic science

Core Elective: III (any one)

1. Forensic ballistics
2. Forensic Toxicology

Course Code	23UFS01	BASICS OF FORENSIC SCIENCE	L	T	P	C
Core/elective/Supportive		Core: 1	5	1	-	5
Pre – requisite		• Basic knowledge in computer science				

Course Objectives

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

Expected Course Outcomes

1	Understand the need and nature of forensic science	K2
2	Classify the crime and crime spot physical evidence by a crime investigator	K2
3	Discuss the role of a forensic scientist.	K2
4	Familiarize oneself with the organization of a forensic science laboratory and equipment.	K3
5	Review the history and development of the forensic science sub-disciplines	K4

K1 – Remember K2 – Understand K3 – apply K4- Analyze K5 – evaluate K6- Create

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.		
Total Lecture Hours		**48 Hours**
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 Hyderbad Edition,(2018)	
2	M.K. Bhasin and S. Nath, Role of Forensic Science in the New Millennium, University of Delhi, Delhi (2002).	
	Related Online Contents (MOOC, SWAYAM,NPTEL, Websites etc)	
1	https://onlinecourses.swayam2.ac.in/cec20_ge10/preview	
2	https://www.coursera.org/learn/forensic-science	

	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**
CO1	**S**	**S**	**S**	**M**	**M**	**L**	**L**	**L**	**L**	**L**
CO2	**S**	**S**	**S**	**M**	**M**	**L**	**L**	**L**	**L**	**L**
CO3	**S**	**S**	**S**	**M**	**M**	**M**	**M**	**L**	**L**	**L**
CO4	**S**	**S**	**M**	**M**	**M**	**M**	**M**	**L**	**L**	**L**
CO5	**S**	**S**	**M**	**M**	**M**	**M**	**M**	**L**	**L**	**L**

*** S-Strong M- Medium L - Low**

Course Code	23UFS02	BASICS OF PHYSICS IN FORENSIC	L	T	P	C
Core/elective/Supportive		Core: 2	5	1	-	5
Pre - requisite		• Basic knowledge in Physics				

Course Objectives

- To understand the basic law in physics
- To understand thermal physics and electromagnetic concepts
- To understand the nuclear physics and its reactions.

Expected Course Outcomes

1	Understand the quantum mechanism and electromagnetic physics	K2
2	Understand the thermal physics.	K2
3	Demonstrate general physic phenomena.	K3
4	Apply basics physics laws in daily concepts	K3

K1 – Remember K2 – Understand K3 – apply K4- Analyze K5 – evaluate K6- Create

UNIT – I	MECHANICS	9 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	9 Hours

Electromagnetism: Coulomb‟s law. Electric field, Magnetic field due to current, Gauss‟s theorem and its application, Ampere‟s law, Kirchhoff‟s law and their applications.

UNIT - IV	WHEAT-STONE BRIDGE	9 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.

Total Lecture Hours	48 Hours

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 – AjoyGhatak (3rd Edition) Mc. Graw Hill Co
2	William H. Hayt& John. A. Buck, Engineering Electromagnetics ,Mc. Graw-Hill Companies, 7th Edition, 2009.
	Related Online Contents (MOOC, SWAYAM,NPTEL, Websites etc)
1	https://onlinecourses.swayam2.ac.in/nce19_sc05/preview
2	https://www.mooc-list.com/course/basic-physics-open2study

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	**S**	**S**	**S**	**L**	**M**	**S**	**L**	**L**	**L**	**L**
CO2	**S**	**S**	**S**	**L**	**M**	**S**	**L**	**L**	**L**	**L**
CO3	**S**	**S**	**S**	**L**	**M**	**M**	**M**	**L**	**L**	**L**
CO4	**S**	**S**	**M**	**L**	**M**	**M**	**M**	**L**	**L**	**L**

*** S-Strong M- Medium L - Low**

Course Code	23UFSE01	BASICS OF PHYSICS LAB	L	T	P	C
Core/elective/Supportive		Core lab: 1	-	-	3	3
Pre - requisite		• Basics of Physics lab				

Course Objectives

- Demonstrate the basic law in physics
- To understand the working of instruments in the physics laboratory.

Expected Course Outcomes

1	Understand the SOP for Vernier caliper, micrometer screw gauge and travelling microscope.	K2
2	Apply the moments in inertia of a flywheel.	K3
3	Demonstrate the basic Newton‟s law of cooling.	K3
4	Apply the gravity experimental model in the physics	K3

K1 – Remember K2 – Understand K3 – apply K4- Analyze K5 – evaluate K6- Create

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 Kater‟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.

Total Lecture Hours	36 Hours

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 – AjoyGhatak (3rd Edition) Mc. Graw Hill Co	
	Related Online Contents (MOOC, SWAYAM,NPTEL, Websites etc)	
1	https://onlinecourses.swayam2.ac.in/nce19_sc05/preview	
2	https://www.mooc-list.com/course/basic-physics-open2study	

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	L	M	M	L	L	L	L
CO2	S	S	S	L	S	M	L	L	L	L
CO3	S	S	S	L	M	M	M	L	L	L
CO4	S	S	M	L	S	M	M	L	L	L

*** S-Strong M- Medium L - Low**

Course Code	23UFSSE01	CRIME AND SOCIETY	L	T	P	C
Core/elective/Supportive		Skill Enhancement Course SEC-1: NME 1	2	1	0	2
Pre - requisite		• Basic knowledge of crime activities in the society				

Course Objectives

- To learn about the basic of crime activities

To learn about the justice system in the crime

Expected Course Outcomes

1	Understand the basic criminology	K2
2	Understand the crime with victimology	K2
3	Identify the crime which happen for the reason	K3
4	Distinguish the corporate crime and criminal justice system	K4

K1 – Remember K2 – Understand K3 – apply K4- Analyze K5 – evaluate K6- Create

UNIT – I	BASICS OF CRIMINOLOGY	12 Hours

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.

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).

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

Total Lecture Hours	60 Hours

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).	
	Related Online Contents (MOOC, SWAYAM,NPTEL, Websites etc)	
1	https://www.my-mooc.com/en/mooc/crime-justice-society/	
2	https://www.futurelearn.com/courses/crime-justice-society	

	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**
CO1	**S**	**S**	**M**	**M**	**M**	**M**	**M**	**M**	**L**	**L**
CO2	**S**	**S**	**M**	**M**	**M**	**M**	**L**	**L**	**L**	**L**
CO3	**S**	**S**	**S**	**L**	**M**	**M**	**M**	**L**	**L**	**L**
CO4	**S**	**S**	**M**	**L**	**M**	**M**	**M**	**L**	**L**	**L**

*** S-Strong M- Medium L - Low**

Subject Code	Subject Name	Category	L	T	P	O	Credits	Inst. Hours	Marks		
									CIA	External	Total
	Basics of Event Management	NME1	Y	-	-	-	2	2	25	75	100

Learning Objectives	
CLO1	To know the basic of event management its concepts
CLO2	To make an event design
CLO3	To make feasibility analysis for event.
CLO4	To understand the 5 Ps of Event Marketing
CLO5	To know the financial aspects of event management and its promotion

UNIT	**Details**	**No. of Hours**	**Learning Objectives**
I	Introduction: Event Management – Definition, Need, Importance, Activities.	6	CLO1
II	Concept and Design of Events: Event Co-ordination, Developing &, Evaluating event concept – Event Design	6	CLO2
III	Event Feasibility: Resources – Feasibility, SWOT Analysis	6	CLO3
IV	Event Planning & Promotion – Marketing & Promotion – 5Ps of Event Marketing – Product, Price, Place, Promotion, Public Relations	6	CLO4
V	Event Budget – Financial Analysis – Event Cost – Event Sponsorship	6	CLO5
	Total	**30**	

Course Outcomes

Course Outcomes	On completion of this course, students will;	**Program Outcomes**
CO1	To understand basics of event management	PO1, PO6
CO2	To design events	PO5, PO6
CO3	To study feasibility of organising an event	PO2, PO6
CO4	To gain Familiarity with marketing & promotion of event	PO6
CO5	To develop event budget	PO6, PO8

Reading List

1.	Event Management: A Booming Industry and an Eventful Career by Devesh Kishore, Ganga Sagar Singh - Har-Anand Publications Pvt. Ltd.
2.	Event Management by Swarup K. Goyal - Adhyayan Publisher - 2009
3.	Event Management & Public Relations by Savita Mohan - Enkay Publishing House

SEMESTER – II

Course Code	23UFS03	FORENSIC PSYCHOLOGY	L	T	P	C
Core/elective/Supportive		Core: 3	5	1	0	5
Pre - requisite		• Basic concepts of psychology and its scope				

Course Objectives

- The basic concepts of Psychology and its scope
- The various perspectives of Psychology
- The elements of brain and nervous system

Expected Course Outcomes

1	To describe key concepts, principles and overarching themes in Psychology	K3
2	To develop a working knowledge of Psychology‟s content domains	K5
3	To describe applications of Psychology	K3
4	To understand the basic concepts of brain and its components	K2

K1 – Remember K2 – Understand K3 – apply K4- Analyze K5 – evaluate K6- Create

UNIT – I	BASIC OF PSYCHOLOGY	12 Hours

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

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.

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.

UNIT - IV	ATTENTION	12 Hours

Attention- Introduction, definition, characteristics, selective and divided attention. Perception- Introduction, definition, Gestalt laws. Process of perception- Depth perception, constancy, movement. Correlated of perception- Awareness, motives, needs, illusion, subliminal perception and extra sensory

perception.		
UNIT- V	**THINKING & INTELLIGENCE**	**12 Hours**
Thinking- Introduction, definition, theories- information processing theory, SR theory, cognitive theory, simulation models. Types- free association, imaginal thought, reasoning, problem solving, decision-making, creative thinking, concept formation, language. Intelligence- Introduction, definition, theories- factor theories, cognitive models of intelligence. Intelligence tests characteristics and types. External and internal influences.		
Total Lecture Hours		**60 Hours**
Text Book(s)		
1	Robert A. Baron, GirishwarMisra, 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.	
	Related Online Contents (MOOC, SWAYAM, NPTEL, Websites etc)	
1	https://onlinecourses.swayam2.ac.in/cec19_cs03/preview	
2	https://onlinecourses.swayam2.ac.in/nos19_hs02/preview	

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	**S**	**S**	**S**	**M**	**M**	**M**	**M**	**S**	**L**	**L**
CO2	**S**	**S**	**S**	**M**	**M**	**M**	**L**	**L**	**L**	**L**
CO3	**S**	**S**	**S**	**L**	**M**	**M**	**S**	**L**	**L**	**M**
CO4	**S**	**S**	**M**	**L**	**M**	**M**	**L**	**L**	**L**	**L**

*** S-Strong M- Medium L - Low**

Course Code	23UFS04	BASICS OF BIOLOGY – I	L	T	P	C
Core/elective/Supportive		Core: 4	5	-	-	5
Pre - requisite		• Basic knowledge in biology or biotechnology				

Course Objectives

- To provide basic knowledge about Biology

To create platform for learning involvement of Biological evidence Investigation related to Forensic Biology and its domains.

Expected Course Outcomes

1	To obtain a general knowledge about basic Structure of cell including the metabolic reactions that occur in cells.	K2
2	To outline the structure of the bio molecules found in all living organisms	K2
3	To explain the structure of human Skelton system and teeth ordering.	K3
4	To describe cellular, biochemical, and physiological aspects of microorganisms	K3
5	To explain the basic structure and cellular activities in plants	K2

K1 – Remember K2 – Understand K3 – apply K4- Analyze K5 – evaluate K6- Create

UNIT – I	CELL BIOLOGY	10 Hours

Cell biology -Ultra structure of prokaryotic & eukaryotic cell-(both plant and animal cells), Structural organization and functions of plasma membrane and cell wall of prokaryotes & eukaryotes. Cellular Organelles and Cytoskeleton structures (Microtubules, Microfilaments and Intermediate filaments).

UNIT II	CHEMICAL STRUCTURES	8 Hours

Introduction, characteristics, chemical structures and Biochemistry of Amino acids, proteins, enzymes, nucleic acid carbohydrates, lipids.

UNIT-III	PLANT PHYSIOLOGY	10 Hours

Plant physiology: Plant anatomy, morphology of leaves, stem, flowers, roots, classification and taxonomy and system of classification of angiosperms (Bentham and Hooker) and Gymnosperms (chamberlain) scale. Mechanical and conducting tissue systems in plants types

UNIT - IV	OSTEOLOGY AND ODONTOLOGY	10 Hours

Introduction to osteology and odontology: Human skeletal system, Formation of bones, different types of bones, ossification, Dental structure of humans, types of teeth and arrangement.

UNIT- V	MICROBIOLOGY	10 Hours

Basics of Microbiology: Broad classification of microorganisms Concept of pure culture technique, stains and staining techniques, Control of Microorganisms: Physical & Chemical methods of control.

