

**NOORUL ISLAM CENTRE FOR HIGHER EDUCATION**  
**NOORUL ISLAM UNIVERSITY**  
**DEPARTMENT OF BIOMEDICAL SCIENCE & TECHNOLOGY**  
**B.Sc. FORENSIC SCIENCE**  
**CURRICULUM & SYLLABI (REGULATION - 2017)**  
**SEMESTER I**

<b>Sl. No.</b>	<b>Course Code</b>	<b>Course Title</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
<b>THEORY</b>						
1	EG2601	English- I	3	1	0	4
2	MS26T1 / MS26M1/ MS26F1	Language- I: Tamil/ Malayalam/ French	3	1	0	4
3	FS2601	Basic of Forensic Science	3	1	0	4
4	FS2602	Basic of Forensic Chemistry	3	1	0	4
5	FS2603	Basic of Forensic Physics	3	0	0	3
<b>PRACTICAL</b>						
6	FS2671	Basic of Forensic Science Lab	0	1	2	2
7	FS2672	Basic of Forensic Chemistry Lab	0	1	2	2
8	FS2673	Basic of Forensic Physics Lab	0	1	2	2
<b>Total</b>			<b>15</b>	<b>7</b>	<b>6</b>	<b>25</b>

**EG2601**

**ENGLISH-I**

**3 1 0 4**

**Objectives:**

To acquire basic knowledge in business English, with communication.

**UNIT – I PROSE : A GALAXY OF PRECIOUS PROSE: (DETAILED) 9**

1. University Days - James Thurber
2. The Model Millionaire - Oscar Wilde
3. On Forgetting - Robert Lynd

**UNIT-II POETRY : HARMONY (DETAILED ) 9**

1. The Solitary Reaper – William Wordsworth
2. Stopping by Woods on a Snowy Evening – Robert Frost
3. Enterprise – Nissim Ezekiel

**UNIT- III SHORT STORY : POPULAR SHORT STORIES ( NON –DETAILED) 9**

1. The Gift of Magi - O. Henry
2. The Ant and the Grasshopper – W. Somerset Maugham
3. The Mark of Vishnu – Kushwant Singh

**UNIT- IV GRAMMAR : 9**

1. FUNCTIONAL ENGLISH - Tense, Active Voice, Passive Voice, Auxiliaries and Modals  
Agreement of subject with verb
2. VOCABULARY – Antonyms, Synonyms, Suffixes, Prefixes, One word Substitution, Odd one out

**UNIT- V 9**

Basics of Letter Writing – Reading Comprehension

**T: 15 + L: 45 = TOTAL: 60 PERIODS**

**BOOKS RECOMMENDED**

1. Galaxy of English Prose, Ed. Dr. B. Symala Rao, Blackie Books, Madras .
2. An Anthology of Poems Harmony, Ed. Biyot K. Tripathy.

**FS2601**

**Basic of Forensic Science**

**3 1 0 4**

**Unit-I**

(9 hrs)

Introduction to crime, Sociological aspect in society, Criminal behavior, Types of crime, Monitoring system in society, Crime scenario in India.

**Unit-II**

(9 hrs)

Detection of Crime, Different agencies involved in crime: Police, Medico-legal expert, Judicial officers.

**Unit-III**

(9 hrs)

Scope and development of forensic science, Forensic science in India, Growth of Core laboratories, set up in country.

**Unit-IV**

(9 hrs)

Facilities provided in forensic Science laboratories for chemical, physical, biological psychological, digital and cyber crime detection and analysis. Detection of crime scene, Crime scene management,

**Unit-V**

(9 hrs)

Importance of physical evidence, collection of physical evidence in crimes like murder theft, extortion, explosion etc. Role of forensic scientists, investigative officers, forensic doctors, fire brigade, judiciary

**T: 15 + L: 45 = TOTAL: 60 HOURS**

**Recommended Books:**

1. Crime Scene Processing and Laboratory Work Book by Patric Jones
2. Forensic Science: An Introduction to Scientific and Investigative Techniques 3rd ed. by Stuart H. James
3. Criminalistics: An Introduction to Forensic Science, 9th ed. By Richard Saferstein
4. Compute Crime and Computer Forensic by Dr. R.K. Tiwari
5. Criminal Profiling: An Introduction to a Behavioral Evidence Analysis, 3rd ed. By Brent E. Turvey

**FS2602**

**Basic of Forensic Chemistry**

**3 1 0 4**

**Unit-I**

(9 hrs)

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. Solutions: Method of exploring concentration of solutions, binary liquids, vapor pressure, composite diagram of binary liquids and solutions, distillation, fractional distillations, vacuum distillations Conductance, conductometry, electro motive force, potentiometry.

**Unit-II**

(9 hrs)

Chemical thermodynamics and kinetics, first law of thermodynamics, Internal energy, enthalpy second law of thermodynamics, entropy and its significance, free energy and work

function, Rate of reaction, order of molecularity reaction, slow reaction and fast reaction, first order reaction, half life period of first order reaction, Activation energy, temperature dependence of activation energy, explosive reactions, Oscillatory reactions.

**Unit-III** (9 hrs)

Study of modern periodic table, long form of periodic table, periodic properties, atomic radii, ionization potential, electron affinity electro negativity, metallic characters, non metallic characters and magnetic properties, comparative study of S and P block elements.

**Unit IV** (9 hrs)

Gravimetric analysis, volumetric analysis, chromatographic separation, the liquid chromatography, Electrophoresis, Thermal methods.

**Unit-V** (9 hrs)

Empirical and molecular formulae, hybridization, nature of chemical bonding, polarization, hydrogen bonding, Vander walls forces, IUPAC nomenclature of alkanes, alkenes, haloalkanes, alcohol ether aldehydes, ketones, carboxylic acids, nitro compounds, nitrites including cyclic analogues and also aromatic compounds, naphthalene, anthrones and phenanthrones, reactive intermediates and related reactions.

**Unit-V** (9 hrs)

Heterocyclic chemistry: natural products, petroleum products, drugs, insecticides, pesticides etc introduction to dyes, paints, polymers.

**T: 15 + L: 45 = TOTAL: 60 HOURS**

**Recommended Books:**

1. Concise Inorganic Chemistry by J.D. Lee (4th edition) 2004. CBS Publishers and Distributors, New Delhi.
2. Organic Chemistry by Moris and Boyed, (1975) Oxford IBH Publishing Co. Pvt. Ltd.
3. Heterocyclic Chemistry by Gupta and Kumar Vol I and Vol II CBS Publishers and Distributors, New Delhi.
4. Insecticides with Modes of Action by I. Ishaya and D. Deghilee
5. Natural Products by S.V. Bhat, (4th edition) 2000. Freeman International Edition.

**FS2603**

**Basic of Forensic Physics**

**3 0 0 3**

**Unit-I** (9 hrs)

Interpretation and application of Newton's laws of motion, pseudo forces, Elastic properties of matter, elastic constants and their interrelation. Fluid dynamics, Equation of continuity, Bernoulli's equation, stream line and turbulent flow, lines of flow in air foil, purseuille's equation.

**Unit-II** (9 hrs)

Velocity of sound, noise and sound intensity measurement, echo, reverberation, Sabine's formula, absorption coefficient, Acoustics of buildings and factors affecting acoustics of

buildings, sound distribution in an auditorium, Introduction to ultrasonic, production of ultrasonic waves, application of ultrasonics.

**Unit-III**

(9 hrs)

Refraction through thin layers, thick lens, and lens combinations, Aberrations, interference in thin films, fringes in wedge shaped films, Newton's rings, simple table spectrophotometer, total internal reflection.

