

**No.: PMEB/AC10/759(3)/2019-20**

**Date: 10-01-2022**

**NOTIFICATION**

Sub.: Introduction of **B.Sc. (Forensic Science)** course under Specialized Programmes from the academic year 2020-21-reg.

- Ref.: 1. Decision of the BOS Meeting held on 04-10-2021.  
2. Decision of the Faculty of Science & Technology meeting held on 20-12-2021.  
3. Decision of the Academic Council meeting held on 23-12-2021.

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The Board of Studies in **B.Sc. (Forensic Science) (UG)** at its meeting held on 04-10-2021 has recommended to approve the 2<sup>nd</sup> and 3<sup>rd</sup> year Syllabus of **B.Sc. (Forensic Science)** course in University of Mysore under specialized/specified programs.

The Faculty of Science & Technology and the Academic Council at their meetings held on 20-12-2021 and 23-12-2021 respectively, are also approved the above said proposal and the same is hereby notified.

The Syllabus of **B.Sc. (Forensic Science)** course is uploaded in University website. The contents may be downloaded from the University website <https://uni-mysore.ac.in/PMEB/>.

**To;**

1. The Registrar (Evaluation), University of Mysore, Mysuru.
2. The Dean, Faculty of Science & Technology, DOS in Earth Science, Manasagangothri, Mysuru.
3. Dr. Nagaraju K.S., Govt. First Grade College, K.R. Nagar.
4. The Principal Co-ordinator, MES, PBMM Education Centre, KRS Road, Metagalli, Mysuru.
5. The Deputy Registrar/ Asst. Registrar/ Superintendent, Examination Branch, UOM, Mysuru.
6. The Special Officer to Hon'ble Vice-Chancellor, University of Mysore, Mysuru.
7. The PA to Vice-Chancellor/Registrar/Registrar (Evaluation), University of Mysore, Mysuru.
8. Office Copy.

  
**REGISTRAR**  
**REGISTRAR**  
University of Mysore  
MYSURU - 570 005

**Specialized Program**  
**Bachelor of Science (Forensic Science)**  
**COURSE CREDIT STRUCTURE & SYLLABUS**

S.No	Course	Title	Credits	Total Credits	Maximum Marks		Total	
					IA			Exam
			L + T + P		C1	C2	C3	Marks
<b>I SEMESTER</b>								
1	<b>DSC1 A</b>	Criminology	3+ 0 + 0	<b>4</b>	10	10	80	100
	<b>DSC1 B</b>	Practical	0 + 0 + 1		5	5	40	50
2	<b>DSC2A</b>	Forensic Chemistry	3 + 0 + 0	<b>4</b>	10	10	80	100
	<b>DSC2B</b>	Practical	0 + 0 + 1		5	5	40	50
3	<b>DSC3A</b>	Forensic Science – I	4 + 0 + 0	<b>6</b>	10	10	80	100
	<b>DSC3B</b>	Practical	0 + 0 + 2		5	5	40	50
4	<b>AECC1</b>	MIL – I ( Sanskrit , Hindi or any other as approved by UGC)	3 + 0 + 0	<b>3</b>	10	10	80	100
5	<b>AECC2</b>	English – I	3 + 0 + 0	<b>3</b>	10	10	80	100
6	<b>AECC3</b>	Environmental Studies	3 + 0 + 0	<b>3</b>	10	10	80	100
<b>Total Credits / Marks</b>				<b>23</b>				<b>750</b>
<b>II SEMESTER</b>								
1	<b>DSC4A</b>	Biochemistry	3+ 0 + 0	<b>4</b>	10	10	80	100
	<b>DSC4B</b>	Practical	0 + 0 + 1		5	5	40	50
2	<b>DSC5A</b>	Forensic Science –II	4 + 0 + 0	<b>6</b>	10	10	80	100
	<b>DSC5B</b>	Practical	0 + 0 + 2		5	5	40	50
3	<b>DSC6A</b>	Criminalistics	3 + 0 + 0	<b>4</b>	10	10	80	100
	<b>DSC6B</b>	Practical	0 + 0 + 1		5	5	40	50
4	<b>AECC4</b>	MIL - II (Sanskrit , Hindi or any other as approved by UGC)	3 + 0 + 0	<b>3</b>	10	10	80	100
5	<b>AECC5</b>	English – II	3 + 0 + 0	<b>3</b>	10	10	80	100
6	<b>AECC6</b>	Constitution of India	3 + 0 + 0	<b>3</b>	10	10	80	100
<b>Total Credits / Marks</b>				<b>23</b>				<b>750</b>