Total Lecture Hours	48 Hours

Text Book(s)

1	Cell Biology, Sixth Edition International, Students Edition, Gerald Karp, Wile Publications, 2010
2	Human Physiology : From Cells to Systems, II Lauralee Sherwood, Cengage Learning, 2008
	REFERENCE BOOKS:
1	Karp, G. Cell and Molecular Biology: Concepts and Experiments. Wiley, 6th edition 2010
2	Text book of Microbiology, Ananth Naryan Pannikar, 10th edition 2017
	Related Online Contents (MOOC, SWAYAM,NPTEL, Websites etc)
1	https://onlinecourses.swayam2.ac.in/nce19_sc12/preview
2	https://onlinecourses.swayam2.ac.in/cec19_bt12/preview

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	M	M	M	M	L	L	L
CO2	S	S	M	M	M	M	L	L	L	L
CO3	S	S	S	M	M	S	M	L	L	L
CO4	S	S	M	M	M	L	L	L	L	L
CO5	S	S	S	M	M	S	M	L	L	L

*** S-Strong M- Medium L - Low**

Course Code	23UFSE02	BASICS OF BIOLOGY LAB	L	T	P	C
Core/elective/Supportive		Elective 2: Generic/ Discipline Specific	-	-	4	3
Pre - requisite		• Basic knowledge in physics				

Course Objectives

- To learn about the cell biology techniques

Expected Course Outcomes

1	To understand the qualitative analysis methods	K2
2	To analyze the enzyme activity in the cell	K4
3	To estimate the protein levels through the test	K5
4	To demonstrate the staining of bacteria	K3

K1 – Remember K2 – Understand K3 – apply K4- Analyze K5 – evaluate K6- Create

1. Qualitative analysis of sugar, proteins, lipids and nucleic acids.
2. Study of Enzyme (Amylase), study the effect of substrate concentration on Enzyme activity.
3. Estimation of protein by Lowry method.
4. Staining Techniques, Simple, Negative staining, Gram Staining,
5. Study of aseptic techniques-preparation of cotton plugs for test tubes and pipettes, wrapping of Petri- plates and pipettes, transfer of media and inoculums.
6. Staining of bacteria :
    a. Simple staining.
    b. Gram‟s staining.

Total Lecture Hours	**36 Hours**

Text Book(s)

1	Cell Biology, Sixth Edition International, Students Edition, Gerald Karp, Wile Publications, 2010
	REFERENCE BOOKS:
1	Karp, G. Cell and Molecular Biology: Concepts and Experiments. Wiley, 6th edition 2010
	Related Online Contents (MOOC, SWAYAM,NPTEL, Websites etc)
1	https://onlinecourses.swayam2.ac.in/nce19_sc12/preview
2	https://onlinecourses.swayam2.ac.in/cec19_bt12/preview

*** S-Strong M- Medium L - Low**

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	S	M	M	L	L	L	L
CO2	S	S	M	M	M	M	M	L	L	L
CO3	S	S	S	M	M	M	M	M	L	L
CO4	S	S	S	S	M	M	M	L	L	L

Course Code	23UFSSE02	BASIC OF COMPUTER SCIENCE Lab	L	T	P	C
Core/elective/Supportive		Skill Enhancement Course SEC - 2		-	2	2
Pre - requisite		• Basic of Computer system				

Course Objectives

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

Expected Course Outcomes

1	To understand number system and methods for conversion from one number system to another.	K3
2	To remember the different logic gates and computer architecture.	K5
3	To classify the operating system, its type, features and common components.	K3
4	To compare the computer network, protocols and network devices	K2
5	To measure the different services provider over the internet	

K1 – Remember K2 – Understand K3 – apply K4- Analyze K5 – evaluate K6- Create

UNIT – I	BASICS OF COMPUTERS	10 Hours

Basics of Computers: History, Generation & Classification of Computers, Computer organization, components of computers – input output device, CPU, memory-RAM, ROM and external storage devices.

UNIT II	DATA REPRESENTATIONS	9 Hours

Data representations: integers, real, binary, octal hexadecimal & their conversions logic gates – Negation, OR, AND, X OR etc.

UNIT-III	INTRODUCTION TO OPERATING SYSTEM	10 Hours

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.

UNIT - IV	BASICS OF NETWORKING	10 Hours

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.

UNIT- V	INTRODUCTION TO INTERNET	9 Hours

Introduction to Internet: World Wide Web, E-mails, chat, search engines, connectivity. Internet Vs Intranet, virtual private network.		
Total Lecture Hours		**48 Hours**
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	
	Related Online Contents (MOOC, SWAYAM,NPTEL, Websites etc)	
1	https://onlinecourses.swayam2.ac.in/nou20_cs03/preview	
2	https://www.tutorialspoint.com/basics_of_computer_science/index.htm	

	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**
CO1	S	S	S	M	M	M	L	L	L	L
CO2	S	S	M	M	M	L	L	L	L	L
CO3	S	S	S	M	M	M	L	L	L	L
CO4	S	S	S	S	L	L	L	L	L	L
CO5	S	S	S	S	M	M	L	L	L	L

*** S-Strong M- Medium L - Low**

SEMESTER – III

Course Code	23UFS05	BASICS OF CHEMISTRY	L	T	P	C
Core/elective/Supportive		Core:5	5	1	0	5
Pre - requisite		• Basic knowledge in chemistry				

Course Objectives

To Obtain a general knowledge of the basic principles and functions of inorganic, organic and physical chemistry

Expected Course Outcomes

1	To Understand modern chemical principles both in theory and practice.	K2
2	To understand the laws of thermodynamics and how these dictate the behavior of chemical substances	K2
3	To remember about Periodic Table of the Elements and its role in organizing chemical information	K1
4	To analyze the Carbon Compounds with different Functional groups	K4

K1 – Remember K2 – Understand K3 – apply K4- Analyze K5 – evaluate K6- Create

UNIT – I	PERIODIC PROPERTIES	14 Hours

Periodic Properties: Atomic radii, ionization potential, electron affinity, electro negativity, metallic characters, non-metallic characters and magnetic properties, d-block elements, transition series (3d) elements with respect to electronic configuration, size, ionization energy, metallic nature, oxidation states, magnetic properties, colour of salts, catalytic properties, complex formation behaviour.

UNIT II	ORGANIC COMPOUNDS	13 Hours

Organic Compounds Alcohols: Nomenclature, methods of preparation, physical and chemical properties, identification of primary, secondary and tertiary alcohols, mechanism of dehydration, uses with special reference to methanol and ethanol.

UNIT-III	PHENOLS	14 Hours

Phenols: Nomenclature, methods of preparation, physical and chemical properties, acidic nature of phenol, electrophilic substitution reactions, uses of phenols. Ethers: Nomenclature, methods of preparation, physical and chemical properties, uses

UNIT - IV	LIQUID STATE	16 Hours

Liquid state: Free volume of liquid and density measurement, physical properties of liquid, Vapor pressure, surface tension surfactants, viscosity, molar refraction, optical activity structure of liquid, determination of surface tension by stalagnometer method (drop number method), viscosity by Ostwald's viscometer method and refractive index by Abbe's refractometer method. Effect of

temperature on surface tension viscosity and refractive index Applications of surface tension, viscosity and refractive index		
UNIT- V	**THERMO CHEMISTRY**	**15 Hours**
Thermo chemistry: Change in internal energy, enthalpy of reaction, relation between ΔH and ΔE, different types of thermo chemical equations, energy change during transition or phase change, bond energy.		
Total Lecture Hours		**72 Hours**
Text Book(s)		
1	Principles of Physical Chemistry and Puri, Sharma and Pathania, Vishal Publishing Company, 46th Edition 2013	
2	Organic Chemistry by Moris and Boyed, Pearson Publishing, 7th edition 2011.	
	REFERENCE BOOKS:	
1	Text book of organic chemistry by Arun Bahl and B. S. Bahl, S. Chand Publishing, 2016	
	Related Online Contents (MOOC, SWAYAM,NPTEL, Websites etc)	
1	https://onlinecourses.swayam2.ac.in/nce19_sc15/preview	
2	https://www.khanacademy.org/science/class-11-chemistry-india	

	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**
CO1	S	S	S	S	M	M	L	L	L	L
CO2	S	S	S	S	M	L	L	L	L	L
CO3	S	M	M	M	M	L	L	L	L	L
CO4	S	S	S	S	M	M	L	L	L	L

*** S-Strong M- Medium L - Low**

Course Code	23UFS06	CHEMISTRY LAB	L	T	P	C
Core/elective/Supportive		Core lab : 4	-	-	4	3
Pre - requisite		• Basic knowledge in chemistry				

Course Objectives

To provide a broad foundation in chemistry that stresses scientific reasoning and analytical problem solving with a molecular perspective.

Expected Course Outcomes

1	Understand the principles of various fields of chemistry	K2
2	Develop transferrable quantitative skills	K5
3	Develop as independent thinkers who are responsible for their own learning	K2
4	Describe bonding models that can be applied to a consideration of the properties of transition metal compounds	K3

K1 – Remember K2 – Understand K3 – apply K4- Analyze K5 – evaluate K6- Create

1. Introduction to Chemistry laboratory apparatus and instruments.
2. Standardization of given liquid by primary standard.
3. To determine surface tension of the given liquid by using stalagmometer.
4. To determine relative viscosity of given organic liquids by viscometer (Four liquids)
5. pH metric measurement (a)To prepare buffers and standardization of pH meter. (b) Determine the molarity of Hcl pH-metrically provided M/10 NaOH.
6. Determination of functional groups.
7. Analysis of acid and basic radicals.
8. Detection of elements.

Total practical Hours	**60 Hours**

Text Book(s)

1	Principles of Physical Chemistry and Puri, Sharma and Pathania,Vishal Publishing Company, 46th Edition 2013
2	Organic Chemistry by Moris and Boyed, Pearson Publishing, 7th edition 2011.
	REFERENCE BOOKS:
1	Text book of organic chemistry by ArunBahl and B. S. Bahl, S. Chand Publishing, 2016
	Related Online Contents (MOOC, SWAYAM,NPTEL, Websites etc)
1	https://onlinecourses.swayam2.ac.in/nce19_sc15/preview
2	https://www.khanacademy.org/science/class-11-chemistry-india

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	S	M	M	L	L	L	L
CO2	S	S	S	M	S	M	L	M	L	L
CO3	S	S	S	S	S	M	L	M	L	L
CO4	S	S	S	M	L	L	L	L	L	L

*** S-Strong M- Medium L – Low**

Course Code	23UFSE03	CRIMINOLOGY AND JUSTICE	L	T	P	C
Core/elective/Supportive		Elective 3: Generic/ Discipline	4	1	0	4
Pre - requisite		• Basic knowledge about crime and justice				

Course Objectives

- To impart knowledge and develop skills relating to application of criminological and enological thoughts in the administration of criminal justice system.

Expected Course Outcomes

1	Understand nature of the crime and historical views	K3
2	Describe the pre-classical and neo-classical of criminology	K5
3	Analyze the various crime justice system	K3
4	Examine the sociological views in the crime.	K2

K1 – Remember K2 – Understand K3 – apply K4- Analyze K5 – evaluate K6- Create

UNIT – I	INTRODUCTION	14 Hours

Introduction: Criminology, Crime - definitions; historical perspectives; nature, origin and scope Criminology as a social science, relations with other social sciences, medicine and law.

UNIT II	SCHOOLS OF CRIMINOLOGY	13 Hours

Schools of Criminology: Pre-classical, Neo-Classical, Positive, Cartographic, Biological and Constitutional Schools. Biological Theories- Atavism, Twin Study, Body Type Theory, Adoption Study, XYY Chromosomes

UNIT-III	SOCIOLOGICAL THEORIES	14 Hours

Sociological theories of Crime - Sub culture theories - Differential Association theory – Differential Opportunity Theory – Laws of Imitation by Gabriel Tarde – Imitation theory by Albert Bandura - Techniques of Neutralization – Routine Activity Theory – Rational Choice Theory – Broken Window Theory– Social Leaning Theory by Ronald L Akers - Crime as normal and abnormal phenomena by Emile Durkheim, Social structure and anomie by Robert K. Merton, Strain theory of delinquency by Robert S. Agnew, Containment theory by Walter C. Reckless, Social Bond Theory by Travis Hirshi; Labelling theory ny Edwin M. Lemert; Shame and reintegration by John Braithwaite; Crime as a rational choice by Derek B. Cornish and Ronald V. Clarke; Routine activity theory by Lawrence E. Cohen and Marcus Felson

UNIT -IV	PSYCHOLOGICAL THEORIES	15 Hours

Psychological Theories: Personality – Definition – Freu‟d and Erickson‟s theories of Personality – Eysencks theory of personality – Motivation – Definition – Types of Motivation, Needs, Maslow‟s Hierarchical Theory – Motivation and Frustration – Frustration and Aggression – Emotions and Crime – Intelligence and Crime

UNIT- V	CRIMINAL JUSTICE SYSTEM	16 Hours

Criminal Justice System: Broad components of criminal justice system. Policing styles and principles. Police‟s power of investigation. Filing of criminal charges. Community policing. Policing a heterogeneous society. Correctional measures and rehabilitation of offenders. Human rights and criminal justice system in India. Crimes in India: Statistics, Crime rate, National Crime records- Bureau, State Crime records Bureau, and District crime records bureau; Patterns and current trends of crime in India

Total Lecture Hours	72 Hours

Text Book(s)		
1	Conklin, J.E. (2001), Criminology, Macmillan Publishing Company.	
2	Chockalingam, K. (1997). „Kuttraviyal" (Criminology) in Tamil, Chennai. Parvathi Publications.	
	REFERENCE BOOKS:	
1	Fathali M. Hoghaddam (1998) Social Psychology: Exploring Universals Across Cultures, New York: W.H.Freeman and Company	
	Related Online Contents (MOOC, SWAYAM,NPTEL, Websites etc)	
1	https://onlinecourses.swayam2.ac.in/cec21_lw04/preview	
2	https://onlinecourses.nptel.ac.in/noc19_hs57/preview	

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	S	M	M	L	L	L	L
CO2	S	S	S	M	M	M	L	L	L	L
CO3	S	S	S	S	M	M	M	L	L	L
CO4	S	S	S	M	M	S	L	L	L	L

*** S-Strong M- Medium L - Low**

Course Code	23UFSSE04	COMPUTER FORENSICS	L	T	P	C
Core/elective/Supportive		Skill Enhancement Course SEC-4: (Entrepreneurial Skill)	2	1	0	2
Pre – requisite		• Basic knowledge about computer system				

Course Objectives

- To provide a knowledge about computer system architecture.
- To provide a knowledge about investigation with digital data.