**Unit- IV**

(9 hrs)

Production of LASER, types of LASER, properties and application of LASER, optical fibers, propagation of light through optical fiber, Angle of acceptance and numerical aperture, losses solar cells. Review of nuclear composition, nuclear properties and half life, Radioactive decay schemes, Applications of Radio Isotopes, Radiometric dating.

**Unit-V**

(9 hrs)

Basics of LR, CR, LCR Circuits, Rectifier circuits, Timer, circuits, Transistor and its characteristics, Introduction to OPAM, remote sensing and controlling, photo-sensors, Logic gates and their application, Flip flops and counters.

**TOTAL: 45 HOURS**

**Recommended Books:**

1. Principle of Electronic by V.K. Gupta (4th edition) 2004. CBS Publishers and Distributors, New Delhi.
2. Digital Electronics by Malnino, 1992. Chapman and Hall Publications.
3. Digital Electronics by Flloyd 2nd edition. 2003. Tata McGraw Hill Publishing Company, Ltd., N. Delhi.
4. Op-amp by Gaikwad 2nd edition. 2008. Tata McGraw Hill Publishing Company, Ltd., N. Delhi.

**FS2671**

**Basic Forensic Science Lab**

**0 1 2 2**

1. Collection and Handling of toxicological samples
2. Collection and Handling of Petroleum samples
3. Collection and Handling of murder case samples
4. Collection and Handling of toxicological samples
5. Study of Bomb Blast scene
6. Collection and Handling of firing crime scene samples
7. Collection and Handling of Hit and run crime scene samples

**TOTAL=45 HOURS**

**FS2672**

**Basic Forensic Chemistry Lab**

**0 1 2 2**

1. To determine the density of given liquid
2. To determine the viscosity of given liquid
3. To determine the surface tension of given liquid
4. Standardization of given liquid by primary standard -

5. To determine strength of given acid
6. Inorganic micro / semi micro qualitative analysis
7. Identification of organic compound -

**TOTAL=45 HOURS**

**FS2673**

**Basic Forensic Physics Lab**

**0 1 2 2**

1. Fly wheel
2. Y by uniform bending
3. of posseuli Method
4. Spectrophotometer (determination of angle of prism A)
5. Refractive index of liquid by using LASER
6. Ultrasonic interferometer
7. Sound Intensity measurement
8. Laser Parameter
9. Solar cell
10. Combination of lenses
11. Newton's rings
12. Wedge shaped film
13. Frequency of AC mains
14. LDR characteristics
15. LCR series resonance
16. Bridge ratifer (to study load regulation)
17. Transistor (CE) characteristics
18. Dc morgan's theorems
19. Ex or gate, NAND and NOR as universal building blocks  
(Minimum 12 experiments should be conducted)

**TOTAL=45 HOURS**

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**SEMESTER II**

<b>Sl. No.</b>	<b>Course Code</b>	<b>Course Title</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
<b>THEORY</b>						
1	EG2602	English- II	3	1	0	4
2	MS26T2 / MS26M2/ MS26F2	Language-I I: Tamil/ Malayalam/ French	3	1	0	4
3	FS2604	Basic of Forensic Biology	3	1	0	4
4	FS2605	Basic of Forensic Psychology	3	0	0	3
5	FS2606	Introduction to Computer	3	0	0	3
<b>PRACTICAL</b>						
6	FS2674	Basic of Forensic Biology Lab	0	1	2	2
7	FS2675	Basic of Forensic Psychology Lab	0	1	2	2
8	FS2676	Introduction to Computer Lab	0	1	2	2
<b>Total</b>			<b>15</b>	<b>6</b>	<b>6</b>	<b>24</b>

**Objectives:**

To acquire basic knowledge in business English, with communication.

**UNIT- I: PROSE : A GALAXY OF PRECIOUS PROSE: (DETAILED) 9**

1. Water the Elixir of Life – C. V. Raman
2. An Astrologer's Day - R. K. Narayan
3. Hazards of Sensual Drugs - Hardin B Jones

**UNIT- II POETRY : HARMONY (DETAILED ) 9**

1. La-Belle Dame Sans Merci – John Keats
2. All the World's a Stage – William Shakespeare
3. Palanquin Bearers – Sarojini Naidu

**UNIT III SHORT STORY : POPULAR SHORT STORIES ( NON –DETAILED) 9**

1. The Necklace – Guy De Maupassant
2. The World Renowned Nose – V. M. Basheer
3. The Selfish Giant – Oscar Wilde

**UNIT IV GRAMMAR : 9**

1. FUNCTIONAL ENGLISH- Articles, Preposition, Conditional clauses, Direct Speech, Indirect Speech
2. Vocabulary- Homonyms, Homophones, Parts of Speech, Sentence formation,

**UNIT V 9**

Non-Verbal Communication

**T: 15 + L: 45 = TOTAL: 60 PERIODS**

**BOOKS RECOMMENDED**

1. Galaxy of English Prose, Ed. Dr. B. Symala Rao, Blackie Books, Madras.
2. An Anthology of Poems, Harmony, Ed. Biyot K. Tripathy.
3. Popular Short Stories.



**FS2604**

**Basic of Forensic Biology**

**3 1 0 4**

**Unit-I**

(9 hrs)

Cell structure and function in prokaryotes and eukaryotes Properties, classification and function of carbohydrates, proteins, nucleic acids and lipids, Study of blood components and body fluids

**Unit-II**

(9 hrs)

Principles of taxonomy and system of classification of angio sperms (Bentham and Hooker) and Gymnosperms (chamberlain) Origin of life and Geological time scale. Mechanical and conducting tissue systems in plants

**Unit-III**

(9 hrs)

Acid, base, and buffers, Beer and Lambert's law, colorimetry and spectrophotometry, principles methods and application of chromatography and electrophoresis

**Unit-IV**

(9 hrs)

Basics of microbiology and concept of pure culture technique microscopy principle and types of microscopy Broad classification of microorganisms Unit-V Immunity and immune system, Structure and Interaction of antigens and antibody, ELISA, western blot, and southern blot techniques.

**Unit-V**

(9 hrs)

Genetic materials – structural organization and function. Mendelian principles, sex linkage and sex determination Recombinant DNA technology and its applications in health, and diseases.

**T: 15 + L: 45 = TOTAL: 60 HOURS**

**Recommended Books:**

1. Harper's Biochemistry by Murray, 2004. John Wiley and Sons, USA
2. Physical Chemistry by Atkins , 2nd edition. 2003. Tata McGraw Hill Publishing Company, Ltd., N. Delhi.
3. Physical Chemistry by Castellan (3rd Edition) 2007 Saunders College Publishers.
4. Biological Spectroscopy by Lalcowicz First edition. 2010. PHI Learning Pvt Ltd, New Delhi

**FS2605**

**Basic of Forensic Psychology**

**3 0 0 3**

**Unit-I**

(9 hrs)

Concepts of psychology, History of psychology, modern perspectives, types of psychological professionals psychology, The science and research methods, professional and ethical issues in psychology.

**Unit-II**

(9 hrs)

Nerves Neurous: Building the network , central nervous system, peripheral nervous system, Human brain structure and function; sensory systems endocrine system.



**Unit-V**

(9 hrs)

Cyber Crimes: Introduction, stand alone computer crimes- Printing of Counterfeit Currency and other documents. Computer Scanners, Imaging Software (Photoshop, Photo paint etc.), Software Piracy, Data Recovery.