S.No	Course	Title	Credits	Total Credits	Maximum Marks		Total Marks	
			L + T + P		IA			Exam
					C1	C2		C3
<b>III SEMESTER</b>								
1	<b>DSC7</b>	Instrumentation Technology in Forensic Science	4 + 0 + 0	<b>4</b>	10	10	80	100
2	<b>DSC8A</b>	Forensic Microbiology	4 + 0 + 0	<b>5</b>	10	10	80	100
	<b>DSC8B</b>	Practical	0 + 0 + 1		5	5	40	50
3	<b>DSC9A</b>	Forensic Dermatoglyphics	3 + 0 + 0	<b>5</b>	10	10	80	100
	<b>DSC9B</b>	Practical	0 + 0 + 2		5	5	40	50
4	<b>AECC7</b>	Forensic Psychology	3 + 0 + 0	<b>3</b>	10	10	80	100
5	<b>AECC8</b>	Communicative Skills – I	3 + 0 + 0	<b>3</b>	10	10	80	100
6	<b>AECC9</b>	Disaster Management	2 + 0 + 0	<b>2</b>	05	05	40	50
<b>Total Credits / Marks</b>				<b>22</b>				<b>650</b>
<b>IV SEMESTER</b>								
1	<b>DSC10A</b>	Forensic Examination of Documents (FED)	3 + 0 + 0	<b>5</b>	10	10	80	100
	<b>DSC10B</b>	Practical	0 + 0 + 2		5	5	40	50
2	<b>DSC11A</b>	Forensic Physics	3 + 0 + 0	<b>5</b>	10	10	80	100
	<b>DSC11B</b>	Practical	0 + 0 + 2		5	5	40	50
3	<b>DSC12</b>	Criminal Laws	4 + 0 + 0	<b>4</b>	10	10	80	100
4	<b>DSC13</b>	Cyber Crimes	4 + 0 + 0	<b>4</b>	10	10	80	100
5	<b>AECC10</b>	Accident Investigation	3 + 0 + 0	<b>3</b>	10	10	80	100
6	<b>AECC11</b>	Communicative Skills - II	3 + 0 + 0	<b>3</b>	10	10	80	100
<b>Total Credits / Marks</b>				<b>24</b>				<b>700</b>

S.No	Course	Title	Credits	Total Credits	Maximum Marks		Total	
			L + T + P		IA	Exam		
					C1	C2		C3
<b>V SEMESTER</b>								
1	DSC14A	Information Technology in Forensic Science	3 + 0 + 0	<b>5</b>	10	10	80	100
	DSC14B	Practical	0 + 0 + 2		5	5	40	50
2	DSC15A	Forensic Medicine	3 + 0 + 0	<b>5</b>	10	10	80	100
	DSC15B	Practical	0 + 0 + 2		5	5	40	50
3	DSC16A	Forensic Biology and Serology	3 + 0 + 0	<b>4</b>	10	10	80	100
	DSC16B	Practical	0 + 0 + 1		5	5	40	50
4 & 5	DSE1 & DSE2	<u>Choose any two</u> A. Forensic Examination of Explosives (FEE)	5 + 0 + 0	<b>5</b>	10	10	80	100
		B. Forensic Examination of Narcotics and Drugs (FEND)	5 + 0 + 0	<b>5</b>	10	10	80	100
		C. Cyber Crime Laws	5 + 0 + 0	<b>5</b>	10	10	80	100
		D. Forensic Ballistics	5 + 0 + 0	<b>5</b>	10	10	80	100
6	SEC1	Skill Development – I	4 + 0 + 0	<b>4</b>	10	10	80	100
<b>Total Credits / Marks</b>				<b>28</b>				<b>750</b>
<b>VI SEMESTER</b>								
1	DSC17	<b>Training components</b> A. Internship in Forensic related Institutions (4 Weeks)	0 + 0 + 5	<b>5</b>	--	--	100	100
2	DSC18	B. Training report (50 Marks) + Presentation & Viva Voce (50 Marks)	0 + 0 + 5	<b>5</b>	--	--	100	100
3	DSC19	Digital Forensics	4 + 0 + 0	<b>4</b>	10	10	80	100
4 & 5	DSE3 & DSE4	<u>Choose any two</u> A. Project Report	0 + 0 + 5	<b>5</b>	10	10	80	100
		B. Forensic Anthropology and Entomology (FAE)	5 + 0 + 0	<b>5</b>	10	10	80	100
		C. DNA Forensics	5 + 0 + 0	<b>5</b>	10	10	80	100
		D. Forensic Toxicology	5 + 0 + 0	<b>5</b>	10	10	80	100
6	SEC2	Skill Development – II	4 + 0 + 0	<b>4</b>	10	10	80	100
<b>Total Credits / Marks</b>				<b>28</b>				<b>600</b>