Expected Course Outcomes

1	Remember about computer structure	K1
2	Understand architecture of the file storage in the computer system.	K2
3	Examine the computer crimes and security firewall	K4
4	Analyze the seized material data.	K4

K1 – Remember K2 – Understand K3 – apply K4- Analyze K5 – evaluate K6- Create

UNIT – I	BASIC OF COMPUTER SYSTEM	11 Hours

Fundamentals and Concepts Fundamentals of computers Hardware and accessories – development of hard disk, physical construction, CHS and LBA addressing, encoding methods and formats. Memory and processor, Methods of storing data, Operating system, Software. Introduction to network, LAN, WAN and MAN.

UNIT II	COMPUTER CRIMES	11 Hours

Computer Crimes definition and types of computer crimes, Distinction between computer crimes and conventional crimes, Reasons for commission of computer crimes, Breaching security and operation of digital systems.

UNIT-III	COMPUTER VIRUS, AND COMPUTER WORM	13 Hours

Trojan horse, trap door, super zapping, logic bombs. Types of computer crimes – computer stalking, pornography, hacking, crimes related to intellectual property rights, computer terrorism, hate speech, private and national security in cyber space. An overview of hacking, spamming, phishing and stalking.

UNIT -IV	COMPUTER FORENSICS	12 Hours

Computer Forensics Investigations: Seizure of suspected computer, Preparation required prior to seizure, Protocol to be taken at the scene, Extraction of information from the hard disk.

UNIT- V	INVESTIGATION METHODS	13 Hours

Treatment of exhibits. Creating bit stream of the original media, Collection and seizure of magnetic

media, Legal and privacy issues, Examining forensically sterile media, Restoration of deleted files, Password cracking and E-mail tracking, Encryption and decryption methods, Tracking users.		
	Total Lecture Hours	**60 Hours**
Text Book(s)		
1	Man Young Rhee, "Internet Security: Cryptographic Principles", "Algorithms and Protocols", Wiley Publications, 2003.	
2	Nelson, Phillips, Enfinger, Steuart, "Computer Forensics and Investigations", Cengage Learning, India Edition, 2008.	
	REFERENCE BOOKS:	
1	John R.Vacca, "Computer Forensics", Cengage Learning, 2005	
2	MarjieT.Britz, "Computer Forensics and Cyber Crime": An Introduction", 3rd Edition, Prentice Hall, 2013.	
	Related Online Contents (MOOC, SWAYAM, NPTEL, Websites etc)	
1	https://onlinecourses.swayam2.ac.in/cec20_lb06/preview	
2	https://onlinecourses.swayam2.ac.in/cec21_ge10/preview	

	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**
CO1	S	S	S	S	M	M	M	L	L	L
CO2	S	S	S	M	L	M	L	L	L	L
CO3	S	S	M	M	L	M	L	L	L	L
CO4	S	S	S	M	L	L	L	L	L	L

*** S-Strong M- Medium L - Low**

Course Code	23UFSSE05	CYBERCRIME AND CYBER LAW	L	T	P	C
Core/elective/Supportive		Skill Enhancement Course SEC-5	2	1	0	2
Pre - requisite		• Basic knowledge in crime happening in real life				

Course Objectives

- To learn about various types of computer system used in the cybercrime
- To know about computer forensic tools

Expected Course Outcomes

1	Understand the different theoretical and cross-disciplinary approaches	K2
2	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
3	Analyze and assess the impact of cybercrime on government, businesses, individuals and society	K4
4	Evaluate the effectiveness of cyber-security, cyber-laws	K5

K1 – Remember K2 – Understand K3 – apply K4- Analyze K5 – evaluate K6- Create

UNIT – I	CYBER CRIMES	13 Hours

Cyber Crimes, Types of Cybercrime and Financial Crimes, Hacking, Cyberspace, A Brief History of the Internet, Recognizing and Defining Computer Crime, Contemporary Crimes, Cyber Laws and Ethics, Law Enforcement Roles and Responses, Incident response, First Responder.

UNIT II	DIGITAL INVESTIGATION	15 Hours

Digital investigation, Digital crime scene evaluation process, Search & Seizure, Digital Forensic Lab Setup, Dead v/s Live Forensics, Types of Digital Evidences, Chain of Custody, Standard Operating Procedures of cyberForensics, Investigation Guidelines, overview of tools, Slack Space, Virtual paging

UNIT-III	EVIDENCE	14 Hours

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

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 LAW	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.		
	Total Lecture Hours	**72 Hours**
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)	
	Related Online Contents (MOOC, SWAYAM, NPTEL, Websites etc)	
1	https://onlinecourses.swayam2.ac.in/cec20_cs15/preview	
2	https://onlinecourses.swayam2.ac.in/ugc19_hs25/preview	

	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**
CO1	S	S	S	M	M	M	L	L	L	L
CO2	S	S	S	M	M	S	S	M	L	L
CO3	S	S	S	S	M	S	M	L	L	L
CO4	S	S	S	M	M	S	S	M	L	L

*** S-Strong M- Medium L - Low**

SEMESTER – IV

Course Code	23UFS07	FINGER PRINTS AND EXAMINED	L	T	P	C
Core/elective/Supportive		Core: 7	5	1	0	5
Pre - requisite		• The basic knowledge of biometric systems				

Course Objectives

To learn about finger prints concepts in crime system

Expected Course Outcomes

1	Understand the importance of fingerprints in Forensic Science.	K3
2	Describe the importance of document examination.	K5
3	Understand about various components, which help in determination of the Document.	K3
4	Acquire skill required for handling questioned documents.	K2
5	Analyze the handwriting variations and forgery.	K4

K1 – Remember K2 – Understand K3 – apply K4- Analyze K5 – evaluate K6- Create

UNIT – I	INTRODUCTION	14 Hours

Introduction. History and development of fingerprinting. Histology and formation of ridges. Fundamental principles of fingerprinting. Types of fingerprints. Fingerprint patterns. Fingerprint characters/minutiae. Classification – Henry‟s classification and cataloguing of fingerprint record. Automated Fingerprint Identification System.

UNIT II	MECHANISM OF FINGER PRINT	13 Hours

Constituents of sweat residue. Locating latent fingerprints and development by physical and chemical techniques and its mechanism. Preservation of developed fingerprints. Digital imaging for fingerprint enhancement. Recording of fingerprints of living and deceased. Plain and rolled fingerprints.

UNIT-III	TYPE OF PRINTS	15 Hours

Footprints- Introduction, types, development, collection and comparison. Footwear impressions- Introduction, types, location, collection, comparison and significance. Collection of standards. Gait pattern analysis. Palm prints- Introduction, examination and significance. Lip prints – Introduction, nature, classification, location, collection and examination of lip prints. Ear prints- classification, examination and their significance.

UNIT - IV	QUESTIONED DOCUMENTS	16 Hours

Introduction, Definition, History and development of questioned document examination. Forgery-

Definition, types and Sections involved. Alterations in documents, including erasures, additions, over-writings and obliterations. Charred documents. Characteristic features of Indian currency notes and coins, passports, visas and stamp papers and their examination. Handwriting- Introduction and development of individuality. Characteristics of handwriting-Class and individual characteristics. Factors influencing handwriting. Forgery and its types. Standards for comparison of handwriting.		
UNIT- V	**PRINTER**	**14 Hours**
Printer: Introduction, parts of a printer, types of printers and their working principle Typewriter: Introduction, working principle, parts of a typewriter. Examination and comparison of printed, typed and Xeroxed documents toner analysis, grabber marks, individual characteristics and defect marks.		
	Total Lecture Hours	**72 Hours**
Text Book(s)		
1	C. Champod, C. Lennard, P. Margot an M. Stoilovic, Fingerprints and other Ridge Skin Impressions, CRC Press, Boca Raton (2004).	
2	Lee and Gaensleen‟s, Advances in Fingerprint Technology, 3rd Edition, R.S. Ramotowski (Ed.), CRC Press, Boca Raton (2013).	
	REFERENCE BOOKS:	
1	Albert S. Osborn, Questioned Documents, 2nd Edition	
2	R.N. Morris, Forensic Handwriting Identification: Fundamental Concepts and Principles, Academic Press, London (2000).	
	Related Online Contents (MOOC, SWAYAM, NPTEL, Websites etc)	
1	https://onlinecourses.swayam2.ac.in/cec20_ge10/preview	
2	http://www.forensicsciencesimplified.org/prints/how.html	

	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**
CO1	S	S	M	M	M	S	M	L	L	L
CO2	S	S	S	M	M	M	L	L	L	L
CO3	S	S	M	M	M	S	M	L	L	L
CO4	S	S	S	M	M	M	L	L	L	L

*** S-Strong M- Medium L - Low**

Course Code	23UFS08	FORENSIC MEDICINE	L	T	P	C
Core/Elective/Supportive		Core: 8	5	1	0	5
Pre - requisite		• Basic knowledge in the chemistry.				

Course Objectives

To understand and identification of informed Medico-legal responsibility

Expected Course Outcomes

1	Understand about the first responding officer roles and responsibilities.	K2
2	To analyze about death scene to ascertaining whether the crime was staged to appear as suicide, accident, homicide.	K4
3	Compare of External and internal autopsy findings in determining medico legal aspects of death.	K3
4	To construct the report of giving medical legal answers of various modes of deaths	K2

K1 – Remember K2 – Understand K3 – apply K4- Analyze K5 – evaluate K6- Create

UNIT – I	DEATH INVESTIGATIONS	14 Hours

Fundamental aspects and scope of forensic medicine. Approaching the crime scene of death. Obtaining first hand information from the caller. Rendering medical assistance to the victim, if alive. Protecting life. Recording dying declaration. Identifying witnesses and, if possible, suspect. Interviewing onlookers and segregating possible witnesses. Suspect in custody – initial interrogation and searching for evidence.

UNIT II	ROLE OF FORENSIC MEDICINE & SUBMISSION PROCEDURE	15 Hours

Role of Forensic Medicine in court – Meaning and Scope Inquest Nature and Powers of Criminal Courts in India Procedure of calling a witness to a court. Procedure in court: Oath Examination – in – chief, Cross Examination and Re-Examination Medical Evidence Medico legal Reports and Dying declaration Doctor as medical/ Expert witness

UNIT-III	AUTOPSY	14 Hours

Autopsy Medical Autopsy: Introduction and objectives, rules for medico legal autopsy, external and internal examination of body, collection of Ante-mortem and post-mortem samples, autopsy report

UNIT -IV	THANATOLOGY	16 Hours
Definition of death. Types of death(somatic and molecular).Medico-legal aspects of death – Causes of death such as asphyxia(strangulation, hanging, drowning etc), electrocution, thermal trauma, heat burns, starvation, natural death, sudden death etc. Changes after death (immediate, early and late changes) and Determination of time since death.		
UNIT- V	**WOUNDS AND INJURIES**	**13 Hours**
Definition of wounds, injuries, and laws governing them. Types and classification of injuries. Ante mortem and post mortem injuries. Aging of injuries. Artificial injuries. Difference between suicidal, homicidal and accidental injuries.		
Total Lecture Hours		**72 Hours**
Text Book(s)		
1	Forensic medicine and toxicology: principles and practice, Professor Krishna Vij Publisher: Elsevier, 5 Edition ,2014	
2	Practical Aspects of Forensic Medicine, Dr T.D. Dogra Dr. AD Aggrawal jaypee publishers,2014.	
	REFERENCE BOOKS:	
1	Parikh's textbook of medical jurisprudence, forensic medicine and toxicology Professor C. K. Parikh, CBS; 6 edition, 2007	
2	The essentials of forensic medicine and toxicology Professor K.S. Narayan Reddy Jaypee Brothers Medical Publishers; 34th edition 2017	
	Related Online Contents (MOOC, SWAYAM, NPTEL, Websites etc)	
1	https://nptel.ac.in/noc/courses/noc17/SEM2/noc17-cy03/	
2	https://nptel.ac.in/courses/104/105/104105084/	

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	M	M	M	M	L	L	L	L
CO2	S	S	S	M	M	M	L	L	L	L
CO3	S	S	M	M	M	M	L	L	L	L
CO4	S	S	S	S	M	M	L	L	L	L

*** S-Strong M- Medium L - Low**

Course Code	23UFSE04	FORENSIC MEDICINE LAB	L	T	P	C
Core/elective/Supportive		Elective 4: Generic/ Discipline	-	-	3	3
Pre - requisite		• Basic knowledge in the crime scene and marks in death				

Course Objectives

To learn about the examination and assessment of individuals who have suspected, injured, or killed by external influence.