**TOTAL: 45 HOURS****Recommended Books:**

1. Introduction to computer by Gilbert Brands First edition. 2010. PHI Learning Pvt Ltd, New Delhi
2. Advances in Computer science and Information Technology by HojattAdeli, (2003), New Age International (P), Ltd.
3. Computer organisation and Architecture, Rajaraman V, Radhakrishnan.T., 2001. First edition. PHI Learning Private Limited, New Delhi.
4. Computer Science, Robert Sedgewick, Kevin Wayne. First edition. 2012. PHI Learning Pvt Ltd, New Delhi

**FS2674****Basic of Forensic Biology****0 1 2 2**

1. Qualitative analysis of sugar, proteins, lipids and nucleic acids
2. Study of morphological types of red blood cells
3. Study of plant-material (wild and cultivated from families, magnoniaceae, combretaceae, amaranthaceae, convolovalaceae).
4. Study of conducting tissue, -xylem and phloem elements in angiosperms and Gymnosperms as seen in L.S. and R.C.S.
5. Preparation of media and sterilization
6. Antigen-antibody reaction (blood groupings)
7. Study of body fluids
8. Radial immune diffusion analysis
9. Isolation of chromosomal DNA
10. Restriction digestion of DNA
11. Chromatography- separation of Amino acids, sugars, lipids using paper chromatography and thin layer chromatography, determination of RF values

**TOTAL: 45 HOURS****FS2675****Basic of Forensic Psychology****0 1 2 2**

1. To cite a crime case where legal procedures pertaining to psychic behavior had to be invoked.
2. To prepare a report on relationship between mental disorders and forensic psychology.
3. To review a crime case involving serial murders. Comment on the psychological traits of the accused.
4. To cite a crime case involving a juvenile and argue for and against lowering the age for categorizing an individual as juvenile.
5. To study a criminal case in which hypnosis was used as a means to detect deception.
6. To prepare a case report on thematic appreciation test.

7. To prepare a case report on Minnesota multiphasic personality inventory test.
8. To prepare a case report on thematic appreciation test.
9. To prepare a case report on word association test.
10. To prepare a case report on Bhatia's battery of performance test of intelligence.
11. To cite a criminal case in which narco analysis was used as a means to detect deception.

**TOTAL: 45 HOURS**

**FS2676**

**Introduction to Computer Lab**

**0 1 2 2**

1. Usage of MS DOS commands: basic concept of internal & external commands, directory & file commands, copying, erasing, renaming, displaying files, introduction to pipes & filters, concept of batch file.
2. Windows operation: Customizing the interface, windows explorer, computer upkeep & utilities Office operation
3. Microsoft word: concept of toolbar, character, paragraph & document formatting, drawing tool bar, header, footer, document editing, page setup, short cut keys, text & graphics.
4. Microsoft excel: concept of spread sheets, creating worksheet, well formatted documents, concept of row, column ,cell & formula bar, using function ,using shortcuts ,chart, conditional formatting, goal seek, validation rule.
5. Microsoft power point: slide presentation, slide layout & design, custom animation, image importing, slide transition

**TOTAL: 45 HOURS**

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**REGULATION - 2017**  
**SEMESTER III**

<b>Sl. No.</b>	<b>Course Code</b>	<b>Course Title</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
<b>Theory</b>						
1	FS2607	Basic of Digital and Cyber Forensics	3	1	0	4
2	FS2608	Forensic Dermatoglyphics	3	1	0	4
3	FS2609	Forensic Ballistics	3	0	0	3
4	FS2610	Environmental Science	2	0	0	2
5	FS2611	Advanced Forensic Psychology	3	1	0	4
<b>Practicals</b>						
6	FS2679	Basic of Digital and Cyber Forensics Lab	0	1	2	2
7	FS2677	Forensic Dermatoglyphics Lab	0	1	2	2
8	FS2678	Forensic Ballistics Lab	0	1	2	2
<b>Total</b>			<b>14</b>	<b>6</b>	<b>6</b>	<b>23</b>

**FS2607            BASIC OF DIGITAL AND CYBER FORENSICS            3   1   0   4**

**Unit-I** (9 hrs)

Basics of computers: Computer organization, components of computers – input output device, CPU, memory-RAM, ROM and external storage devices. Data representations: integers, real, binary, octal hexadecimal.

**Unit-II** (9 hrs)

Introduction to operating system: Basics of operating system, memory structure, concurrency, scheduling, synchronization and memory management examples of operating systems-Windows and Linux.

**Unit-III** (9 hrs)

File system and networking:- Introduction to file system, FAT12, FAT16, FAT32, NTFS, EXT2, EXT3, HFS, Basics of networking- types of topologies, LAN, MAN, WAN.

**Unit-IV** (9 hrs)

Introduction to internet: World wide web, E-mails, chat, search engines, networking protocols, network security- threats, vulnerabilities, Access control, virus, Trojans etc, security plan and policies

**Unit-V** (9 hrs)

Cyber crime and digital evidence: what is cyber crime, types of cyber crimes, digital evidence, Digital Vs Physical Evidence, Nature of Digital Evidence, Precautions, while dealing with Digital Evidence.

**T: 15 + L: 45 = TOTAL: 60 HOURS**

**Recommended Books:**

1. Introduction to Forensic Science in Crime Investigation By Dr.(Mrs.) Rukmani Krishnamurthy
2. Cyber Law in India by Farooq Ahmad- Pioneer Books
3. Information Technology Law and Practice by Vakul Sharma - Universal Law Publishing Co. Pvt. Ltd.
4. The Indian Cyber Law by Suresh T. Vishwanathan- Bharat Law House New Delhi

**FS2608            FORENSIC DERMATOGLYPHICS            3   1   0   4**

**Unit- I** (9 hrs)

Introduction and history, with special reference to India. Biological basis of fingerprints. Formation of ridges. Fundamental principles of fingerprinting. Types of fingerprints. Fingerprint patterns. Fingerprint characters/minutiae. Plain and rolled fingerprints.

**Unit-II** (9 hrs)

Classification and cataloguing of fingerprint record. Automated Fingerprint Identification System. Significance of poroscopy and edgeoscopy.

**UNIT-III**

(9 hrs)

Latent prints. Constituents of sweat residue. Latent fingerprints' detection by physical and chemical techniques. Mechanism of detection of fingerprints by different developing reagents.

**Unit-IV**

(9 hrs)

Application of light sources in fingerprint detection. Preservation of developed fingerprints. Digital imaging for fingerprint enhancement. Fingerprinting the deceased. Developing fingerprints on gloves. Importance of footprints.

**Unit-V**

(9 hrs)

Casting of foot prints, Electrostatic lifting of latent foot prints. Palm prints. Lip prints - Nature, location, collection and examination of lip prints. Ear prints and their significance. Palm prints and their historical importance.

**T: 15 + L: 45 = TOTAL: 60 HOURS****Recommended Books:**

1. Forensic Entomology: The Utility of Arthropods in Legal Investigations Jason H. Byrd, James L. Castner Taylor and Francis, 2009
2. Forensic entomology: an introduction By Dorothy E. Gennard Wiley.
3. Forensic palynology Dallas Mildenhall, Patricia Wiltshire, Vaughn Bryant Elsevier, 2006
4. Forensic palynology: an in-depth look at its indispensable value National University, San Diego, 2002

**FS2609****FORENSIC BALLISTICS****3 0 0 3****Unit-I**

(9 hrs)

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

**Unit-II**

(9 hrs)

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**

(9 hrs)

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, influence of range. Ricochet and its effects, stopping power.

**Unit-IV**

(9 hrs)

Types of ammunition. Constructional features and characteristics of different types of cartridges and bullets. Primers and priming compounds. Projectiles. Headstamp 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** (9 hrs)

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. Reconstruction with respect to accident, suicide, murder and self defence.