**DSC** - Discipline Specific Course  
**DSE** - Discipline Specific Elective  
**SEC** - Skill Enhancement Courses  
**AECC** - Ability Enhancement Compulsory Courses

## SEMESTER - III

### DSC7 - INSTRUMENTATION TECHNOLOGY IN FORENSIC SCIENCE

**Total Credits (L + T + P): 4 + 0 + 0**

**Total Hours: 50hrs**

**Objectives:**

- a. The importance of chromatographic and spectroscopic techniques in processing crime scene evidence.
- b. The utility of Solvent Extraction Technique

**Learning Outcomes:**

- a. The visualize trace evidence and comparing it with control samples.
- b. The use instrumentation and Forensic Application of Atomic Absorption/Emission and X- Ray Spectrometry.

**Module-I**

**08hrs**

**Simple Separation Techniques:** General Idea and Basic Principle of Distillation and Various Types of Distillation Techniques. Centrifugation: Centrifuge and its Types. Filtration, Evaporation and Crystallization. Distribution Law. Solvent Extraction Technique - LLE, SPE, Micro SPE.

**Module -II**

**10hrs**

**Basic Concept of Atomic and Molecular Spectra:** Basic Principle, Instrumentation and Forensic Application of Ultraviolet- Visible, Infrared Spectroscopy and NMR. Principle of Instrumentation and Forensic Application of Atomic Absorption/Emission and X-Ray Spectrometry.

**Module – III**

**12hrs**

**Chromatography:** Basic concepts of Chromatography; Theory and Classification of Chromatography (Planar and Column Chromatography, Adsorption and Partition Chromatography, Ion Exchange Chromatography, Gel Exclusion Chromatography, Affinity Chromatography), Principles, Working and Forensic Application of Planer Chromatography; TLC, PC, HPTLC. Principles of Working and Forensic Application of Column Chromatography. Working Principles of HPLC and GC.

**Module -IV**

**10hrs**

**Electrophoresis:** Electrophoretic Techniques, General Principles and Classification of Electrophoresis Factors Affecting Electrophoresis, Preparative, Horizontal, Vertical, Two Dimensional Electrophoresis,

**Module -V**

**10hrs**

Basic concepts of Low Voltage Electrophoresis, High Voltage Electrophoresis, Gel Electrophoresis, Isoelectric Focusing and Capillary Electrophoresis, SDS-PAGE, Agarose Electrophoresis, Forensic Application of Electrophoresis.

**References:**

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).
3. J.W. Robinson, Undergraduate Instrumental Analysis, 5th Edition, Marcel Dekker, Inc., New York (1995).
4. D.R. Redsicker, The Practical Methodology of Forensic Photography, 2nd Edition, CRC Press, Boca Raton (2000).

## DSC8A - FORENSIC MICROBIOLOGY (THEORY)

**Total Credits (L + T + P): 4 + 0 +1**

**Total Hours: 50**

### **Objectives:**

- a. The applications of microbiology to forensic science.
- b. Fundamental principles and functions of microbiology.
- c. The divisions in a microbiology laboratory.

### **Learning Outcomes:**

- a. The significance of microbiology to forensic science.
- b. The fundamental principles and functions of microbiology.
- c. The divisions in a microbiology laboratory.

### **Module I:**

**10hrs**

**Fundamentals of Microbiology:** Morphology and classification of microorganisms. Growth, nutrition and multiplication of bacteria. Fundamental principles. Different types of microscopes. Electron microscope. Comparison Microscope. Forensic applications of microscopy. Sterilization and Disinfection - Principles and use of equipments of sterilization namely hot air oven, autoclave and serum inspissator, pasteurization, antiseptics and disinfectants.

### **Module II:**

**10hrs**

**Bacteriology:** Classification of bacteria, morphology, infections, lab diagnosis, treatment and prevention of common bacterial infections. *Staphylococcus*, *Streptococcus*, *Pneumococcus*, *Neisseria*, *Corynebacterium diphtheriae*, *Clostridia*, *Enterobacteriaceae* - *Shigella*, *Salmonella*, *Klebsiella*, *E.coli*, *Proteus*, *Vibrio cholerae*, *Pseudomonas* and *Spirochetes*.

### **Module III:**

**12hrs**

**Mycobacteriology, Parasitology and Mycology:** Mycobacteria- classification, pathogenesis, lab diagnosis and prevention Classification, infections and lab diagnosis of following parasites. Entamoeba, Giardia, Malaria, Hookworm, Roundworm and Filarial worms.

Mycology- Morphology, disease caused and lab diagnosis of following fungi. Candida, Cryptococcus, Dermatophytes, opportunistic fungi (*Aspergillus*, *Zygomycetes* and *Penicillium*).