Expected Course Outcomes

1	Understand the cause of death	K2
2	Create a checklist in the crime scene	K6
3	Analyze the marks in the death scene	K4
4	Create a questionnaire for first responder in the crime spot	K6

K1 – Remember K2 – Understand K3 – apply K4- Analyze K5 – evaluate K6- Create

1. To design a questionnaire for the first responder to the death scene.
2. To design a protocol to deal with the media at the crime scene.
3. To design a checklist for the forensic scientists at the death scene.
4. To design a canvass form giving description of an unidentified victim.
5. To analyze and preserve bite marks.
6. To study different stages of changes after death
7. To identify shooter on the basis of firearm injuries
8. To identify different causes of death
9. To study post-mortem findings of a cadaver

Total Practical Hours	**72 Hours**

Text Book(s)

1	Practical Guide for Forensic Medicine and Toxicology by K Tamilmani
	REFERENCE BOOKS:
1	T. Bevel and R.M. Gardner, Bloodstain Pattern Analysis, 3rd Edition, CRC Press, Boca Raton (2008)
	Related Online Contents (MOOC, SWAYAM, NPTEL, Websites etc)
1	https://nptel.ac.in/noc/courses/noc17/SEM2/noc17-cy03/
2	https://nptel.ac.in/courses/104/105/104105084/

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10

CO1	S	S	S	M	M	M	M	L	L	L
CO2	S	S	S	M	M	S	L	L	L	L
CO3	S	S	M	S	M	S	M	M	L	L
CO4	S	S	S	S	M	M	M	L	L	L

*** S-Strong M- Medium L - Low**

Course Code	23UFSSE06	INSTRUMENTATION	L	T	P	C
Core/elective/Supportive		Skill Enhancement Course SEC - 6	2	1	-	2
Pre - requisite		• Basic knowledge in photography and crime evidence.				

Course Objectives

- The importance of chromatographic and spectroscopic techniques in processing crime scene evidence.
- The significance of microscopy in visualizing trace evidence and comparing it with control samples.

Expected Course Outcomes

1	Understand various principles involved in instrumentation	K3
2	Apply various techniques to visualize trace evidences	K5
3	Significance of various techniques involved in identifying various Chemical and Biological materials.	K3
4	Understand the working of various instruments.	K2

K1 – Remember K2 – Understand K3 – apply K4- Analyze K5 – evaluate K6- Create

UNIT – I	GENERAL PHYSICAL AND BIOLOGICAL CONCEPTS	14 Hours

General Physical and Biological concepts- Mass, Density, range of electromagnetic radiation, interaction between matter and radiation, fluorescence, phosphorescence. pH and buffers. Significance of instrumentation in Forensic Science. Centrifuge Principles, types and Forensic applications.

UNIT II	FORENSIC APPLICATIONS OF MICROSCOPE	14 Hours

Principles, ray diagrams, parts and working, sample preparation and Forensic applications of-Simple microscope, Compound microscope, Stereo microscope, Polarized light microscope, Dark-field microscope, Comparison microscope, Fluorescent microscope, Electron microscope.

UNIT-III	PRINCIPLES OF SPECTROSCOPY	16 Hours

Principles of spectroscopy- Beer Lambert‟s Law, ray diagram, parts and working and Forensic applications of- UV-Visible spectroscopy and IR spectroscopy. FTIR. Principles and Forensic applications of- Atomic Absorption and Emission Spectroscopy, Raman spectroscopy, X-Ray spectroscopy. Principle, working and applications of Mass Spectroscopy

UNIT - IV	CHROMATOGRAPHY	14 Hours

Principles, working and Forensic applications of Paper chromatography, Column chromatography, and TLC. 3D photography, Photographic evidence, Infrared and ultraviolet photography, Digital photography, Videography, Crime scene and laboratory photography.

UNIT- V	FORENSIC APPLICATION WORKING PRINCIPLES	14 Hours

General principles, factors affecting, Types- Horizontal and Vertical, SDS PAGE, AGE, Crossed over electrophoresis and Capillary electrophoresis, Genetic Analyzer. Forensic applications. Principles and working and Forensic applications of Autoclave, Laminar Air Flow-HEPA filters, Incubators, CO2 incubators.		
Total Lecture Hours		**72 Hours**
Text Book(s)		
1	D.A. Skoog, D.M. West and F.J. Holler, Fundamentals of Analytical Chemistry, 6th Edition, Saunders College Publishing, Fort Worth (1992)	
2	W. Kemp, Organic Spectroscopy, 3rd Edition, Macmillan, Hampshire (1991).	
	REFERENCE BOOKS:	
1	J.W. Robinson, Undergraduate Instrumental Analysis, 5th Edition, Marcel Dekker, Inc., New York (1995).	
2	J.C.Giddings, Dynamics of Chromatography, Marcel Dekker, New York.	
	Related Online Contents (MOOC, SWAYAM, NPTEL, Websites etc)	
1	https://nptel.ac.in/courses/103/108/103108100/	
2	https://nptel.ac.in/courses/104/108/104108078/	

	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**
CO1	S	S	S	S	M	M	M	M	L	L
CO2	S	S	S	M	M	S	M	M	L	L
CO3	S	S	M	M	S	M	M	M	L	L
CO4	S	S	L	L	M	M	L	L	L	L

*** S-Strong M- Medium L - Low**

Course Code	23UFSSE07	COMPUTER FORENSICS LAB	L	T	P	C
Core/elective/Supportive		Skill Enhancement Course SEC -7	-	-	4	3
Pre - requisite		• Basic knowledge about computers and hardware				

Course Objectives

- To provide knowledge about cyber forensic investigation process, incident response process, forensic tools

Expected Course Outcomes

1	Understand the evidence of computer forensics	K2
2	Demonstrate the various procedure against the collected digital evidence	K5
3	Finding the slack and MBR disk space form small disk	K5
4	Analyze the disk space and type of the formatting the disk	K4

K1 – Remember K2 – Understand K3 – apply K4- Analyze K5 – evaluate K6- Create

1. Identification, Seizure, Search of Digital media.
2. Evidence Collection and image creation from the evidence.
3. Demonstration of various Forensic tools like Partition magic, Encase etc.
4. Data Recovery, Deleted File Recovery viewing small Disk.
5. Viewing small disk MBR and Slack.
6. Demonstration of Concealment Techniques (Cryptography PGP).
7. Demonstration of Concealment Techniques (Stenography).
8. Demonstration of other Concealment Techniques.
9. Formatting NTFS and EX2, EX3.
10. Case study of Biometric Techniques.

Total Practical Hours | **48 Hours**

Text Book(s)

1	Incident Response and Computer Forensic by Kelvin Mandia, McGraw-Hill Education; 3rd edition (August 1, 2014)
2	Cyber Forensic by Marecella Menendez, John Wiley & Sons (15 May 2012)
	REFERENCE BOOKS:
1	Cyber Forensic A Field Manual for Collecting, Examining and Preserving Evidence of Computer Crimes by Albert Marcella, Jr., Doug Menendez, CRC Press 2nd Edition 2007
	Related Online Contents (MOOC, SWAYAM, NPTEL, Websites etc)
1	https://nptel.ac.in/courses/106/106/106106178/
2	https://onlinecourses.swayam2.ac.in/cec20_lb06/preview

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	S	M	M	M	M	L	L
CO2	S	S	S	S	S	S	S	M	L	L
CO3	S	S	M	S	S	M	M	M	L	L
CO4	S	S	M	S	M	S	M	L	L	L

*** S-Strong M- Medium L - Low**

Course Code	23UFS09	FORENSIC BIOLOGY AND SEROLOGY	L	T	P	C
Core/elective/Supportive		Core: 9	5	1	0	4
Pre - requisite		•				

Course Objectives

- To understand the evidence of biological and serological.
- To understand the Blood sampling evidence in accidents, murder cases, and violent crime investigations

Expected Course Outcomes

1	Understand the general concepts and definitions used in Forensic Biology and serology.	K2
2	Understand the role of Forensic biologists in crime scene investigation	K2
3	Examine the biological evidence with laboratory handling procedures	K1
4	Analyze the Importance of Forensic Entomology and Wildlife Forensics	K4

K1 – Remember K2 – Understand K3 – apply K4- Analyze K5 – evaluate K6- Create

UNIT – I	BIOLOGICAL EVIDENCE	14 Hours

Nature and importance of biological evidence. Collection and preservation of common biological evidences. Significance and origin of hair evidence. Transfer, persistence and recovery of hair evidence. Structure of human hair. Comparison of hair samples. Morphology and biochemistry of human hair. Comparison of human and animal hair. Importance of pollen grains, wood and diatoms in Forensic science.

UNIT II	COMMON BODY FLUIDS	17 Hours

Composition and functions of blood. Collection and preservation of blood evidence. Distinction between human and non-human blood- Origin determination. Determination of blood groups. Forensic characterization of bloodstains. Typing of dried stains. Blood enzymes and proteins. Semen. Forensic significance of semen. Composition, functions and morphology of spermatozoa. Collection, evaluation and tests for identification of semen. Individualization on the basis of semen examination. Composition, functions and Forensic significance of saliva, sweat, urine, fecal stains, milk and vomit. Tests for their identifications.

UNIT-III	BLOODSTAIN	16 Hours

Bloodstain characteristics. Impact bloodstain patterns. Cast -off bloodstain patterns. Projected bloodstain patterns. Contact bloodstain patterns. Blood trails. Bloodstain drying times. Documentation of bloodstain pattern evidence. Crime scene reconstruction with the aid of bloodstain pattern analysis.

UNIT - IV	ENTOMOLOGY	12 Hours

Basics of Forensic entomology. Insects of Forensic importance. Collection of entomological evidence during death investigations.

UNIT- V	SIGNIFICANCE OF WILDLIFE FORENSICS	13 Hours
Significance of Wildlife Forensics. Organizations involved. IUCN Red List Conservation Status- Extinct, Extinct in Wild, Critically Endangered, Endangered, Vulnerable, Near Threatened, Least Concern. List of protected species in India. Illegal trading of wildlife items. Identification of Physical evidences pertaining to wildlife crime		
	Total Lecture Hours	**72 Hours**

Text Book(s)	
1	Alan Gunn, Essential Forensic Biology, 2nd Edition, Wiley (2009)
2	J. M. Butler, Advanced Topics in Forensic DNA Typing, Academic Press, (2014).
	REFERENCE BOOKS:
1	Handbook For Forensic Biology, by Shadma Siddiqui Chandra Bahadur Singh Dangi 2020
2	Forensic serology by Shanan S Tobe, Elsevier Science, 2022
	Related Online Contents (MOOC, SWAYAM, NPTEL, Websites etc)
1	https://onlinecourses.swayam2.ac.in/cec20_bt05/preview
2	https://onlinecourses.swayam2.ac.in/cec20_bt02/preview

	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**
CO1	S	S	S	M	M	M	L	L	L	L
CO2	S	S	S	M	M	L	L	L	L	L
CO3	S	S	S	M	M	S	S	M	L	L
CO4	S	S	S	S	M	S	M	L	L	L

*** S-Strong M- Medium L - Low**

Course Code	23UFS10	FORENSIC BIOLOGY AND SEROLOGY LAB	L	T	P	C
Core/Elective/Supportive		Core lab	-	-	5	4
Pre - requisite		• Basic knowledge in biology and blood stains.				

Course Objectives

- To learn about forensic biology and serology.

Expected Course Outcomes

1	Identify and examine hair and other biological evidences	K1
2	Measure the various biological samples through the test.	K5
3	Apply the skills to carry-out serological tests.	K3
4	Experiment the science of bloodstain pattern analysis	K3

K1 – Remember K2 – Understand K3 – apply K4- Analyze K5 – evaluate K6- Create

1. To examine hair morphology and identify species.
2. To carry out microscopic examination of pollen grains.
3. To carry out microscopic examination of diatoms.
4. To carry out preliminary and confirmatory tests for blood.
5. To determine the blood group from fresh and dried blood stains.
6. To identify the given stain as saliva.
7. To identify the given stain as urine.
8. To identify various bloodstain patterns in a crime scene.
9. To prepare a case report on Wildlife Forensics.
10. To prepare a case report on Forensic Entomology.

Total practical Hours	**72 Hours**

Text Book(s)

1	Alan Gunn, Essential Forensic Biology, 2nd Edition, Wiley (2009)
2	J. M. Butler, Advanced Topics in Forensic DNA Typing, Academic Press, (2014).
	REFERENCE BOOKS:
1	Forensic serology by Shanan S Tobe, Elsevier Science, 2022
	Related Online Contents (MOOC, SWAYAM,NPTEL, Websites etc)
1	https://onlinecourses.swayam2.ac.in/cec20_bt05/preview
2	https://onlinecourses.swayam2.ac.in/cec20_bt02/preview

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	M	M	M	M	L	L	L
CO2	S	S	M	M	M	M	L	L	L	L

CO3	S	S	S	M	M	S	S	M	L	L
CO4	S	S	M	M	S	S	M	L	L	L

*** S-Strong M- Medium L - Low**

Course Code	23UFS11	DIGITAL AND CYBER FORENSIC	L	T	P	C
Core/elective/Supportive		Core: 11	5	1	0	4
Pre - requisite		• Basic knowledge in cybercrime and computer evidence				

Course Objectives

Expected Course Outcomes

1	Explain the principles of network, mobile and cyber forensic science	K2
2	Illustrate the cyber-crime investigation procedures	K2
3	Apply the cyber-crime techniques to data acquisition and evidence collection	K3
4	Analyzing the digital evidences and arriving at conclusions	K4
5	Examine the Volatile and Non-volatile Digital Evidence	K4

K1 – Remember K2 – Understand K3 – apply K4- Analyze K5 – evaluate K6- Create

UNIT – I	BASICS OF DIGITAL FORENSICS	14 Hours

Digital Forensics- Introduction, Objective and Methodology, Rules of Digital Forensics, Good Forensic Practices, Daubert‟s Standards, Principles of Digital Evidence. Overview of types of Computer Forensics – Network Forensics, Mobile Forensics, Social Media Forensics and E-mail Forensics. Services offered by Digital Forensics. First Responder – Role, Toolkit and Do‟s and Don‟ts.

UNIT II	CYBER CRIME INVESTIGATION	13 Hours

Introduction to Cyber Crime Investigation, Procedure for Search and seizure of digital evidences in cyber-crime incident- Forensics Investigation Process- Presearch consideration, Acquisition, Duplication & Preservation of evidences, Examination and Analysis of evidences, Storing of Evidences, Documentation and Reporting, Maintaining the Chain of Custody.