**TOTAL: 45 HOURS**

**Recommended Books:**

1. Forensic Ballistics in Criminal Justice: Kaushalendra Kumar.
2. Firearms in Criminal Investigation and Trials: B. R. Sharma, 4th Edition, Universal Law Publishing Company. New Delhi.
3. Handbook of Firearms and Ballistics, Examining and Interpreting Forensic Evidence
4. Criminalistics, An Introduction to Forensic Science: Richard Saferstein, 10th Edition, Pearson Education International.
5. Forensic Science An Introduction to Scientific and Investigative Techniques : Stuart H. James and Jon J. Nordby., 3rd Edition CRC Press, Taylor & Francis Group

**FS2610**

**ENVIRONMENTAL SCIENCE**

**2 0 0 2**

**Unit-I** (9 hrs)

Definition, scope and importance. Natural resources and associated problems: Forest, Water, Minerals, Food, Energy, Land. Role of an individual in conservation of natural resources. Equitable use of resources for sustainable lifestyles lectures.

**Unit-II** (9 hrs)

Forest Resources Role of an individual in conservation of natural resources. Equitable use of resources for sustainable lifestyles lectures. Concept of an ecosystem. Structure and function of an ecosystem. Producers, consumers and decomposers. Energy flow in the ecosystem. Ecological succession. Food chains, food webs and ecological pyramids.

**Unit-III** (9 hrs)

Introduction- Definition: Genetic, species and ecosystem diversity. Biogeographical classification of India. Value of Bio-diversity: Consumptive use, productive use, social, ethical, aesthetic and option values. Bio-diversity at global, National and local levels. Hot-spots of Bio-diversity Threats to Bio-diversity: habitat loss, poaching of wildlife, man-wildlife conflicts. Endangered and endemic species of India. Conservation of Bio-diversity: In-situ and Ex-situ conservation of Bio-diversity.

**Unit-IV** (9 hrs)

Definition, Causes, effects and control measures of: (a) Air pollution, (b) Water pollution, (c) Soil pollution, (d) Marine pollution, (e) Noise Pollution, (f) Thermal pollution, (g) Nuclear hazards. Solid waste management: Causes, effects and control measures of urban and industrial wastes. Role of individual in prevention of pollution. Disaster management: floods, earthquake, cyclone and landslides.

**Unit-V** (9 hrs)

Urban problems related to energy Water conservation, rain water harvesting, watershed management. Environmental ethics: issues and possible solutions. Urban problems related to



energy Water conservation, rain water harvesting, watershed management Environmental ethics: issues and possible solutions. Population growth, variation among nations. Population explosion-Family Welfare programme. Environment and human health Human Rights.

**TOTAL: 45 HOURS**

**Recommended Books:**

1. Suryakanta, Community medicine with recent advances, 4<sup>th</sup> edition
2. Essentials of community medicines for allied health sciences, JSS university publications, 2015
3. Bhalwar R, Public health and community medicine, Pune, 2<sup>nd</sup> edition, 2012

**FS2611      ADVANCED FORENSIC PSYCHOLOGY      3   1   0   4**

**Unit-I**

**The Content of Forensic Psychology:** History of Forensic Psychology (Historical Perspective) Defining Forensic Psychology. Importance of Forensic Psychology. Services provided by Forensic Psychologists.

**Unit-II**

**Assessment and Evaluation in Forensic Psychology (Psychological Testing):** What is Psychological Tests? , Types of Tests. Characteristics of good test. Tests that are used in Forensic Psychology Assessment. , Intelligence Tests., Achievement Tests , Personality Tests The MMPI Test.

**Unit-III**

**Applying Social Psychology in the interpersonal aspects of legal system:** Before the trial begins: 1. Effect of police procedure and media coverage. , 2. Eye Witness Testing: Problems and Solutions. The Central participation in trial , 1. Effect of Attorney, Judges, Jurors, and Defenders.

**Unit-IV**

**Legal Aspects of Forensic Psychology:** Introduction. Historical Background Survey into Psychological evidence in court. Ethical and Professional Issues The role of Forensic Psychology. Civil cases, Criminal cases.

**Unit-V**

**Personality Disorders:** Defining and Diagnosing Personality Disorders. Odd-Eccentric Personality Disorders. Dramatic-Emotional Personality Disorders. Anxious-Fearful Personality Disorders. Alternative Conceptualization of Personality Disorder Stress Factors in the stress reaction. Coping with the stress

**T: 15 + L: 45 = TOTAL: 60 HOURS**

**REFERENCE BOOKS:**

1. Introduction to Psychology, Morgan, King, Weiss and Schopler, VII edition, (1989) McGraw Hill, India.
2. Abnormal psychology & modern life, Carson RC & Butcher JN (10th Ed) Harper-Collins
3. The Counseling process Patterson, Lewis E. & Welfel, Elizabeth Reynold – [2000] Hilgard,
4. Introduction to Psychology, Atkinson and Atkinson, (1975) Oxford IBH Publishing Co. Pvt. Ltd.



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**SEMESTER IV**

<b>Sl. No.</b>	<b>Course Code</b>	<b>Course Title</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
<b>Theory</b>						
1	FS2612	Technological Methods in Forensic Science	3	1	0	4
2	FS2613	Forensic Medicine	3	1	0	4
3	FS2614	Forensic Molecular Biology	3	1	0	4
4	FS2615	Advanced Digital and Cyber Forensic	3	0	0	3
5	FS2616	Criminal Law	3	0	0	3
<b>Practicals</b>						
6	FS2680	Technological Methods in Forensic Science Lab	0	1	2	2
7	FS2681	Forensic Molecular Biology Lab	0	1	2	2
8	FS2682	Advanced Digital and Cyber Forensic Lab	0	1	2	2
<b>Total</b>			<b>15</b>	<b>6</b>	<b>6</b>	<b>24</b>



Miranda warning card. Assessing the crime scene. Request for forensic team. Importance of command post and log book. Management of crowd and media.

**Unit-III** (9 hrs)

Importance of taking notes. Items to be a part of noting. Documenting the death scene. Processing evidence. Evaluation of injuries. Importance of canvass form. Indexing the death investigation. Handling buried body cases – search for buried bodies, methods of exhumation. Suicide cases – evaluating the type of injuries, gauging the psychological state of victim, suicide notes.

**Unit-IV** (9 hrs)

Forensic pathology. Medico-legal aspects of death. Causes of death. Determination of time since death. Investigation of sexual offences. Death by drowning. Injuries. Types and classification of injuries. Antemortem and post mortem injuries. Aging of injuries. Artificial injuries.

**Unit-V** (9 hrs)

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

**T: 15 + L: 45 = TOTAL: 60 HOURS**

**Recommended Books:**

1. Practical Crime Scene Analysis & Reconstruction – Roos M. Gardner & Tom Bevel
2. Death Scene Investigation – Scott A. Wagner
3. Forensic Science in criminal investigation and trials – B.R. Sharma
4. Forensic Science in Crime Investigation – Dr. Mrs. Rukmani Krishnamurthy
5. Forensic Science – An introduction to scientific and investigative techniques – Stuart H. James & Jon J. Nordby
6. Forensic Medicine – P.V. Guharaj & M. R. Chandran

**FS2614**

**FORENSIC MOLECULAR BIOLOGY**

**3 1 0 4**

**Unit-I** (9 hrs)

Clone, Overview of the procedure, Gene library, Hybridization. Extraction and Purification of nucleic acids, Detection and Quantitation of Nucleic acids, Gel Electrophoresis.

**Unit-II** (9 hrs)

Restriction Endonucleases, Ligation, Alkaline Phosphate, Double Digest, Modification of Restriction Fragments ends, Other Ways of joining DNA Molecules.

**Unit-III** (9 hrs)

Vectors -Plasmid vectors, Vectors based on the lambda Bacteriophage, Cosmids, M13 vectors, Expression vectors, Vectors for cloning and expression in Eukaryotic cells, Super vectors : YACs and BACs.