### **Module IV:**

**08hrs**

**Virology:** General features of viruses, diseases caused lab diagnosis and prevention of following viruses, Herpes, Hepatitis, HIV, Dengue, Influenza, Chikungunya, Rabies, Poliomyelitis and SARS-COV.

### **Module V:**

**10 hrs**

**Hospital acquired infection:** Causative agents, transmission methods, investigation, prevention and control of hospital acquired infections.

**Application of Forensic Microbiology:** Microbial poisoning-Quality of various food products & examination procedure- growth of microorganisms- Bioterrorism.

## **DSC8B - FORENSIC MICROBIOLOGY (PRACTICAL)**

**Total Credit: 01**

**Total Hours: 10hrs**

1. Compound microscope and its application in microbiology
2. Demonstration of sterilization equipments: hot air oven, autoclave, bacterial filters. Demonstration of commonly used culture media, nutrient broth, nutrient agar, blood agar, chocolate agar, Mac conkey medium, L J media, Robertson cooked meat media, Mac Conkey agar with LF & NLF, and Nutrient agar with staph colonies. Anaerobic culture, Methods and Antibiotic susceptibility test.
3. Demonstration of common serological tests: Widal, VDRL, ASLO, CRP, RF, Rapid tests for HIV and HCV.
4. Grams staining.
5. Acid fast staining.
6. Principles and practice of Biomedical waste management

### **References:**

1. Text Book of Microbiology- Ananthanaryan & Paniker, 7th Edition 2006 Orient Longman Pvt, Ltd
2. Experiments in Microbiology- K.R. Anoja 5th Edition 2018, New Age International Publications
3. Microbiology Prescott, 11 Edition 2020, McGraw Hill Publications
4. A Textbook of Microbiology- R.C. Dubey & D.K. Maheshwari, 4th Edition 2015, S Chand & Co Ltd.



## **DSC9A - FORENSIC DERMATOGLYPHICS (THEORY)**

**Total Credits (L + T +P): 3 + 0 + 2**

**Total Hours: 40**

### **Objectives:**

- a. The fundamental principles on which the science of fingerprinting is based.
- b. Fingerprints are the most infallible means of identification.
- c. The world's first fingerprint bureau was established in India.

### **Learning Outcomes:**

- a. The method of classifying criminal record by fingerprints was worked out in India, and by Indians.
- b. The physical and chemical techniques of developing fingerprints on crime scene evidence.
- c. The significance of foot, palm, ear and lip prints

### **Module I:**

**08hrs**

**Fundamentals of Fingerprinting:** Introduction and history with special reference to India. Biological basis of fingerprints. Formation of ridges. Principles of fingerprinting. Types of fingerprints. Fingerprint patterns. Fingerprint characters / minutiae. Plain and rolled fingerprints. Classification and cataloguing of fingerprint record.

### **Module II:**

**06hrs**

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

### **Module III:**

**10hrs**

**Advanced Fingerprinting Techniques:** Automated Fingerprint Identification System. Significance of poroscopy and edgeoscopy. Application of light sources in fingerprint detection.

Preservation of developed fingerprints. Digital imaging for fingerprint enhancement. Fingerprinting the deceased. Developing fingerprints on gloves.

### **Module IV:**

**08hrs**

**Footprints Impressions:** Importance of footprints. Casting of foot prints, Electrostatic lifting of latent foot prints.

### **Module V:**

**08hrs**

**Other Types of Impressions:** Palm prints. Significance Palm prints and their historical importance. Lip prints - Nature, location, collection and examination of lip prints. Ear prints and their applications.

## **DSC9B - FORENSIC DERMATOGLYPHICS (PRACTICAL)**

**Total Credits: 2**

**Total Hours: 20**

### **Practical**

1. To enumerate with the aid of diagrams, different types of fingerprint patterns and fingerprint characters.
2. To record plain and rolled Fingerprints.
3. To identify core and delta in sample fingerprints.
4. To examine the patterns of all your ten fingers and carry out the primary classification of your index card.
5. To detect of fingerprints by powder method.
6. To detect fingerprints by ninhydrin method
7. To detect fingerprints by iodine method.
8. To detect fingerprints by silver nitrate method
9. To lift the developed fingerprints from different surfaces using tape.
10. To cast footprints using plaster of Paris.