UNIT-III	DATA ACQUISITION AND EVIDENCE GATHERING	14 Hours

Data Acquisition of live system, Shutdown Systems and Remote systems, servers. E-mail Investigations, Password Cracking. Seizing and preserving mobile devices. Methods of data acquisition of evidence from mobile devices. Data Acquisition and Evidence Gathering from Social Media. Performing Data Acquisition of encrypted systems. Challenges and issues in cyber-crime investigation.

UNIT - IV	ANALYSIS OF DIGITAL EVIDENCES	16 Hours

Search and Seizure of Volatile and Non-volatile Digital Evidence, Imaging and Hashing of Digital

Evidences, Introduction to Deleted File Recovery, Steganography and Steg-analysis, Data Recovery Tools and Procedures, Duplication and Preservation of Digital Evidences, Recover Internet Usage Data, Recover Swap files/Temporary Files/Cache Files. Software and Hardware tools used in cyber-crime investigation – Open Source and Proprietary tools. Importance of Log Analysis in forensic analysis. Understanding Storage Formats for Digital Evidences – Raw Format, Proprietary Formats, Advanced Forensic Formats.

UNIT- V	**WINDOWS AND LINUX FORENSICS**	**15 Hours**

Windows Systems Artifacts: File Systems, Registry, Event logs, Shortcut files, Executables. Alternate Data Streams (ADS), Hidden files, Slack Space, Disk Encryption, Windows registry, startup tasks, jump lists, Volume Shadow, shell bags, LNK files, Recycle Bin Forensics (INFO, $i, $r files). Forensic Analysis of the Registry – Use of registry viewers, Regedit. Extracting USB related artifacts and examination of protected storages. Linux System Artifact: Ownership and Permissions, Hidden files, User Accounts and Logs.

	Total Lecture Hours	**72 Hours**
	Text Book(s)	
1	Nina Godbole and Sunit Belapore; "Cyber Security: Understanding Cyber Crimes, Computer Forensics and Legal Perspectives", Wiley Publications,2011.	
2	Bill Nelson, Amelia Phillips and Christopher Steuart; "Guide to Computer Forensics and Investigations" – 3rd Edition, Cengage, 2010 BBS.	
	REFERENCE BOOKS:	
1	LNJN National Institute of Criminology and Forensic Science, "A Forensic Guide for Crime Investigators – Standard Operating Procedures", LNJNNICFS, 2016.	
2	Peter Hipson; "Mastering Windows XP Registry", Sybex, 2002.	
	Related Online Contents (MOOC, SWAYAM,NPTEL, Websites etc)	
1	https://onlinecourses.swayam2.ac.in/cec20_lb06/preview	
2	https://onlinecourses.swayam2.ac.in/cec21_ge10/preview	

	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**
CO1	S	S	S	M	M	M	M	L	L	L
CO2	S	S	M	M	M	S	M	L	L	L
CO3	S	S	M	L	M	S	S	M	L	L
CO4	S	S	M	L	L	M	L	L	L	L
CO5	S	S	S	S	M	S	M	M	L	L

*** S-Strong M- Medium L – Low**

Course Code	23UFS12	Project Work Lab	L	T	P	C
Core/elective/Supportive		Core:12	0	0	5	8
Pre - requisite		Students should have the strong knowledge in forensic evidence data collection, examine procedures.				

Course Objectives

1. Provide an in-depth exploration of a topic of special interest.
2. Acquire knowledge on the chosen topic and apply the knowledge, experience, and skills learned in the Law and Justice programme to the chosen topic.
3. Apply various research techniques, find suitable sources of information, and acknowledge them in the research project.
4. Develop effective communicative skills to present research on Law and Justice Issues.

Expected Course Outcomes

On the successful completion of the course, student will be able to:

1	Understand the independent research on Law and Justice Topics.	K2
2	Create a various investigation ideas to finding the evidence	K6
3	Apply the students various angle on the crime cases.	K3
4	Effectively present and defend your research orally.	K5
5	Produce a thesis of publishable quality.	K5

K1 – Remember K2 – Understand K3 – apply K4- Analyze K5 – evaluate K6- Create

The Project will be based on a research topic in Forensic Science/Criminology. The topic will be assigned in consultation with police and forensic science establishments, giving due consideration to the problem areas faced by these institutions. The students will be expected to undertake extensive fieldwork, in collaboration with mobile police laboratories. The students will undertake certain projects pertaining to Digital and Cyber Forensics and DNA Analysis. The projects will be assigned in consultation with respective departments experts.

Aim of the project work

1. The aim of the project work is to acquire practical knowledge on the implementation of the forensic concepts studied.
2. Examining evidence from a crime scene using strictly scientific knowledge and principles in order to find facts about a criminal case.
3. Each student should carry out individually one project work and it may be a work using the cyber forensic software packages or DNA typing or Serology, etc.
4. That they have learned, the implementation of concepts from the papers studied, or implementation of any innovative idea focusing on application oriented concepts.

Viva Voce

1. Viva-Voce will be conducted at the end of the year by both Internal (Respective Guides) and External Examiners, after duly verifying the Annexure Report available in the College, for a total of

200 marks at the last day of the practical session.

2. Out of 200 marks, 160 marks for project report and 40 marks for Viva Voce.

Project Work Format

PROJECT WORK

TITLE OF THE DISSERTATION

Bonafide Work Done by

STUDENT NAME

REG. NO.

Dissertation submitted in partial fulfillment of the requirements for the award of
<Name of the Degree>
of Periyar University, Salem - 11.

College Logo

Signature of the Guide Signature of the HOD

Submitted for the Viva-Voce Examination held on _____

Internal Examiner External Examiner

Month – Year

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Acknowledgement

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1. Introduction

2. Objective of study

3. Methodology

4. Recovered Evidence

5. Justice System for the Case

6. Conclusion

Bibliography

Appendices

A. Evidence prof

B. Result / Output

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	M	M	S	S	L	L	L

CO2	S	S	S	M	L	S	S	S	L	L
CO3	S	S	M	M	L	S	S	L	L	L
CO4	S	S	S	M	M	S	S	M	L	L
CO5	S	S	M	M	L	S	S	L	L	L

*** S-Strong M- Medium L - Low**

ELECTIVES: I

Course Code	23UFSE05	ANTHROPOLOGY	L	T	P	C
Core/elective/Supportive		Elective - I - A	5	1	0	4
Pre - requisite		• Basic knowledge in physics and chemistry				

Course Objectives

- To under the analysis of human remains for the medico legal purposes of establishing identity

Expected Course Outcomes

1	Understand the importance of forensic anthropology in recovery of skeletal elements	K2
2	Assesses of species, ancestry, gender, age, physical characteristics and time since death	K2
3	Different techniques of facial reconstruction and their forensic importance.	K3
4	Significance of somatoscopy and somatometry.	K3
5	Analyze the importance of forensic odontology in determining age of deceased and bite mark analysis.	K4

K1 – Remember K2 – Understand K3 – apply K4- Analyze K5 – evaluate K6- Create

UNIT – I	FORENSIC ANTHROPOLOGY	14 Hours

Forensic Anthropology - Scope of forensic anthropology. Study of human skeleton. Nature, formation, and identification of human bones. Determination of age, sex, race from skeletal material

UNIT II	FORENSIC ODONTOLOGY	14 Hours

Forensic Odontology- Development and role of forensic odontology in mass disaster Types of teeth and their comparative anatomy. Estimation of age from teeth Bite marks- Introduction, Forensic significance of bite marks. Collection, preservation and photography of bite marks evidence. Legal aspects of bite marks.

UNIT-III	PERSONAL IDENTIFICATION	15 Hours

Personal Identification – Somatoscopy. Somatoscopy – observation of hair on head, forehead, eyes, root of nose, nasal bridge, nasal tip, chin, Darwin‟s tubercle, ear lobes, supra-orbital ridges, physiognomic ear breadth, circumference of head. Scar marks and occupational marks

UNIT -IV	PERSONAL IDENTIFICATION SOMATOMETRY	13 Hours

Somatometry – measurements of head, face, nose, cheek, ear, hand and foot, body weight, height. Indices - cephalic index, nasal index, cranial index, upper facial index.

UNIT- V	FACIAL RECONSTRUCTION	16 Hours

Facial Reconstruction - Portrait Parle/ Bertillon system. Photo fit / identikit. Facial superimposition

techniques. Cranio facial super imposition techniques – photographic super imposition, video superimposition, Roentgen graphic superimposition. Use of somatoscopic and craniometrics methods in reconstruction. Importance of tissue depth in facial reconstruction. Genetic and congenital anomalies – causes, types, identification and their forensic significance	
Total Lecture Hours	**72 Hours**
Text Book(s)	
1	.M.Y. Iscan and S.R. Loth, The scope of forensic anthropology in, Introduction to Forensic Sciences, 2nd Ed., W.G. Eckert (Ed.), CRC Press, Boca Raton (1997).
2	D. Ubelaker and H. Scammell, Bones, M. Evans & Co., New York (2000)
	REFERENCE BOOKS:
1	Forensic Anthropology: Current Methods and Practice, Angi M. Academic Press; 1st edition (5 March 2014)
	Related Online Contents (MOOC, SWAYAM,NPTEL, Websites etc)
1	https://www.coursera.org/learn/dental-medicine-penn
2	https://onlinecourses.nptel.ac.in/noc20_hs77/preview

	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**
CO1	S	S	S	M	M	M	M	L	L	L
CO2	S	S	M	M	M	S	M	L	L	L
CO3	S	S	M	L	M	S	S	M	L	L
CO4	S	S	M	L	L	M	L	L	L	L
CO5	S	S	S	S	M	S	M	M	L	L

*** S-Strong M- Medium L - Low**

Course Code	23UFSE05	CRIMINAL LAW AND SPECIAL LAW	L	T	P	C
Core/elective/Supportive		Elective - I- B	5	1	0	4
Pre - requisite		• Basic of Crime and Indian act				

Course Objectives

- To understand the basic of criminal law and IPC details.
- To learn about some special law of the crime.

Expected Course Outcomes

1	Understand the elements of Criminal Procedure Code related to forensic science	K2
2	Remember about Acts and provisions of the Constitution of India related to forensic science	K4
3	Understand the Acts of governing socio-economic crimes.	K5
4	Understand the Acts of governing environmental crimes.	K6

K1 – Remember K2 – Understand K3 – apply K4- Analyze K5 – evaluate K6- Create

UNIT – I	INTRODUCTION TO CRIMINAL LAWS	14 Hours

Introduction to Criminal Laws and Salient Features of Constitution of India Definitions – Vices, sin, tort and crime – History of criminal law – Constitution, Indian Penal Code and Indian Evidence Act – Nature and Scope Constitution of India and its Supremacy – History of Constitution of India – Preamble – Citizenship – Fundamental Rights – Directive Principles of State Policy – Executive, Legislature andJudiciary

UNIT II	SELECTED SECTIONS OF INDIAN PENAL CODE (IPC)	13 Hours

Abetment – Criminal Conspiracy – Offences against the State: Waging or attempting to wage war against the state, Sedition – Offences against public tranquility: Unlawful assembly, rioting and affray – Offences relating to religion – Offences affecting the human body: Murder, suicide, hurt, kidnapping and rape– Offences against Property: Theft, Extortion, Robbery, Dacoity, Forgery, False document, Criminal breach of trust – Offences relating to marriage: Cruelty by husband, bigamy, adultery and defamation – Criminal intimidation – Insult and annoyance

UNIT-III	SELECTED SECTIONS OF CRIMINAL PROCEDURE CODE	14 Hours

Definitions under Code of Criminal Procedure, 1973 – Organizational set up of judiciary in India – Constitution of criminal courts and officers – Jurisdiction and powers of criminal courts – Court of Sessions – Judicial magistrates – Executive magistrates – Public Prosecutors – Informal courts (Nyaya Panchayat and Lok Adalats) – Complaint – Inquiry – Investigation – Police report – Public prosecutor – Defense counsel – Arrest – Bail – Search – Seizure – Trial processes

UNIT - IV	SELECTED SECTIONS OF INDIAN EVIDENCE ACT	16 Hours

Definitions – Concepts – Fact in issue – Relevant fact – Evidence: Proved, disproved, admissibility and relevancy – Relevant evidence in statement form: Admission confessions, dying declarations and

expert opinions Conspiracy evidence – Approver evidence – Presumptions of law Presumptions of fact – Burden of proof – Examination in-chief – Cross-examination andre-examination– Impeaching the credit of witness		
UNIT- V	**SPECIAL LAWS**	**15 Hours**
Protection for Children Sexual Offences Act (POCSO), Goondas Act, Civil Rights Protection Act, Protection for Women from Domestic, Narcotic Drugs and Psychotropic Substances Act (NDPS), Human Rights Act, Right to Information Act (RTI).		
	Total Lecture Hours	**72 Hours**

Text Book(s)		
1	Vipa P. Sarthi, Law of Evidence, 6th Edition, Eastern Book Co., Lucknow (2006).	
2	(Chief Justice) M. Monir, Law of Evidence, 6th Edition, Universal Law Publishing Co. Pvt. Ltd., New Delhi (2002).	
	REFERENCE BOOKS:	
1	D.A. Bronstein, Law for the Expert Witness, CRC Press, Boca Raton (1999).	
	Related Online Contents (MOOC, SWAYAM,NPTEL, Websites etc)	
1	https://onlinecourses.swayam2.ac.in/cec21_lw04/preview	
2	https://onlinecourses.swayam2.ac.in/cec21_hs08/preview	

	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**
CO1	S	S	S	M	M	M	M	M	L	L
CO2	S	S	M	M	M	L	L	M	L	L
CO3	S	S	M	L	M	M	M	M	L	L
CO4	S	S	M	L	M	L	L	M	L	L

*** S-Strong M- Medium L - Low**

Course Code	23UFSE05	CRIMINAL PROCEDURE AND EVIDENCE	L	T	P	C
Core/elective/Supportive		Elective - I - C	5	1	0	4
Pre - requisite		• Basic knowledge about the crime and law.				