**Unit-IV** (9 hrs)

The importance of DNA Cloning, PCR: basic features and application, Principles of Cell-based DNA Cloning, Cloning System for amplifying different sized fragments, Cloning System for producing single-stranded and mutagenized DNA.

**Unit-V** (9 hrs)

Nucleic Acid Hybridization: Principle and application - Preparation of nucleic probes, Principle of Nucleic acid hybridization, Nucleic acid hybridization assays, and microarrays.

**T: 15 + L: 45 = TOTAL: 60 HOURS**

**Recommended Books:**

1. Keith Wilson, John Walker, Principles and Techniques of Biochemistry and Molecular Biology, 2010
2. VasanthaPattabhi, Gautham.N, Biophysics, Narosa Publishing House, 2002
3. Bhat .S. V, Biomaterials, Springer, Netherlands, 2002

**FS2615      ADVANCED DIGITAL AND CYBER FORENSIC      3   0   0   3**

**Unit-I** (9 hrs)

Introduction to Computer/Cyber Forensic, Cyber Forensic Steps (Identification, Seizure, Acquisition, Authentication, Presentation, Preservation), Who is Computer Forensic Expert, Cyber Forensic Investigation Process, The Goal of the Forensic Investigation, Why Investigate (Internet usage exceeds norm, Using email inappropriately, Use of Internet, email, or PC in a non-work-related manner, Theft of information, Violation of security policies or procedures, Intellectual property infractions, Electronic tampering ), Establishing a Basis or Justification to Investigate, Determine the Impact of Incident, Auditing V/s Cyber Forensic Investigations

**Unit-II** (9 hrs)

Introduction to Incident Response Process(What is Computer Security Incident, What are the goals of Incident Response, Who is involved in Incident Response Process, Incident Response Methodology, Formulate a Response Strategy, Investigate the Incident.),Preparing For Incident Response, Overview of Pre-incident Preparation, Identifying Risk, After Detection of an Incident.

**Unit-III** (9 hrs)

Introduction, Examining a Breadth of Products, Cyber Forensic Tools Good, Better, Best: What's the Right Incident Response Tool for Your Organization? , Tool Review Forensic Toolkit, EnCase, Cyber check suites, what is disk Imaging etc. Specifications for Forensic tools Tested.

**Unit-IV** (9 hrs)

Volatile and Non volatile Evidences collection (Safeback, Gettime, FileList,Filecvt and Excel, Getfree, Swapfiles and Getswap,GetSlack, Temporary Files), Detailed Procedures for Obtaining a bit stream backup of hard drive, File System (Details of File system, Data Structure Of File System, Data Recovery in Different file system).

**Unit-V** (9 hrs)

Introduction to Cryptography, Types of Cryptographic Algorithms(Secret Key Cryptography, Public Key Cryptography, Hash Function),Electronic Signature, Stenography, Reversing the

Stenographic Process, Cloaking Techniques(Data Hide and Seek),Renaming Files, Manipulating File System, Data Hiding on NTFS with Alternate data Stream.

**TOTAL: 45 HOURS**

**RECOMMENDED BOOKS:**

1. File System Forensic Analysis by Brian Carrier, Publisher: Addison-Wesley Professional
2. Cyber Law & Crimes (IT Act 2000 & Computer Crime Analysis) by Barkha& Ram Mohan, Publisher: Asian Law House, Hyderabad
3. Cyber Crime – Dr. R C Mishra, Publisher: Authorspress
4. Forensic Science in Crime Investigation Dr. Rukmani Krishnamurthy, Publisher: Selective & Scientific Books

**FS2616**

**Criminal Law**

**3 0 0 3**

**Unit-I**

Classification – civil, criminal cases. Essential elements of criminal law. Constitution and hierarchy of criminal courts.

Criminal Procedure Code.Cognizable and non-cognizable offences.

Bailable and non-bailable offences.

Sentences which the court of Chief Judicial Magistrate may pass.

Summary trials – Section 260(2).

**Unit-II**

Judgements in abridged forms – Section 355.

Indian Penal Code pertaining to offences against persons – Sections 121A, 299, 300, 302, 304A, 304B, 307, 309, 319, 320, 324, 326, 351, 354, 359, 362.

Sections 375 & 377 and their amendments.

Indian Penal Code pertaining to offences against property Sections – 378, 383, 390, 391, 405, 415, 420, 441, 463, 489A, 497, 499, 503, 511.

**Unit-III**

Indian Evidence Act – Evidence and rules of relevancy in brief. Expert witness. Cross examination and re-examination of witnesses.

Sections 32, 45, 46, 47, 57, 58, 60, 73, 135, 136, 137, 138, 141.

Section 293 in the code of criminal procedure.

**Unit-IV**

Preamble, Fundamental Rights, Directive Principles of State Policy. – Articles 14, 15, 20, 21, 22, 51A.

**Unit-V**

Narcotic, Drugs and Psychotropic Substances Act.Essential Commodity Act.

Drugs and Cosmetics Act.Explosive Substances Act. Arms Act.

Dowry Prohibition Act.

Prevention of Food Adulteration Act.Prevention of Corruption Act.

Wildlife Protection Act. I.T. Act. Environment Protection Act. Untouchability Offences Act

**TOTAL: 45 HOURS**

**Suggested Readings**

1. D.A. Bronstein, *Law for the Expert Witness*, CRC Press, Boca Raton (1999).





**NOORUL ISLAM CENTRE FOR HIGHER EDUCATION, KUMARACOIL**  
**B.Sc. FORENSIC SCIENCE**  
**CURRICULUM & SYLLABUS**  
**REGULATION – 2017**  
**SEMESTER V**

<b>SL. No.</b>	<b>COURSE CODE</b>	<b>COURSE TITLE</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
<b>THEORY</b>						
1.	FS2617	Questioned Documents & Handwriting Examination	3	1	0	4
2.	FS2618	Forensic Anthropology	3	1	0	4
3.	FS2619	Criminalistics	3	0	0	3
4.	FS2620	DNA Fingerprinting	3	0	0	3
5.	FS2621	Forensic Toxicology	3	0	0	3
<b>PRACTICAL</b>						
6.	FS2683	Questioned Documents & Handwriting Examination Laboratory	0	1	2	2
7.	FS2684	Forensic Anthropology Laboratory	0	1	2	2
8.	FS2685	Criminalistics Laboratory	0	1	2	2
<b>TOTAL</b>			15	5	6	23

**NOORUL ISLAM CENTRE FOR HIGHER EDUCATION, KUMARACOIL**

**B.Sc. FORENSIC SCIENCE**

**CURRICULUM & SYLLABUS**

**REGULATION – 2017**

**SEMESTER VI**

<b>SL. No.</b>	<b>COURSE CODE</b>	<b>COURSE TITLE</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
<b>THEORY</b>						
1.	FS2622	Crime and Society	3	1	0	4
2.	FS2623	Accident Investigation	3	1	0	4
3.	FS2624	Police Science	3	0	0	3
4.	FS2625	Forensic Science and Society	3	0	0	3
5.	FS2626	Arson & Explosive Examination	3	0	0	3
<b>PRACTICAL</b>						
6.	FS2686	Crime and Society Laboratory	0	1	2	2
7.	FS26P1	Project / Dissertation	0	2	4	4
<b>TOTAL</b>			<b>15</b>	<b>5</b>	<b>6</b>	<b>23</b>

## SEMESTER V

### THEORY

#### 5.1 FS2617 QUESTIONED DOCUMENTS & HANDWRITING EXAMINATION 3 1 0 4

##### AIM:

To gain the technical knowledge of document and handwriting examination

##### OBJECTIVE:

To make the student able to examine the questioned document as well as signature and handwriting examination

##### OUTCOMES:

- Will be able to define the key concept
- Will be able to identify the handwriting and signature
- Will be able to analyze the paper and ink of a document
- Will be able to compare the handwriting
- Will be able to identify variations in the questioned document

#### **UNIT - I** **Introduction to Documents** **9**

Definition of questioned documents. Types of questioned documents. Preliminary examination of documents. Basic tools needed for forensic documents examination - ultraviolet, visible, infrared and fluorescence spectroscopy, photomicrography, microphotography, visible spectral comparator, electrostatic detection apparatus.