### **References:**

1. J.E. Cowger, Friction Ridge Skin, CRC Press, Boca Raton (1983).
2. D.A. Ashbaugh, Quantitative-Qualitative Friction Ridge Analysis, CRC Press, Boca Raton (2000).
3. C. Champod, C. Lennard, P. Margot an M. Stoilovic, Fingerprints and other Ridge Skin Impressions, CRC Press, Boca Raton (2004).
4. Lee and Gaensleen's, Advances in Fingerprint Technology, 3rd Edition, R.S. Ramotowski (Ed.), CRC Press, Boca Raton (2013)

## AECC7 - FORENSIC PSYCHOLOGY

**Total Credits (L + T +P): 3 + 0 + 0**

**Total Hours: 40**

### **Objectives:**

- a. The overview of forensic psychology and its applications.
- b. The legal aspects of forensic psychology.
- c. The significance of criminal profiling.

### **Learning Outcomes:**

- a. The importance of psychological assessment in gauging criminal behavior.
- b. The tools and techniques required for detection of deception.
- c. The critical assessment of advanced forensic techniques like polygraphy, narco analysis and brain electrical oscillation signatures.

### **Module I:**

**06hrs**

**Fundamentals of Forensic Psychology:** Definition and concepts of forensic psychology and forensic psychiatry. Psychology and law. Ethical issues in forensic psychology.

### **Module II**

**08hrs**

**Psychological theories of crime:** Biological factors and crime – social learning theories, psycho-social factors, abuse. Juvenile delinquency – theories of offending (social cognition, moral reasoning), Child abuse (physical, sexual, emotional), juvenile sex offenders, legal controversies.

### **Module III**

**08hrs**

**Psychology and Criminal Behavior:** Psychopathology and personality disorder. Psychological assessment and its importance. Drug Addiction and Crime. Serial murderers. Psychology of terrorism.

### **Module IV**

**08hrs**

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

### **Module V**

**10hrs**

**Forensic Psychology and Law:** Assessment of psychological status. Psychopathology and Forensic psychology. Psychology of evidence: eye-witness testimony, confession evidence. Criminal profiling system. Psychology in the legal setting with special reference to Section 84 IPC.

### **Case Studies / Activities:**

1. To cite a crime case where legal procedures pertaining to behavior had to be invoked.
2. To prepare a report on relationship between psychological 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 drug addiction was involved.

**References:**

- 1.A.A. Moenssens, J. Starrs, C.E. Henderson and F.E. Inbau, *Scientific Evidence in Civil and Criminal Cases*, 4th Edition, The Foundation Press, Inc., New York (1995).
- 2.R. Saferstein, *Criminalistics*, 8th Edition, Prentice Hall, New Jersey (2004).
- 3.J.C. DeLadurantey and D.R. Sullivan, *Criminal Investigation Standards*, Harper & Row, New York (1980).
- 4.J. Niehaus, *Investigative Forensic Hypnosis*, CRC Press, Boca Raton (1999).
- 5.E. Elaad in *Encyclopedia of Forensic Science*, Volume 2, J.A. Siegel, P.J. Saukko and G.C. Knupfer (Eds.), Academic Press, London (2000).

## AECC8 - COMMUNICATIVE SKILLS- I

**Total Credits (L+ T + P): 3 + 0 + 0**

**Total Hours: 40**

### **Objectives:**

- a. To learn about English communication skills.
- b. To improve the vocabulary, learning and listening skills.

### **Learning Outcomes:**

- a. To be able to speak effectively in presentations.
- b. Able to develop presentation skills along with interview skills.

### **Module-I**

**08 hrs**

**The Sentence-** Basics, Kinds of Sentence - Transformation of Sentence- The Noun- Kinds – Noun- Noun Forms. The pronoun – Kinds – Personal, Reflexive, Lymphatic and Possessive. The Verb- Tense Forms and its Usage.

### **Module-II**

**08 hrs**

**Spoken English Skills** -Vocabulary-Word Power; Grammar-Common Errors and Sentence Building, Phonetics; Reading Comprehension and Vocabulary Building Psychometrics; Aptitude and Personality Assessment and Testing.

### **Module-III**

**08 hrs**

**Oral Communication Skills-** Public Speaking - Group Presentations and Discussions - Participation in Meetings and Interviews – Brainstorming - Designing and Delivering Presentations, Team Presentations-Non-Verbal Communication: Forms of Non-Verbal Communication, Interpreting Non-Verbal Messages, Tips for Effective use of Non-Verbal Communication.

### **Module-IV**

**08 hrs**

**Skills Development Through Practice** - Listening Skills and Barriers; Role Plays, Debates, Elocution, Mock Interviews, Persuasive Communication, Convincing Skills, Conversations.

### **Module-V**

**08 hrs**

**Presentation Skills and Techniques** -Personal Grooming and Business Etiquettes- Corporate Etiquette, Social Etiquette and Telephone Etiquette, Impression Management- Image Building and Self Awareness- Developing Self Awareness - Projecting a Successful Personality-Attending Interviews.