Course Objectives

- To under the Phenomenon knowledge about crime with several disciplines from several perspectives and methodologies.

Expected Course Outcomes

1	Understand about the code of criminal procedure with hierarchy of judiciary	K2
2	Remember the constitution of India and perspectives	K1
3	To understand the concept of bail and Fair trial	K2
4	Analyze the evidence of the criminal cases with cross examination	K4
5	Point out the evidence and ask punished based the evidence	K4

K1 – Remember K2 – Understand K3 – apply K4- Analyze K5 – evaluate K6- Create

UNIT – I	ORIGIN	14 Hours

Origin of Criminal Procedure, definitions under Code of Criminal Procedure, 1973 – Hierarchical organization of judiciary in India – Constitution of criminal courts and officers – Jurisdiction and powers of criminal courts –Court of Sessions – Judicial magistrates – Executive magistrates – Public Prosecutors – Informal courts (NyayaPanchayat and LokAdalats)

UNIT II	PRE-TRIAL PROCESSES	13 Hours

Constitutional perspectives: Organization of police, prosecutor and defense counsel – Arrest: Distinction between cognizable and non-cognizable offences – Warrant and summons – Absconder status – Rights of arrested persons under Cr.P.C and Article 22 (2) of the Constitution of India – Search: General principles of search, search with and without warrant and police search during investigation – Seizure – Constitutional aspects of validity of search and seizure proceedings – Security: Nature and procedures

UNIT-III	TRIAL PROCESSES	14 Hours

Commencement of proceedings: Complaint, inquiry, framing of charges, form and content of charge – Bail: General principles and cancellation of bails – Anticipatory bail – Preliminary pleas to bar trial – Remand – Jurisdiction – Time limitations – Pleas of autrefois acquit and autrefois convict – Fair trial – Concept of fair trial – Presumption of innocence – Venue of trial – Constitutional interpretation of Article 21 as a right to speedy trial – Trial before a Court of Session: Procedural steps and substantiate rights – Accusatorial and inquisitorial systems – Summary trial

UNIT - IV	EVIDENCE IN CRIMINAL CASES	16 Hours

Definitions – Concepts – Fact in issue – Relevant fact – Evidence: Proved, disproved, 35 admissibility and relevancy – Relevant evidence in statement form: Admission confessions, dying declarations and expert opinions – Conspiracy evidence – Approver evidence – Presumptions of law – Presumptions of fact – Burden of proof Examination in-chief – Cross-examination, Andre-examination– Impeaching the credit of the witness.

UNIT- V	JUDGEMENTS	15 Hours

Judgements post-conviction orders in lieu of punishment – Appeals – Reference and revisions– Transfer of criminal cases – Suspension of sentence – Execution – Remission – Commutation of sentence – Disposal of property – Acquittal – Bonds – Fine – Imprisonment

Total Lecture Hours	72 Hours

Text Book(s)

1	K.N. Chandrasekharan Pillai (Rev.), R.V. Kelkar‟s Criminal Procedure (5th ed., 2008)

2	K.I. Vibhute (Ed.), Criminal Justice (1st ed., 2004)	
	REFERENCE BOOKS:	
1	Lippman, M athew, Criminal Procedure (2011)	
2	Singer, Richard G., Criminal Procedure II: From Bail to Jail, 2nd ed. (2011)	
	Related Online Contents (MOOC, SWAYAM,NPTEL, Websites etc)	
1	https://onlinecourses.swayam2.ac.in/cec21_lw04/preview	
2	https://onlinecourses.swayam2.ac.in/cec20_ge10/preview	

	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**
CO1	S	S	S	S	M	M	L	L	L	L
CO2	S	S	S	M	M	L	L	L	L	L
CO3	S	S	M	M	M	M	M	L	L	L
CO4	S	S	M	M	M	L	L	M	L	L

*** S-Strong M- Medium L - Low**

Course Code	23UFSE06	INTRODUCTION TO RESEARCH METHODOLOGY	L	T	P	C
Core/Elective/Supportive		Elective VI: Generic/ Discipline	4	1	0	3
Pre - requisite		• Basic analytical skill required to start the research				

Course Objectives

- To develop a research orientation and to acquaint them with fundamentals of research methods

Expected Course Outcomes

1	Understand Some Basic Concepts Of Research And Its Methodologies	K2
2	Identify Appropriate Research Topics	K4
3	Define Appropriate Research Problem And Parameters	K5
4	Write a research articles and basic of research proposal	K6

K1 – Remember K2 – Understand K3 – apply K4- Analyze K5 – evaluate K6- Create

UNIT – I	INTRODUCTION	14 Hours

Introduction-Definitions and types of research; Research process and steps in conducting research; Applications of Research. Ethical issues in conducting research.

UNIT II	RESEARCH MODELING	13 Hours

Research Modeling- Types of Data, Data collection methods- Survey method, Observation method, Experimentation; Scaling techniques; types of sampling, steps in sampling, advantage and limitations of sampling

UNIT-III	APPLICATION OF STATISTICAL TOOLS	14 Hours

Application of Statistical tools -Measures of Central tendency – Mean, Median, Mode; Introduction of Probability Theories and Concepts, Probability Distributions- Discrete and Continuous Probability Distributions; Measures of Association: Correlation and regression

UNIT -IV	DATA ANALYSIS TECHNIQUES	16 Hours

Data Analysis Techniques--Quantitative and qualitative methods of data analysis; Hypothesis Testing - Parametric tests (Z-test, t-test, F-test) and Non-parametric Tests (Chi-Square Test, ANNOVA), Tests of significance based on normal distributions; association of attributes.

UNIT- V	REPORT WRITING	15 Hours

Report Writing --Report generation, report writing, and APA format – Title page, Abstract, Introduction, Methodology, Results, Discussion, References, and Appendices.

Total Lecture Hours	72 Hours

Text Book(s)		
1	Sylvia W Smoller, J Smoller, Biostatistics & Epidemiology A Primer for health and Biomedical professionals, 4th edition, Springs, 2015	
2	Richard F. Morton & J. Richard Hebd: A study guide to Epidemiology and Biostatistics, 2nd Ed.(2012), University Park Press, Baltimore.	
	REFERENCE BOOKS:	
1	Mausner & Bahn: Epidemiology-An Introductory text, 2nd Ed., (1985) W. B. Saunders Co	
	Related Online Contents (MOOC, SWAYAM,NPTEL, Websites etc)	
1	https://onlinecourses.nptel.ac.in/noc19_ge21/preview	
2	https://onlinecourses.swayam2.ac.in/cec20_hs17/preview	

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	M	M	M	M	L	L	L
CO2	S	S	S	M	M	L	M	L	L	L
CO3	S	S	S	L	S	S	L	L	L	L
CO4	S	S	S	L	S	M	M	L	L	L

*** S-Strong M- Medium L - Low**

Course Code	23UFSSE07	FIELD VISIT :- CRIME INVESTIGATION WITH POLICE DEPARTMENT	L	T	P	C
Core/elective/Supportive		Supportive	-	-	-	2
Pre – requisite		• Basic skills about the crime scene				

Course Objectives

- To understand real scenario of the crime.
- To know the investigation procedure.

Expected Course Outcomes

1	Understand the crime scene procedure to collect the evidence.	K3
2	Evaluate the evidence found from the crime spot.	K5
3	Analyze the evidence with various methodologies and procedures.	K4
4	Create a questionnaire as per the crime and evidence	K6

K1 – Remember K2 – Understand K3 – apply K4- Analyze K5 – evaluate K6- Create

AIM OF THE COURSE

The purpose of this field visit (core paper) is to bridge the theoretical fundamentals with that of actual practice and to inculcate a spirit of inquiry & research rigor to investigate the shades that go into the working place. Apart from adapting as team investigation, students are expected to gather, filter the required information and prepare the report in a standardized format of the case.

PROCESS

Colleges are encouraged to institute MoU/ collaborative initiative with firms organization/ government agencies in their juristic / state to get the consent and to make the crime spot visit more purposeful. Every student should do the file visit in a group manner not exceeding five, shall undergo a 2 hours per a week in any police station [city, location to be specified by the respective college] of his/her choice during 6^{th} semester. In case of insufficient hours, college level adjustments can be made to facilitate the student‟s on training. Prior permission may be obtained from the organization in advance by the students concerned and information shall be passed onto the colleges thus enabling the training supervision by the concerned faculties authorized by the college. Monthly electronic reporting should be obtained to ensure coherent and comprehensive in the progression of the field visit.

A final report [Field Visit Record – FVR] contains the following things.

1. Crime basic details [person details, location mention in xxxxx, yyyy format]
2. Evidence [which found in the crime spot]
3. Methodology [procedure adopting to prove the evidence]
4. Questionnaire preparation [for investigation]

The report shall be prepared not exceeding 30 [A4] pages [pre-printed record designed for this purpose].

INTERNAL PROCEDURE

- Compliance of the procedure (permission seeking from college and police station, informing in advance, monthly reporting and FVR submission) 15 marks

- Structure and Monthly review of FVR 10 marks

EVALUATION PROCEDURE

- There shall be a university-approved comprehensive viva-voce examination at the end of fifth semester. Students shall maintain a [Field Visit Record – ITR] individually for the purpose of the oral examinations.
- FVR shall also be evaluated jointly internal with an external examiner during the viva- voce examination.
- The total mark of 50 for the skill enhancing field visit (core subjects)shall be divided between internal and external evaluations and it is 25 and 25 marks respectively.

	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**
CO1	S	S	S	M	M	S	S	L	L	L
CO2	S	S	S	M	L	S	S	S	L	L
CO3	S	S	M	M	L	S	S	L	L	L
CO4	S	S	S	M	M	S	S	M	L	L

SEMESTER – VI

Course Code	23UFS13	VICTIMOLOGY	L	T	P	C
Core/elective/Supportive		Core: 13	6	1	0	4
Pre - requisite		•				

Course Objectives

- To familiarize the students of Criminology with the functioning of the various institutions of the criminal justice system and juvenile justice system.

Expected Course Outcomes

1	Understand the victimology and justice for victim of crime.	K2
2	Analyze the criminological perspectives and its types.	K4
3	Understand the victims of various crime activities	K2
4	Analyze the victim services of the various crime and understand the National victim Assistance(NOVA)	K4

K1 – Remember K2 – Understand K3 – apply K4- Analyze K5 – evaluate K6- Create

UNIT – I	VICTIMOLOGY	14 Hours

Basics Victimology: Basic Concepts - Historical development of Victimology. Meaning and Definition of victim. National and International concern for victims of crime – UN Amnesty International - UN Declaration of Basic Principles of Justice for Victims of Crime and Abuse of Power, 1985. Handbook of Justice for Victims, 1998. Guide for Policy Makers, 1998. USA - Patterns of Criminal Victimization - Role of victims in Criminal Occurrence, Victim – Offender relationship. Impact of Victimization– Physical and financial impact.

UNIT II	PERSPECTIVES ON VICTIMIZATION	17 Hours

Criminological perspectives: repeat victimization, routine activities, lifestyle exposure, fear of crime, victimization surveys including cost of crime. Psychological perspectives: Effects of crime on victims and the way victims are viewed. Legal perspectives: Rights of the Crime Victims – Victim in the criminal Justice System, Need and Significance of Victim oriented Justice System. Sociological perspectives: analysis of social reaction to crime and victimization over the Ages, the importance of feminist and critical theory and the development of the victim Movement and victim advocacy.

UNIT-III	INDIVIDUAL AND MASS VICTIMIZATION	16 Hours

Victims of traditional crime. Women victims - Dowry, battered women, Rape and other kinds of Sexual harassment - Child abuse. Cyber Crime Victimization of Women and Children. Trafficking in women and children. Victims of abuse of power, Genocide, Crimes against humanity, Internally Displaced persons, Victims of War - Child Soldiers, Refugees

UNIT - IV	CRIMINAL JUSTICE SYSTEM AND VICTIMS	12 Hours

CJS and victim relationship: Collaborator or evidence - Victim & Police: Lodging of FIR & recording of statement - Deposition & cross-examination in courts. – Secondary Victimization by the criminal justice system and the society– Role of judiciary in Justice for victims. Creating awareness among the criminal justice professionals and the public on victim issues.