#### **UNIT - II** **Handwriting Examination** **9**

Basis of handwriting identification. Characteristics of handwriting - scope and application. Class and individual characteristics. Arrangement, alignment, margin, slant, speed, pressure, spacing, line quality, embellishments, movement and pen lifts. Factors influencing handwriting - physical, mechanical, genetic and physiological.

#### **UNIT - III** **Comparison and Examination of Paper and Ink** **9**

Comparison of paper, ink, printed documents, typed documents, Xeroxed documents. Determining the age and relative age of documents.

#### **UNIT - IV** **Comparison of Handwriting** **9**

Basis of handwriting comparison. Collection of handwriting samples. Forgery detection. Counterfeiting. Examination of altered and erased documents. Tools used in handwriting examination.

#### **UNIT - V** **Examination of Questioned Document** **9**

Alterations in documents, including erasures, additions, over - writings and obliterations. Indented and invisible writings. Charred documents. Examination of counterfeit Indian currency notes, passports, visas and stamp papers. Disguised writing and anonymous letters.

**TEXT BOOK:**

1. Katherine M Koppehaver, "Forensic Document Examination - Principles & Practice" Humana Press, 2012.
2. Nabar B S, "Forensic Science in Crime Investigation", Asia Law House, 2nd Edition, 2010.
3. Saferestein Richard, "Criminalistics", Pearson Prentice Hall, 13th Edition 2015.

**REFERENCES:**

1. O. Hilton, Scientific Examination of Questioned Documents, CRC Press, Boca Raton(1982).
2. A.A. Moenssens, J. Starrs, C.E. Henderson and F.E. Inbau, Scientific Evidence in Civil and Criminal Cases, 4th Edition, Foundation Press, New York (1995).
3. R.N. Morris, Forensic Handwriting Identification: Fundamental Concepts and Principles, Academic Press, London (2000).
4. E. David, The Scientific Examination of Documents - Methods and Techniques, 2nd Edition, Taylor & Francis, Hants (1997).

**5.2 FS2618**

**FORENSIC ANTHROPOLOGY**

**3 1 0 4**

**AIM:**

To study the anthropological application in forensic science

**OBJECTIVE:**

To study the application of anthropology in forensic science in identification of living and dead human being and to identify the skeleton remains.

**OUTCOMES:**

- Will be able to apply the concept of Forensic Anthropology
- Will be able to apply the somatoscopy in identification
- Will be able to apply the somatometry in identification
- Will be able to prepare the portrait parle
- Will be able to apply the principle of facial reconstruction

**UNIT - I**

**Introduction to Forensic Anthropology**

**9**

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

**UNIT - II**

**Somatoscopy**

**9**

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

**UNIT - III** **Somatometry** **9**

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 - IV** **Portrait Parle** **9**

Portrait Parle/ Bertillon system. Photofit/identi kit. Facial superimposition techniques. Cranio facial super imposition techniques - photographic super imposition, video superimposition, Roentgenographic superimposition.

**UNIT - V Reconstruction** **9**

Use of somatometric and craniometric methods in reconstruction. Importance of tissue depth in facial reconstruction. Genetic and congenital anomalies - causes, types, identification and their forensic significance.

**L: 45 + T: 15 = TOTAL: 60 HOURS**

**TEXT BOOK:**

1. Steven, Byers, "Introduction to Forensic Anthropology", Prentice Hall, 4th Edition 2010.
2. Stuart M James, Jon J Nordby, Suzanne Bell, "Forensic Science" CRC Press, 2012.
3. Anil Agarwal, "Text Book of Forensic Medicine & Toxicology", Avinchal Publishing Company, 2nd Edition, 2010

**REFERENCES:**

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).
3. S.Rhine, Bone Voyage: A Journey in Forensic Anthropology, University of Mexico Press, Mexico (1998).

**5.3 FS2619** **CRIMINALISTICS** **3 0 0 3**

**AIM:**

To study about crime scene and collection and analyzes of evidence

**OBJECTIVE:**

To study about the different crime scene and evidences may be encountered in crime scene and its collection and analysis of such evidence.

**OUTCOMES:**

- Will be able to understand the different crime scene
- Will be able to document the crime scene
- Will be able to handle the Glass Evidence
- Will be able to handle the Fibre Evidence
- Will be able to handle the Toolmark Evidence

<b>UNIT - I</b>	<b>Introduction to Crime Scene</b>	<b>9</b>
Types of crime scenes - indoor and outdoor. Securing and isolating the crime scene. Crime scene search methods. Safety measures at crime scenes. Legal considerations at crime scenes.		
<b>UNIT - II</b>	<b>Documentation of Crime Scene</b>	<b>9</b>
Documentation of crime scenes - photography, videography, sketching and recording notes. Duties of first responders at crime scenes. Coordination between police personnel and forensic scientists at crime scenes.		
<b>UNIT - III</b>	<b>Glass Evidence</b>	<b>9</b>
Glass evidence - collection, packaging, analysis. Matching of glass samples by mechanical fit and refractive index measurements. Analysis by spectroscopic methods. Fracture analysis and direction of impact. Paint evidence - collection, packaging and preservation. Analysis by destructive and non - destructive methods. Importance of paint evidence in hit and run cases.		
<b>UNIT - IV</b>	<b>Fibre Evidence</b>	<b>9</b>
Fibre evidence - artificial and man - made fibres. Collection of fibre evidence. Identification and comparison of fibres. Cloth evidence - importance, collection, analysis of adhering material. Matching of pieces. Soil evidence - importance, location, collection and comparison of soil samples.		
<b>UNIT - V</b>	<b>Tool Mark Evidence</b>	<b>9</b>
Toolmark evidence. Classification of toolmarks. Forensic importance of toolmarks. Collection, preservation and matching of toolmarks. Restoration of erased serial numbers and engraved marks. Forensic gemmology.		

**TOTAL: 45 HOURS**

**TEXT BOOK:**

1. Marlyin T, Miller, "Crime Scene Investigation Laboratory Manual", Elsevier Science Publication, 2005.
2. Barry J Fisher, David R Fisher, "Techniques of Crime Scene Investigation", CRC Press, 2005.
3. Stuart M James, Jon J Nordby, Suzanne Bell, "Forensic Science" CRC Press, 2012.
4. Nabar B S, "Forensic Science in Crime Investigation", Asia Law House, 2nd Edition, 2010.
5. Saferestein Richard, "Criminalistics", Pearson Prentice Hall, 13th Edition 2015.

**REFERENCES:**

1. Guharaj, P. V., Chandran M. R. "Forensic Medicine", 2nd Ed., Universities Press (India) Pvt. Ltd, 2006.
2. Di Maio J. M. Vincent, Dana S. E. "Handbook of Forensic Pathology", VIVA Books Pvt.Ltd., 2006.

**5.4 FS2620**

**DNA FINGERPRINTING**

**3 0 0 3**

**AIM:**

To study the importance of DNA Application in Forensic Science

**OBJECTIVE:**

To study the DNA Application in identification of Individual and application of the technology in finding solution for parental disputes.