### **References:**

1. Kaul, Asha (2005), Effective Business Communication, PHI, New Delhi.
2. Urmila Roy (2016), Guide to Managerial Communication: Effective Writing & Speaking, PHI, New Delhi.
3. Mandal S.K. (2015), Effective Communication and Public Speaking, Jaico, Mumbai.
4. Meenakshi Raman & Prakash Singh (2012), Business Communication, Oxford University Press.
5. Bovee, Thill & Schatzman (2003), Business Communication Today, Pearson, New Delhi.

## **AECC9 - DISASTER MANAGEMENT**

**Total Credits (L + T + P): 2 + 0 + 0**

**Total Hours: 25**

### **Objectives:**

To familiarize students with the Disaster Management skills to enable them deal with manmade and natural disasters striking mankind

### **Module-I**

**07hrs**

Introduction to Disasters: Concepts, and definitions (Disaster, Hazard, Vulnerability, Resilience, Risks). Disasters: Classification, Causes, Impacts (including social, economic, political, environmental, health, psychosocial, etc.) Differential impacts- in terms of caste, class, gender, age, location, disability Global trends in disasters, urban disasters, pandemics, complex emergencies, Climate change.

### **Module-II**

**07hrs**

Approaches to Disaster Risk reduction: Disaster cycle - its analysis, Phases, Culture of safety, prevention, mitigation and preparedness community based DRR, Structural-nonstructural measures, roles and responsibilities of- community, Panchayati Raj Institutions/Urban Local Bodies (PRIs/ULBs), states, Centre, and other stake-holders.

### **Module-III**

**06hrs**

Inter-relationship between Disasters and Development: Factors affecting Vulnerabilities, differential impacts, impact of Development projects such as dams, embankments, changes in Land-use etc. Climate Change Adaptation. Relevance of indigenous knowledge, appropriate technology and local resources

### **Module-IV**

**05hrs**

Disaster Risk Management in India Hazard and Vulnerability profile of India Components of Disaster Relief: Water, Food, Sanitation, Shelter, Health, Waste Management Institutional arrangements (Mitigation, Response and Preparedness, DM Act and Policy, Otherrelated policies, plans, programmes and legislation)

### **References:**

1. Gupta Anil K, Sreeja S. Nair.
2. 2011 Environmental Knowledge for Disaster Risk Management,
3. NIDM, New Delhi Indian Journal of Social Work 2002.
4. Special Issue on Psychosocial Aspects of Disasters, Volume 63, Issue 2, April.
5. Kapur, Anu & others, 2005: Disasters in India Studies of grim reality, RawatPublishers, Jaipur
6. Kapur Anu 2010: Vulnerable India: A Geographical Study of Disasters, IIAS and Sage Publishers, New Delhi.

## **SEMESTER - IV**

### **DSC10A FORENSIC EXAMINATION OF DOCUMENTS (FED) - THEORY**

**Total Credits (L + T +P): 3 + 0 + 2**

**Total Hours: 40hrs**

**Objectives:**

- a. The importance of examining questioned documents in crime cases.
- b. The tools required for examination of questioned documents.

**Learning Outcomes:**

- a. The significance of comparing hand writing samples.
- b. The importance of detecting frauds and forgeries by analyzing questioned documents.

**Module I:**

**10hrs**

**Introduction to Questioned Documents:** Definition of Documents, questioned documents and the type of cases encountered; Importance, nature and problems of questioned documents. Location, collection, handling and presentation of forensic documents. Advocacy of exemplars and standards. Identification and authenticity of currencies.

**Module II:**

**08hrs**

**Handwriting and Hand printing:** Identification – principle individual handwriting characteristics, external, internal and physical factors affecting handwriting or signature of a person.

**Module III:**

**06hrs**

**Signatures:** Authentic Signatures, forged signatures, disguised signatures, traced signatures, and their characteristics

**Module IV:**

**08hrs**

**Typewriting identification and comparison:** Comparison of typewritten documents, common types of styles, detection of altered typewritten documents

**Module V:**

**08hrs**

**Tools for Examination:** Hand lens, Camera, Compound Microscope, Stereo microscope, TLC, Transmitted light source, UV-IR radiation chamber and Oblique Light source.

### **DSC10B - FORENSIC EXAMINATION OF DOCUMENTS (FED) - PRACTICAL**

**Total Credits: 02**

**Total Hours: 20**

1. Handwriting analysis based on size, slant
2. Examination of documents under different light sources- transmitted, oblique, UV

3. Identification of genuine and fake currencies
4. Identification features of security documents

**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*, 4<sup>th</sup> 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*, 2<sup>nd</sup> Edition, Taylor & Francis, Hants (1997).