UNIT- V	VICTIM ASSISTANCE	13 Hours

Alternative services for crime victims – victims support Services in the developed countries – Victim

support services in India. Types of assistance. Offender Restitution Programs - Victim Witness Programs – Crisis Intervention – Victim Advocacy – Introduction to Restorative Justice and Principles of Restorative Justice – Victim compensation and restitution. Compensation for victims of crime: Indian Scenario. Advantages and disadvantages of Criminal Justice – based victim support schemes- All Women Police Stations- .Role of NGOs and Professional associations, ISV, WSV, Child Line, One Stop Shop and National Organization for Victim Assistance (NOVA).		
	Total Lecture Hours	**72 Hours**
Text Book(s)		
1	Chockalingam, K. 1985, Readings in Victimology, Raviraj Publications, Chennai.	
2	Karmen, A, Crime Victims: An Introduction to Victimology, (2nd Edition) 1990	
	REFERENCE BOOKS:	
1	Victimology By William G. Doerner , Steven P. Lab 9th Edition	
2	D.E. Zulawski and D.E. Wicklander, Practical Aspects of Interview and Interrogation, CRC Press, Boca Raton (2002).	
	Related Online Contents (MOOC, SWAYAM,NPTEL, Websites etc)	
1	https://onlinecourses.swayam2.ac.in/cec20_ge37/preview	
2	https://onlinecourses.swayam2.ac.in/cec20_lb06/preview	

	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**
CO1	S	S	M	M	M	M	L	L	L	L
CO2	S	S	S	M	M	M	L	L	L	L
CO3	S	S	M	M	L	M	L	L	L	L
CO4	S	S	M	M	L	L	L	L	L	L

*** S-Strong M- Medium L - Low**

Course Code	23UFS14	DNA TYPING IN FORENSIC	L	T	P	C
Core/elective/Supportive		Core: 14	6	1	0	4
Pre - requisite		• Basic knowledge in DNA structure				

Course Objectives

- TO understanding of the various uses of DNA typing technology

Expected Course Outcomes

1	Understand the basic principle of DNA analysis	K2
2	Analyze the forensic significance of DNA typing.	K4
3	Evaluating the role of DNA typing in parentage testing.	K4
4	Understand the importance of Short Tandem Repeats and Restriction Fragment Length Polymorphism in DNA technique	K2

K1 – Remember K2 – Understand K3 – apply K4- Analyze K5 – evaluate K6- Create

UNIT – I	Basic Principles	**11 Hours**

DNA as biological blueprint of life - Extraction of DNA for analysis - Quantitation of DNA – yield gel quantitation and slot blot quantitation. Mitochondrial DNA – sequence analysis

UNIT II	**FORENSIC DNA TYPING**	**13 Hours**

Collection of specimens. Polymerase chain reaction – historical perspective, sequence polymorphisms, individualization of evidence. Short tandem repeats (STR) – role of fluorescent dyes, nature of STR loci. Restriction fragment length polymorphism (RFLP) – genetic markers used in RFLP, typing procedure and interpretation of results.

UNIT-III	**PARENTAGE TESTING**	**12 Hours**

Principles of heredity .Genetics of paternity. DNA testing in disputed paternity. Mendelian laws of parentage testing. Mathematical basis of parentage identification. Missing body cases. Reference populations and databases.

UNIT - IV	**PERSONAL IDENTIFICATION**	**13 Hours**

Allele frequency determination. Hardy-Weinberg law. Probability determination in a population database. Deoxyribose Nucleic Acid – Structural properties Sources of DNA evidence. DNA Extraction-Basic Principles -Method of DNA extraction. DNA Quantification -Slot Blot Assay, Southern /Northern Blotting. DNA Amplification by Polymerase Chain Reaction. DNA data basing.

UNIT- V	**FORENSIC DNA TYPING**	**11 Hours**

- Polymorphism in DNA system – DNA markers RELP, RAPD, VNTRs, SNP, Autosomal – STR, Y-STR, Mitochondrial DNA. Touch DNA. Application in disputed paternity cases, child swapping, Missing person‟s identity – immigration, veterinary & wild life and Agriculture cases

Total Lecture Hours	**60 Hours**

Text Book(s)

1	J.M. Butler, Forensic DNA Typing, Elsevier, Burlington (2005).
2	K. Inman and N. Rudin, An Introduction to Forensic DNA Analysis, CRC Press, Boca Raton (1997).

REFERENCE BOOKS:

1	H. Coleman and E. Swenson, DNA in the Courtroom: A Trial Watcher‟s Guide, Gene Lex Corporation, Washington (1994).
2	W.J. Tilstone, M.L. Hastrup and C. Hald, Fisher‟s, Techniques of Crime Scene Investigation, CRC Press, Boca Raton (2013)

Related Online Contents (MOOC, SWAYAM,NPTEL, Websites etc)

1	https://onlinecourses.swayam2.ac.in/cec21_bt21/preview

2	https://onlinecourses.swayam2.ac.in/cec20_bt17/preview	

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	M	M	M	M	M	L	L	L
CO2	S	S	S	M	M	M	M	L	L	L
CO3	S	S	S	S	M	M	L	L	L	L
CO4	S	S	M	S	M	L	L	L	L	L

*** S-Strong M- Medium L - Low**

Course Code	23UFS15	WILDLIFE FORENSIC	L	T	P	C
Core/elective/Supportive		Core: 15	6	1	0	4
Pre - requisite		•				

Course Objectives

- To understand the importance of wildlife.
- To know the various agencies involved in conservation of wildlife.

Expected Course Outcomes

1	Understand the historical context of the development of wildlife conservation, and an understanding of what constitutes wildlife crime.	K2
2	Understand the significance of international trade in wildlife and a knowledge of the main provisions of CITES	K2
3	Apply various ideas for seizure the evidence	K4
4	Understand the role of wildlife investigation teams	K2

K1 – Remember K2 – Understand K3 – apply K4- Analyze K5 – evaluate K6- Create

UNIT – I	WILDLIFE FORENSICS	13 Hours

Fundamentals of wildlife forensics. Significance of wildlife forensics. Protected and endangered species of animals and plants. Illegal trading in wildlife items, such as skin, fur, bone, horn, teeth, flowers and plants. Identification of physical evidence pertaining to wildlife forensics. Identification of pug marks of various animals.

UNIT II	FORENSIC ENTOMOLOGY	10 Hours

Forensic Entomology: Basics of forensic entomology. Insects of forensic importance. Collection of entomological evidence during death investigations.

UNIT-III	AGENCIES AND LAW	13 Hours

The list of agencies involved and their function in combating wildlife crime- IUCN, CITES, TRAFFIC, WTI, Wildlife crime Control Bureau, WII, ZSI, CCMB, Institute of wood science and technology, FSL. Wildlife Protection Act.

UNIT - IV	WILDLIFE CRIME SCENE	12 Hours

Search and seizure, documentation, types of evidences found, crime scene sketch, collection and packaging, chain of custody. Forensic Significance. Wildlife investigation team and role of each member.

UNIT- V	GENETICS AND WILDLIFE CONSERVATION	12 Hours

Introduction to Genetics. Species identification, Mitochondrial DNA. Importance of genetics in wildlife protection and conservation. Case elaboration.

Total Lecture Hours 60 Hours

Text Book(s)

1	Linacre &Tob, Wildlife dna analysis: applications in Forensic science.
2	Jane E. Huffman, John R. Wallace, Wildlife Forensics: Methods and Applications, 1st Edition.
	REFERENCE BOOKS:
1	Wildlife DNA Analysis: Applications in Forensic ScienceBy Adrian M. T. Linacre, Shanan S. Tobe 2013
2	L. Stryer, Biochemistry, 3rd Edition, W.H. Freeman and Company, New York (1988).
	Related Online Contents (MOOC, SWAYAM,NPTEL, Websites etc)
1	https://onlinecourses.nptel.ac.in/noc20_bt39/preview
2	https://onlinecourses.swayam2.ac.in/cec20_bt02/preview

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	S	M	M	L	L	L	L
CO2	S	S	S	M	M	M	L	L	L	L
CO3	S	S	S	S	M	M	M	L	L	L
CO4	S	S	S	M	M	S	L	L	L	L

*** S-Strong M- Medium L - Low**

ELECTIVE – II

Course Code	23UFSE08	ACCIDENT INVESTIGATION	L	T	P	C
Core/elective/Supportive		ELECTIVE II – A	5	1	0	3
Pre - requisite		• Basic knowledge about crime and law				

Course Objectives

- To learn about the accident investigation procedure and tools to carry over the investigations.

Expected Course Outcomes

1	understanding of accident investigation	K2
2	Readily applicable accident investigation procedures	K4
3	Learn about the evidence collect, analyze and communicate data	K3
4	Understand the tachograph related data for the accident	K3

K1 – Remember K2 – Understand K3 – apply K4- Analyze K5 – evaluate K6- Create

UNIT – I	MOTOR VEHICLE ACCIDENTS	12 Hours

Accident scene. Sources of forensic information. Eyewitness accounts. Extent of vehicle damage. Visibility conditions. Photographs of accident site. Estimation of speed. Tire marks, skid marks, scuff marks. Maintenance of vehicles. Abandoned vehicles. Importance of air bags. Railway accidents

UNIT II	ACCIDENT ANALYSIS	12 Hours

Pre-crash movement. Post-crash movement. Collision model. Gauging driver‟s reaction. Occupant‟s kinematics. Types of injuries resulting from accident. Biomechanics of injuries. Hit and run investigations. Trace evidence at accident sites.

UNIT-III	TACHOGRAPHS	12 Hours

Forensic significance of tachograph data. Tachograph charts. Principles of chart analysis. Accuracy of speed record. Tire slip effects. Falsification and diagnostic signals. Route tracing.

UNIT -IV	INVESTIGATION KIT AND PROCEDURES	12 Hours

Tools and Special Equipment for the Investigator, Scene Investigation, Vehicle Exteriors, Vehicle Interiors, Restraining Systems, Vehicle and Occupant Investigation Forms, Interview forms for victims and witnesses.

UNIT- V	MOTOR VEHICLES ACT	12 Hours

Salient features of the active applications of the act in investigations of accident cases, Drunken

Driving, breathalyzer, alcohol level in the blood, sweat, urine.		
	Total Lecture Hours	**60 Hours**
Text Book(s)		
1	T.S. Ferry, Modern Accident Investigation and Analysis, Wiley, New York (1988).	
2	D. Lowe, The Tachograph, 2nd Edition, Kogan Page, London (1989).	
	REFERENCE BOOKS:	
1	T.L. Bohan and A.C. Damask, Forensic Accident Investigation: Motor Vehicles, Michie Butterworth, Charlottesville (1995).	
2	**Basic Vehicle Motion Analysis: A Modern Accident Reconstruction Guide, by David N. Dresser 2011.**	
	Related Online Contents (MOOC, SWAYAM,NPTEL, Websites etc)	
1	https://www.udemy.com/course/accident-incident-investigation	
2	https://onlinecourses.nptel.ac.in/noc20_mg43/preview	

	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**
CO1	S	S	S	S	M	M	M	M	L	L
CO2	S	S	S	M	M	S	M	M	L	L
CO3	S	S	M	M	S	M	M	M	L	L
CO4	S	S	L	L	M	M	L	L	L	L

*** S-Strong M- Medium L - Low**

Course Code	23UFSE08	CONTEMPORARY CRIMES	L	T	P	C
Core/elective/Supportive		ELECTIVE II – B	5	1	0	3
Pre - requisite		• Basic knowledge in crime and society				

Course Objectives

- **To learn about the contemporary crime and the reason for happening the crimes**

Expected Course Outcomes

1	Explore how forensic accounting, practices and forensic audit would enhance fraud prevention and detection in India.	K2
2	Understand proven that educational level is affecting the effectiveness of use of techniques of fraud prevention and detection.	K2
3	Understand the cybercrime and organized crime with motivations.	K1
4	Apply the knowledge in environmental crime activities and real life examples.	K4

K1 – Remember K2 – Understand K3 – apply K4- Analyze K5 – evaluate K6- Create

UNIT – I	CYBER CRIME	12 Hours

Cyber Crime: Cyber Crimes and Cyber assisted Crimes – Hacking – Phreaking – Phishing – Online Harassment. Evolution of crimes in Social Media - Technology and Crime Electronic Monitoring. Cyber Criminology - Cyber Victimology– GPS –Bitcoin – Cryptography- Space Transition theory.

UNIT II	ORGANIZED CRIME	12 Hours

Organized Crime Meaning of organized crime- Racketeering, Contract killings, drug trafficking, corruption, smuggling, extortion, loan sharking, human trafficking, money laundering, bootlegging, arms trafficking, gambling, funding illegally, murder, tax evasion and forger, Sand mafia.

UNIT-III	CORPORATE CRIMES	10 Hours

Meaning of organized crime - White Collar Crime – Mallaya‟s Financial Scandals Punjab National Bank : Niravmodi‟s Scam - The case of Cognizant Technology Solutions -Saradha Group Financial scandal

UNIT - IV	ENVIRONMENTAL CRIMES	13 Hours

Environmental Crimes-Difference between Sanctuary and National Park-UN Environment Programme - The Ministry of Environment, Forest and Climate Change– Indian Forest Service -Wild animal trafficking- electronic waste mismanagement- 45 Indiscriminate logging – Finning - Dumping in rivers and aquifers - Hunting endangered species-Crime Prevention through Environmental Design(CPTED)

UNIT- V	TERRORISM	13 Hours
Meaning of Terrorism and Insurgency, Types of Terrorism, Role of Indian Army, Indian Navy & Indian Air force, National Counter Terrorism Centre, Al- Qaeda- Twin tower attack – Maoist – Naxalites- ISIS – MAFIA-Mumbai Serial Bomb Blasts- Delhi Serial Bomb Blast Godhra train burning-Mumbai Train Blast - Indian Parliament Attack-Coimbatore Bombings, Pulwama attack.		
	Total Lecture Hours	**60 Hours**
Text Book(s)		
1	John S Dempsey: Introduction to Private Security.	
2	Clifton L Smith & David J Brooks: Security Science.	
	REFERENCE BOOKS:	
1	Mary Kaldor & Lavor Rangelov: The Handbook of Global Security Policy.	
2	P.J Ortmeier: Public Safety and Security Administration.	
	Related Online Contents (MOOC, SWAYAM,NPTEL, Websites etc)	
1	https://onlinecourses.swayam2.ac.in/cec19_hs08/preview	
2	https://onlinecourses.swayam2.ac.in/nou21_hs31/preview	

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	M	M	S	S	L	L	L
CO2	S	S	S	M	L	S	S	S	L	L
CO3	S	S	M	M	L	S	S	L	L	L
CO4	S	S	S	M	M	S	S	M	L	L

*** S-Strong M- Medium L - Low**

Course Code	23UFSE08	TECHNOLOGICAL METHODS IN FORENSIC SCIENCE	L	T	P	C
Core/elective/Supportive		ELECTIVE II – C	5	1	0	3
Pre - requisite		• Basic knowledge in instrumentation				

Course Objectives

- To learn the foundations of modern forensic science and the basic principles of forensic instrumental analysis

Expected Course Outcomes

1	Understand the importance of chromatographic	K2
2	Analyze the evidence through spectroscopic techniques in trace.	K2
3	Apply the skills to visualizing trace evidence through the microscopy	K1
4	Understand the Utility of electrophoresis and in identifying chemical and biological materials	K4

K1 – Remember K2 – Understand K3 – apply K4- Analyze K5 – evaluate K6- Create

UNIT – I	GAS CHROMATOGRAPHY	12 Hours

Gas Chromatography: Theoretical principles, instrumentations and technique, columns, stationary phases, detectors, Forensic applications. HPLC: theory, Instrumentation, Technique, column, detectors, LC-MS, Forensic applications.