**OUTCOMES:**

- Will be able to define the basic concepts of DNA Fingerprinting
- Will be able to apply the PCR & STR Technique
- Will be able to apply the RFLP Technique
- Will be able to apply the technique in parental disputes
- Will be able to write a Expert Report

**UNIT - I Introduction to DNA Fingerprinting 9**

DNA Typing: DNA polymorphisms: the basis of DNA typing, Minisatellite analysis, Polymerase chain reaction based analysis, Mitochondrial DNA analysis, Y chromosome analysis, Randomly amplified polymorphic DNA (RAPD) analysis.

**UNIT - II PCR & STR Technique 9**

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.

**UNIT - III RFLP Technique 9**

Restriction fragment length polymorphism (RFLP) - genetic markers used in RFLP, typing procedure and interpretation of results. Touch DNA.

**UNIT - IV DNA in Paternal Disputes 9**

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 - V Report Writing 9**

Report Writing: Role of DNA typing in identifying unrecognizable bodies. Allele frequency determination. Hardy - Weinberg law. Probability determination in a population database.

**TOTAL: 45 HOURS**

**TEXT BOOK:**

1. Jai Prakash G Shewale, "Forensic DNA Analysis ", CRC Press, 5th edition, 2012.
2. John M Butler, "Advance Topics in Forensic DNA Typing - Methodology", Elsevier, 2005

**REFERENCES:**

1. K. Inman and N. Rudin, An Introduction to Forensic DNA Analysis, CRC Press, Boca Raton (1997).
2. H. Coleman and E. Swenson, DNA in the Courtroom: A Trial Watchers Guide, GeneLex Corporation, Washington (1994).
3. W.J. Tilstone, M.L. Hastrup and C. Hald, Fishers, Techniques of Crime Scene Investigation, CRC Press, Boca Raton (2013).

**AIM:**

To study the application of Toxicology in forensic science

**OBJECTIVE:**

To study the different types of toxic and identification of such toxics and toxins and analyzing.

**OUTCOMES:**

- Will be able to understand the significance of toxicology
- Will be able to distinguish the different toxic materials
- Will be able to handle and analyzing toxic materials
- Will be able to identify the narcotics and other drugs
- Will be able to apply the amazing techniques to identify the drugs and toxics

**UNIT - I** **Toxicology** **9**

Significance of toxicological findings. Techniques used in toxicology. Toxicological analysis and chemical intoxication tests. Postmortem Toxicology. Human performance toxicology. Dose - response relationship. Accidental, suicidal and homicidal poisonings.

**UNIT - II** **Toxic & Toxins** **9**

Signs and symptoms of common poisoning and their antidotes. Collection and preservation of viscera, blood and urine for various poison cases. Application of immunoassays in forensic work. Animal poisons. Snake venom. Mode of action. Carbon monoxide poisoning. Vegetable poisons. Poisonous seeds, fruits, roots and mushrooms.

**UNIT - III** **Identification of Alcohol** **9**

Beverages. Alcoholic and non - alcoholic illicit liquors. Analysis and identification of ethyl alcohol. Definition of narcotics, drugs and psychotropic substances. Broad classification - Narcotics, stimulants, depressants and hallucinogens. General characteristics and common example of each classification. Natural, synthetic and semi - synthetic narcotics, drugs and psychotropic substances.

**UNIT - IV** **Narcotics & Psychotropic Drugs** **9**

Crime scene search for narcotics, drugs and psychotropic substances - searching a suspect, searching a dwelling, searching a vehicle. Clandestine drug laboratories. Collection and preservation of drug evidence. Testing of narcotics, drugs and psychotropic substances.

**UNIT - V** **Analysis of Toxic Materials** **9**

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 ante - mortem blood.



**TOTAL: 45 HOURS**

**TEXT BOOK:**

1. Anil Agarwal, "Textbook of Forensic Medicine & Toxicology" Avinchal Publishing Company, 2nd Edition 2010.
2. V V Pilay, "Textbook of Forensic Medicine & Toxicology", Paras Publisher, 5th Edition, 2010.

**REFERENCES:**

1. Justice K Kannan, "Modi A Text book of Medical Jurisprudence & Toxicology" Lexisnexis, 26th Edition, 2010.



**OUTCOMES:**

- Will be able to apply the concept of Forensic Anthropology
- Will be able to apply the somatoscopy in identification
- Will be able to apply the somatometry in identification
- Will be able to prepare the portrait parle
- Will be able to apply the principle of facial reconstruction

**LIST OF EXPERIMENTS:**

1. To determine of age from skull and teeth.
2. To determine of sex from skull.
3. To determine sex from pelvis.
4. To study identification and description of bones and their measurements.
5. To investigate the differences between animal and human bones.
6. To estimate stature from long bone length.
7. To conduct portrait parle using photofit identification kit.

**TOTAL: 45 HOURS****5.3 FS2685****CRIMINALISTICS LABORATORY****0 1 2 2****AIM:**

To study about crime scene and collection and analyzes of evidence

**OBJECTIVE:**

To study about the different crime scene and evidences may be encountered in crime scene and its collection and analysis of such evidence.

**OUTCOMES:**

- Will be able to understand the different crime scene
- Will be able to document the crime scene
- Will be able to handle the Glass Evidence
- Will be able to handle the Fibre Evidence
- Will be able to handle the Toolmark Evidence

**LIST OF EXPERIMENTS:**

1. To prepare a report on evaluation of crime scene.
2. To reconstruct a crime scene (outdoor and indoor).
3. To compare soil samples by density gradient method.
4. To compare paint samples by physical matching method.
5. To compare glass samples by refractive index method.
6. To identify and compare tool marks.
7. To compare cloth samples by physical matching.

**TOTAL: 45 HOURS**

## SEMESTER VI

### THEORY

**6.1 FS2622**

**CRIME AND SOCIETY**

**3 1 0 4**

**AIM:**

To gain knowledge about crime in different parlance in society.

**OBJECTIVE:**

To gain knowledge about crime in different form and role of criminal justice system in investigation and controlling.

**OUTCOMES:**

- Will be able to define the key concepts
- Will be able to analyze the crime
- Will be able to define different types of crime
- Will be able to understand the role of Police in crime
- Will be able to apply the research methodology in research

**UNIT - I** **Introduction** **9**

Definition, aims and scope. Theories of criminal behavior - classical, positivist, sociological. Criminal anthropology.

**UNIT - II** **Criminal Profiling** **9**

Criminal profiling. Understanding modus operandi. Investigative strategy. Role of media. Elements, nature, causes and consequences of crime. Deviant behavior.

**UNIT - III** **Different Types of Crimes** **9**

Hate crimes, organized crimes and public disorder, domestic violence and workplace violence. White collar crimes Victimology. Juvenile delinquency. Social change and crime.

**UNIT - IV** **Policing** **9**

Broad components of criminal justice system. Policing styles and principles. Polices power of investigation. Filing of criminal charges. Community policing. Policing a heterogeneous society.

**UNIT - V** **Research Methodology** **9**

Research Methodology - Introduction, Methods, Sampling Techniques, Research Tool, Preparation of Synopsis, Report Writing.

**L: 45 + T: 15 = TOTAL: 60 HOURS**

**TEXT BOOK:**

1. Nabar B S, "Forensic Science in Crime Investigation", Asia Law House, 2nd Edition, 2010.
2. Saferestein Richard, "Criminalistics", Pearson Prentice Hall, 13th Edition 2015.

## REFERENCES:

1. File System Forensic Analysis by Brian Carrier, Publisher: Addison - Wesley Professional
2. Forensic Science in Crime Investigation Dr. Rukmani Krishnamurthy, Publisher: Selective & Scientific Books
3. Forensic Science - From the Crime Scene to the Crime Lab by Richard Saferstein

## 6.2 FS2623

## ACCIDENT INVESTIGATION

3 1 0 4

### AIM:

To analyze the accident scene and to writing report

### OBJECTIVE:

To gain knowledge of different types of accidents and its characteristics to understand the accident and to prepare the reports.