## DSC11A - FORENSIC PHYSICS (THEORY)

**Total Credits (L + T + P): 3 + 0 + 2**

**Total Hours: 40hrs**

### **Objectives:**

- a. The skills in scientific inquiry, problem solving and laboratory techniques
- b. The significance of glass and soil examination

### **Learning Outcomes:**

- a. The broad base of knowledge in physics.
- b. The understanding of laws of nature.
- c. To introduce the students to the characteristics and properties of different evidences like glass, soil, paint, hair and fibre, which are normally encountered at the scene of crime.

### **Module I:**

**08hrs**

**Fundamentals of Forensic Physics:** Introduction to the Forensic physics, Basics of prevalent physical evidences (soil, glass, fibre, hair and liquids)

### **Module II:**

**08hrs**

**Glass Examination:** Glass: Composition (organic and inorganic elements), Analysis using spectroscopic methods. Comparing glass fragments and glass fractures.

### **Module III:**

**08hrs**

**Forensic Paint Examination:** Introduction to paint chemistry, types of paints and their composition, forensic examination of paints (household and automobile)

### **Module IV:**

**08hrs**

**Soil examination:** Composition of soil (organic and inorganic), Properties (Colour, density, size distribution of soil particles), Collection and preservations of soil, Mineral and chemical analysis of soil, Density gradient techniques and its importance in criminal investigation

### **Module V:**

**08hrs**

**Introduction to various marks:** Definition, nature, types of marks, skid marks, tread marks, significance and examination, Definition, nature, types, significance and examination of foot and shoeprints, gait pattern and footprint casting.

## DSC11B - FORENSIC PHYSICS (PRACTICAL)

**Total Credits: 2**

**Total Hours: 20**

1. Analysis of fractured glass
2. Analysis of Paint chips
3. Comparative analysis of Glass fragments.
4. Analysis of soil (Density gradient)

5. Differentiation of soil on the basis of pH.
6. Size distribution analysis of soil particles.
7. Analysis of different tyre marks.

**References:**

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. M.K. Bhasin and S. Nath, Role of Forensic Science in the New Millennium, University of Delhi, Delhi (2002).
3. S.H. James and J.J. Nordby, Forensic Science: An Introduction to Scientific and Investigative Techniques, 2<sup>nd</sup> Edition, CRC Press, Boca Raton (2005).
4. W.G. Eckert and R.K. Wright in Introduction to Forensic Sciences, 2<sup>nd</sup> Edition, W.G. Eckert (ED.), CRC Press, Boca Raton (1997).
5. R. Saferstein, Criminalistics, 8<sup>th</sup> Edition, Prentice Hall, New Jersey (2004).
6. W.J. Tilstone, M.L. Hastrup and C. Hald, Fisher's Techniques of Crime Scene Investigation, CRC Press, Boca Raton (2013).

## DSC12 - CRIMINAL LAW

**Total Credits (L + T + P): 4 + 0 + 0**

**Total Hours: 48hrs**

### **Objectives:**

- a. Elements of Criminal Procedure Code related to forensic science.
- b. Acts and provisions of the Constitution of India related to forensic science.

### **Learning Outcomes:**

- a. The laws and Acts governing/prevention of socio-economic crimes.
- b. The base for all the laws in India, the Constitution of India.

### **Module I:**

**10hrs**

**Laws related to Crime:** Classification – civil and 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). Judgements in abridged forms – Section 355.

### **Module II:**

**06hrs**

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

### **Module III:**

**12hrs**

**Indian Penal Code** – Sections 121A, 299, 300, 302, 304A, 304B, 307, 309, 319, 320, 324, 326, 351, 354, 359, 362. Sections 375 and 377 and their amendments. Indian Penal Code pertaining to offences against property – 378, 383, 390, 391, 405, 415, 420, 441, 463, 489A, 497, 499, 503.

### **Module IV:**

**08hrs**

**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.

### **Module V:**

**12hrs**

**Acts Pertaining to Socio-economic and Environmental Crimes:** 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. Environment Protection Act. Civil Rights Act. I.T. Acts.

### **References:**

1. D.A. Bronstein, Law for the Expert Witness, CRC Press, Boca Raton (1999).
2. Vipa P. Sarthi, Law of Evidence, 6th Edition, Eastern Book Co., Lucknow (2006).
3. A.S. Pillia, Criminal Law, 6th Edition, N.M. Tripathi Pvt Ltd., Mumbai (1983).

4. R.C. Nigam, Law of Crimes in India, Volume I, Asia Publishing House, New Delhi (1965).
5. (Chief Justice) M. Monir, Law of Evidence, 6th Edition, Universal Law Publishing Co. Pvt. Ltd., New Delhi (2002).