UNIT II	MICROSCOPY	12 Hours

Microscopy- Types of Microscopes Used in the Forensic Sciences, Stereomicroscope, Compound microscope, Polarizing Light Microscope, Comparison microscope, Electron Microscopy TEM, SEM and their forensic Application

UNIT-III	ELECTROPHORESIS TECHNIQUE	12 Hours

Electrophoresis Technique: General principles, Factors affecting electrophoresis, Sodium dodecyl sulphate(SDS) polyacrylamide gel electrophoresis, Agarose gel electrophoresis, Gel immunodiffusion, Immuno- electrophoresis.

UNIT - IV	BASIC SPECTROSCOPY	13 Hours

Basic Spectroscopy-- Introduction, electromagnetic radiations, full range, UV-Visible – principal absorbance, transmittance, Beer-Lambert‟s laws and its applications of UV-Visible. IR-molecular spectra, electronics, vibrational, rotational spectra. Principles, diagrams, working and construction, uses and applications and IR spectroscopy.

UNIT- V	ATOMIC ABSORPTION SPECTROSCOPY	11 Hours

AAS- Introduction, Basic principles, Instrumentation and Techniques, Optical Considerations, The Cold Vapor Mercury Technique, The Hydride Generation Technique, Forensic applications. MASS

Spectroscopy- Principle, Instrumentation and working, Forensic applications.		
	Total Lecture Hours	**60 Hours**
Text Book(s)		
1	D.A. Skoog, D.M. West and F.J. Holler, Fundamentals of Analytical Chemistry, 6th edition 1992	
2	Concepts, Instrumentation and Techniques in Atomic Absorption Spectrophotometry by Richard D. Beaty and Jack D. Kerber second edition.	
	REFERENCE BOOKS:	
1	Srivastava Meena, Yadav R. S Principles Of Laboratory Techniques And Methods, 2007.	
2	J.W. Robinson, Undergraduate Instrumental Analysis, 5th Edition, Marcel Dekker, Inc., New York (1995).	
	Related Online Contents (MOOC, SWAYAM,NPTEL, Websites etc)	
1	https://onlinecourses.swayam2.ac.in/cec20_lb06/preview	
2	https://onlinecourses.swayam2.ac.in/cec19_cs03/preview	

	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**
CO1	S	S	S	M	M	M	M	L	L	L
CO2	S	S	S	M	M	S	L	L	L	L
CO3	S	S	M	S	M	S	M	M	L	L
CO4	S	S	S	S	M	M	M	L	L	L

*** S-Strong M- Medium L - Low**

ELECTIVE – III

Course Code	23UEX01	FORENSIC BALLISTICS	L	T	P	C
Core/elective/Supportive		ELECTIVE III – D			0	1
Pre - requisite		• Basic knowledge in physics law				

Course Objectives

- To understand the role of the forensic firearm examiner, and introduce the fundamental principles in firearm identification, examination and investigation.

Expected Course Outcomes

1	Understand the classification of firearms and their firing mechanisms.	K2
2	Understand the methods of identifying firearms methods for characterization of gunshot residue.	K2
3	Analyze the firearm injuries and identify the ammunition.	K4
4	Analyze the firearm evidence	K4

K1 – Remember K2 – Understand K3 – apply K4- Analyze K5 – evaluate K6- Create

UNIT – I	FIREARMS	10 Hours

Firearms-History and development of firearms. Classification of firearms. Weapon types and their operation. Firing mechanisms of different firearms.

UNIT II	INTERNAL AND EXTERNAL BALLISTICS	14 Hours

Internal ballistics – Definition, ignition of propellants, shape and size of propellants, manner of burning, and various factors affecting the internal ballistics: lock time, ignition time, barrel time, erosion, corrosion and gas cutting. External Ballistics – Vacuum trajectory, effect of air resistance on trajectory, base drag, drop, drift, yaw, shape of projectile and stability, trajectory computation, ballistics coefficient and limiting velocity, Measurements of trajectory parameters, introduction to automated system of trajectory computation and automated management of ballistic data.

UNIT-III	TERMINAL BALLISTICS	11 Hours

Terminal Ballistics – Effect of projectile on hitting the target: function of bullet shape, striking velocity, striking angle and nature of target, tumbling of bullets, effect of instability of bullet, effect of intermediate targets, and influence of range. Ricochet and its effects, stopping power.

UNIT -IV	AMMUNITION	12 Hours

Ammunition - Types of ammunition characteristics of different types of cartridges and bullets. Primers and priming compounds. Projectiles. Head stamp markings on ammunitions. Different types of marks produced during firing process on cartridge – firing pin marks, breech face marks, chamber marks, extractor and ejector marks.

UNIT- V	FIREARM EVIDENCE	13 Hours

Firearm Evidence - Matching of bullets and cartridge cases in regular firearms. Identification of bullets, pellets and wads fired from improvised, country made firearms. Automated method of bullet and cartridge case comparison. Determination of range of fire and time of fire. Mechanisms of formation of gunshot residues. Methods of analysis of gunshot residues from shooting hands and targets, with special reference to clothings. Identification and nature of firearms injuries

Total Lecture Hours	**60 Hours**

Text Book(s)

1	B.J. Heard, Handbook of Firearms and Ballistics, Wiley and Sons, Chichester (1997).

2	W.F. Rowe, Firearms identification, Forensic Science Handbook, Vol. 2, R. Saferstein (Ed.), Prentice Hall, New Jersey (1988)
	REFERENCE BOOKS:
1	A.J. Schwoeble and D.L. Exline, Current Methods in Forensic Gunshot Residue Analysis, CRC Press, Boca Raton (2000).
2	E. Elaad in Encyclopedia of Forensic Science, Volume 2, J.A. Siegel, P.J. Saukko and G.C. Knupfer (Eds.), Academic Press, London (2000)
	Related Online Contents (MOOC, SWAYAM,NPTEL, Websites etc)
1	https://onlinecourses.nptel.ac.in/noc20_mm03/preview
2	http://epgp.inflibnet.ac.in/epgpdata/uploads/epgp_content/S000016FS/P000693/M011480/ET/1516189224FSC_P6_M17_e-text.pdf

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	S	M	M	L	L	L	L
CO2	S	S	S	M	M	M	L	L	L	L
CO3	S	S	S	S	M	M	M	L	L	L
CO4	S	S	S	M	M	S	L	L	L	L

*** S-Strong M- Medium L - Low**

Course Code	23UEX01	FORENSIC TOXICOLOGY	L	T	P	F
Core/elective/Supportive		ELECTIVE III – E	-	1	0	1
Pre - requisite		• Basic knowledge in chemistry and forensic medicine				

Course Objectives

- To learn the drugs and their implications in a forensic setting.
- To analysis the drugs level and types of drugs

Expected Course Outcomes

1	Understand the significance of toxicological studies in forensic science.	K2
2	Classification of poisons and their modes of actions.	K3
3	Understand the concept of absorption of poisons in body fluids.	K3
4	Classification and characteristics of the narcotics, drugs and psychotropic substances.	K4

K1 – Remember K2 – Understand K3 – apply K4- Analyze K5 – evaluate K6- Create

UNIT – I	BASICS OF TOXICOLOGY	10 Hours

Toxicology: Introduction, Classification of Toxicology, Forensic toxicology. significance of toxicological findings. Techniques used in toxicology. Toxicological analysis and chemical intoxication tests. Postmortem Toxicology.

UNIT II	POISONS	11 Hours

Classification of poisons. Plant poisons, Animal poisons, Metallic Poisons. Physico-chemical characteristics and mode of action of poisons. Accidental, suicidal and homicidal poisonings. Signs and symptoms of common poisoning and their antidotes. Collection and preservation of viscera, blood and urine for various poison cases. Identification of biocides and metal salts in body fluids. Metabolism and excretion of poisons.

UNIT-III	IDENTIFICATION OF TOXINS	11 Hours

Application of immunoassays in forensic work. Animal poisons. Snake venom. Mode of action. Carbon monoxide poisoning. Vegetable poisons. Poisonous seeds, fruits, roots and mushrooms. Beverages. Alcoholic and non-alcoholic illicit liquors. Analysis and identification of ethyl alcohol. Estimation of ethyl alcohol in blood and urine. Proof spirit. Crime scene management in illicit liquor cases.

UNIT -IV	NARCOTICS, DRUGS AND PSYCHOTROPIC SUBSTANCES	14 Hours

Narcotics, Drugs and Psychotropic Substances-Definition of narcotics, drugs and psychotropic substances. Broad classification – Narcotics, stimulants, depressants and hallucinogens. General characteristics and common example of each classification. Drugs and psychotropic substances. Designer drugs. Tolerance, addiction and withdrawal symptoms of narcotics, drugs and psychotropic substance.

UNIT- V	ANALYSIS OF NARCOTICS	14 Hours

Testing of narcotics, drugs and psychotropic substances. Isolation techniques for purifying narcotics, drugs and psychotropic substances – thin layer chromatography, gas-liquid chromatography and high performance liquid chromatography. Presumptive and screening tests for narcotics, drugs and psychotropic substances. Microcrystalline testing of drugs of abuse. Analysis of narcotics, drugs and psychotropic substances in breast milk, saliva, urine, hair and antemortem blood. Drugs and driving.

Total Lecture Hours	**60 Hours**

Text Book(s)

1	Professor K.S. Narayan Reddy the Essentials Of Forensic Medicine And Toxicology, jaypee Brothers Medical Publishers, 33rd Edition, 2014	
2	Professor V.V. Pillay Textbook Of Forensic Medicine And Toxicology, Paras Medical Publisher, 18th edition (2017)	
	REFERENCE BOOKS:	
1	W.J. Tilstone, M.L. Hastrup and C. Hald, Fisher‟s, Techniques of Crime Scene Investigation, CRC Press, Boca Raton 8th Edition (2013)	
2	Principles of Forensic Toxicology Barry Levine, Amer. Assoc. for Clinical Chemistry,4th Edition 2014	
	Related Online Contents (MOOC, SWAYAM, NPTEL, Websites etc)	
1	https://onlinecourses.swayam2.ac.in/cec20_bt19/preview	
2	https://dor.gov.in/narcotic-drugs-psychotropic	

	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**
CO1	S	S	S	M	M	M	M	L	L	L
CO2	S	S	M	M	M	M	L	L	L	L
CO3	S	S	S	M	M	S	M	L	L	L
CO4	S	S	M	M	M	L	L	L	L	L

*** S-Strong M- Medium L - Low**

Course Code	23UFSPC07	RESEARCH METHODOLOGY LAB	L	T	P	C
Core/elective/Supportive		Professional Competency Skill	-	-	2	2
Pre - requisite		• Basic knowledge in research methodology				

Course Objectives

- The course aims at introducing them to the basic concepts used in research and to scientific social research methods and their approach.

Expected Course Outcomes

1	Understand the basic of research	K2
2	Apply various idea in the research area	K3
3	Analyze the data which is given to the research work	K4
4	Create a various ideas to apply in the research work	K6

K1 – Remember K2 – Understand K3 – apply K4- Analyze K5 – evaluate K6- Create

1. To perform practical for probability and non-probability sampling types.
2. To calculate mean median mode of a given data.
3. To calculate standard deviation, standard error, variance and coefficient of variation for given data.
4. To perform correlation and regression analysis for given data.
5. To perform student„s‟ test and Chi square analysis for hypothesis testing.

Total practical Hours	**48 Hours**

Text Book(s)

1	Richard F. Morton & J. Richard Hebd: A study guide to Epidemiology and Biostatistics, 2nd Ed.(2012), University Park Press, Baltimore.
2	Sylvia W Smoller, J Smoller, Biostatistics & Epidemiology A Primer for health and Biomedical professionals, 4th edition, Springs, 2015
	REFERENCE BOOKS:
1	Mausner & Bahn: Epidemiology-An Introductory text, 2nd Ed., (1985) W. B. Saunders Co.
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1	https://onlinecourses.nptel.ac.in/noc19_ge21/preview
2	https://onlinecourses.swayam2.ac.in/cec20_hs17/preview

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	M	M	S	S	L	L	L
CO2	S	S	S	M	L	S	S	S	L	L
CO3	S	S	M	M	L	S	S	M	L	L
CO4	S	S	S	M	M	S	S	M	L	L

*** S-Strong M- Medium L - Low**