### OUTCOMES:

- Will be able to define the concepts
- Will be able to analyze the accident scenes
- Will be able to define the accident and its mode
- Will be able to identify the mechanism of accident
- Will be able to prepare forensic report of Accident

### UNIT - I Introduction

9

Accident scene. Sources of forensic information. Eyewitness accounts. Extent of vehicle damage. Visibility conditions.

### UNIT - II Accident Scene

9

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 - III Mode of Accidents

9

Pre - crash movement. Post - crash movement. Collision model. Gauging drivers reaction. Occupantss kinematics. Types of injuries resulting from accident.

### UNIT - IV Investigation

9

Biomechanics of injuries. Hit and run investigations. Trace evidence at accident sites. Route tracing.

### UNIT - V Forensic Report

9

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

**TEXT BOOK:**

1. T.S. Ferry, Modern Accident Investigation and Analysis, Wiley, New York (1988).
2. Nabar B S, "Forensic Science in Crime Investigation", Asia Law House, 2nd Edition, 2010.
3. Saferestein Richard, "Criminalistics", Pearson Prentice Hall, 13th Edition 2015.

**REFERENCES:**

1. D. Lowe, The Tachograph, 2nd Edition, Kogan Page, London (1989).
2. T.L. Bohan and A.C. Damask, Forensic Accident Investigation: Motor Vehicles, Michie Butterworth, Charlottesville (1995).
3. S.C. Batterman and S.D. Batterman in Encyclopedia of Forensic Sciences, Volume
4. J.A.Siegel, P.J. Saukko and G.C. Knupfer (Eds.), Academic Press, London (2000).

**6.3 FS2624**

**POLICE SCIENCE**

**3 0 0 3**

**AIM:**

To study the Police Organization and its responsibility

**OBJECTIVE:**

TO study the organizational setup of police in State & Central Level and to gain knowledge of responsibility of police and police station

**OUTCOMES:**

- Will be able to gain knowledge on evolution of police system
- Will be able to gain knowledge on State Police Organization
- Will be able to gain knowledge on Central Police Organization
- Will be able define the role of police station
- Will be able to gain knowledge of police prevention activities

**UNIT - I**

**Evolution of Police System**

**9**

Historical development of police - Ancient, Medieval and Modern Indian Police. General organization of the State Police - Administrative hierarchy and the Ranges.

**UNIT - II**

**State Police System**

**9**

C I D - Organization and functions of various branches, Economic Crime Wing - Cyber division, Intelligence Wing, Training wing, Technical Services - SCRB, FSL, FPB.

**UNIT - III**

**Organization of CPO**

**9**

Organizational set up and functions of

- (a) Line Units: - Assam Rifles; CRPF; RPF; ITBP; CISF; BSF; NSG&SPG.
- (b) Staff Units: - BPR&D - NCRB, SVNPA, LNjNICFS, CDTS.
- (c) Directorate of Forensic Sciences - CFSL, CFPB, GEQD, DNA fingerprint unit.
- (d) Mixed Units: - CBI, IB& R and A Wing.

**UNIT - IV****Police Station****9**

- (a) Meaning & establishment of a Police Station - Rural; Urban and Metropolitan (As per Police Manual).
- (b) Types & functions of different kinds of police stations.
- i. Civil Police Station.
  - ii. Traffic Police Station.
  - iii. Women Police Station.
- (c) Crime control records maintained in the Police Stations.
- (d) Police Help Line

**UNIT - V****Police Preventive Activities****9**

- (a) Police methods: E - Beat, Patrolling, Surveillance and Criminal Intelligence.
- (b) Voluntary agencies in crime prevention.
- (c) Police Relationship with Media & other related departments.

**TOTAL: 45 HOURS****TEXT BOOK:**

1. William G Bailey, "The Encyclopedia of Police in India", Routledge, 1st Edition 2008.
2. Arvind Verma & K S Subramanian, "Understanding The Police in India", Lexisnexis, 2008.

**REFERENCES:**

1. Shankar Sen, "Indian Police Today", Asia Law House, 1997.
2. John Sullivan, "Introduction to Police Science", CRC Press, 1995.

**6.4 FS2625****FORENSIC SCIENCE AND SOCIETY****3 0 0 3****AIM:**

To study the role of forensic and its allied science for society well being

**OBJECTIVE:**

To study the role of forensic and its allied sciences in defining the activities and its prevention and investigation and analysis of evidence

**OUTCOMES:**

- Will be able to identify the different crimes
- Will be able to identify the artifacts and archeological importance materials
- Will be able to utilize the artificial intelligence in crime analysis
- Will be able to gain knowledge of biometric system
- Will be able to handle the key biometric process





**OBJECTIVE:**

To gain the knowledge of different accelerants and its reaction in arson scenes and chemical examination of such accelerants and studying different types of explosives and examination of explosive remains.

**OUTCOMES:**

- Will be able to define the fire and its investigation
- Will be able to investigate the fire or arson scene
- Will be able to define explosives
- Will be able to define explosive agents
- Will be able to investigate the explosive scene

**UNIT - I Introduction to Fire 9**

Chemistry of fire, conditions of fire, fire scene Patterns, Location of point of ignition. Recognition of type of fire. Searching of the fire scene, Collection and preservation of arson evidence.

**UNIT - II Analysis of Fire Debris & Arson Scene 9**

Analysis of Fire Debris, Analysis of Ignitable Liquid residue, Post - flashover burning. Scientific investigation and Evaluation of the clue materials. Information from smoke staining,

**UNIT - III Explosives 9**

Explosives, types of explosives - Low explosives, High Explosives, Homemade Explosives, Military Explosives, Booby Traps.

**UNIT - IV Explosive Agents 9**

Blasting Agents - TNT, PETN, RDX, Explosion process, blast waves, shattering power of explosive, Industrial Explosives.

**UNIT - V Investigation of Explosion Scene 9**

Searching the scene of explosion, Mechanism of explosion, Post blast residue collection & analysis, Blast Injuries. Detection of hidden explosives.

**TOTAL: 45 HOURS**

**TEXT BOOK:**

1. Nabar B S, "Forensic Science in Crime Investigation", Asia Law House, 2nd Edition, 2010.
2. Saferstein Richard, "Criminalistics", Pearson Prentice Hall, 13th Edition 2015.

**REFERENCES:**

1. J.D. Deham, Kirks Fire Investigation, 3rd Ed. Printice Hall, New Jersey, 1991.
2. A.A.Moenssens, J. Starrs C.E. Henderson & F E Inabu, Scientific Evidence in Civil & Criminal Cases, 4thEd. The Foundation Press, Inc, NewYork, 1995.

## **PRACTICAL**

**6.1 FS2686                      ACCIDENT INVESTIGATION LABORATORY                      0 1 2 2**

**AIM:**

To analyze the accident scene and to writing report

**OBJECTIVE:**

To gain knowledge of different types of accidents and its characteristics to understand the accident and to prepare the reports.

**OUTCOMES:**

- Will be able to define the concepts
- Will be able to analyze the accident scenes
- Will be able to define the accident and its mode
- Will be able to identify the mechanism of accident
- Will be able to prepare forensic report of Accident

**LIST OF EXPERIMENTS:**

1. To lift tire marks.
2. To study the pattern of skid marks.
3. To study the pattern of scuff marks.
4. To estimate the speed of the vehicle from skid marks.
5. To prepare a report on a major road accident.
6. To prepare a report on a major train accident.

**TOTAL: 45 HOURS**