## **DSC13 - CYBER CRIMES**

**Total Credits (L + T + P): 4 + 0 + 0**

**Total Hours: 50hrs**

### **Objectives:**

- a. About the different computer hardware and software.
- b. The cyber crimes its different type and laws related to information technology.

### **Learning Outcomes:**

- a. The operating system its type, features and common components.
- b. Have knowledge about different computer network, protocols and network devices.

### **Module I**

**08hrs**

**Fundamentals of Cyber Crimes:** Meaning and definition, Information Security and Devices

### **Module II**

**12hrs**

**Networking and Threats:** Fundamentals of networking, components, architecture, networking protocols, types of computer network, network topologies, network security-threats (hacking, cyber bullying, morphing, virus attacks etc.), vulnerabilities, access control.

### **Module III**

**10hrs**

**Classification of Cyber Crimes:** Cyber Crimes against individual, institution, state and society. Cyber crimes and financial frauds.

### **Module IV**

**10hrs**

**Challenges of Cyber Technology:** Importance and scope of studying cyber crimes in the contemporary world.

### **Module V**

**10hrs**

**Legal issues related to Cyber Crime:**

- (a) Information Technology Act, 2000;
- (b) Aadhar card linking with Bank Account, Passport, Mobile Sim
- (c) Cyber Police Station
- (d) Cyber security plans and policies

### **References**

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
3. Forensic Computing: A Practitioner's Guide by A J Sammes & Brian Jenkinson.

Springer-Verlag London, 2nd edition 2007

4. Scene of the Cybercrime: Computer Forensics Handbook by Syngress, Elsvire, 2nd edition 2008

## AECC10 - ACCIDENT INVESTIGATION

**Total Credits (L + T + P): 3 + 0 + 0**

**Total Hours: 45hrs**

### **Objectives:**

- a. The difference type of accidents
- b. The significance of accident investigation

**Learning Outcomes: After studying this paper the students will know –**

- a. The skills of accident investigation
- b. The importance of scene of accident in the court of law

### **Module I**

**07hrs**

**Basics of Accidents:** Accident scene, sources of forensic information, Eyewitness accounts. Extent of vehicle and individual damage, Railway and Air accidents. Visibility conditions.

### **Module II**

**12hrs**

**Evidences related to accidents:** Photographs of accident site. Estimation of speed. Tire and track marks, skid marks, scuff marks, remnants and black box analysis. Intoxication. Fitness of vehicles. Trace evidence at accident sites.

**Tachographs:** Significance, Tachograph charts and analysis. Tire slip effects. Falsification and diagnostic signals. Route tracing.

### **Module III**

**08hrs**

**Accident Analysis:** Pre-crash and Post-crash movement. Hit and run investigations. Collision model. Assessing driver's and occupant reaction and psychological condition. Analysis of Intoxicated condition. Occupant kinematics.

### **Module IV**

**08hrs**

**Types of injuries:** Various types of injuries due to accidents. Forensic injury biomechanics of accidents.

### **Module V**

**10hrs**

**Claims and Settlements:** Importance of insurance and its types, Role of Insurance agency in early claims, Role of Police and crime scene investigation officers in claiming insurance. Challenges in claims.

### **References**

1. T.S. Ferry, Modern Accident Investigation and Analysis, Wiley, New York (1988).
2. D. Lowe, The Tachograph, 2<sup>nd</sup> Edition, Kogan Page, London (1989).
3. T.L. Bohan and A.C. Damask, Forensic Accident Investigation: Motor Vehicles, Michie Butterworth, Charlottesville (1995).
4. S.C. Batterman and S.D. Batterman in Encyclopedia of Forensic Sciences, Volume 1, J.A. Siegel, P.J. Saukko and G.C. Knupfer (Eds.), Academic Press, London (2000).

## AECC11 - COMMUNICATIVE SKILLS-II

**Total Credits (L + T + P): 3 + 0 + 0**

**Total Hours: 40 hrs**

### **Objectives:**

- a. To understand English communication skills.
- b. To study and develop professional writing skills required to write job application and letters.

### **Learning Outcomes:**

- a. To able to draft formal letters.
- b. To be able to know the skills required for group discussions, interviews and meetings.

### **Module-I** **08 hrs**

Imaginary Writing with an Emphasis on Exploring Multiple Genres, Developing Critical Awareness.

### **Module-II** **08 hrs**

Drafting Message – Letter Writing (Formal and Informal) Greetings – Condolence and Congratulations.

### **Module-III** **10 hrs**

Business Letters, Tenders and Memorandum, Consumer Grievance, Reservation, Enquiry, Professional Brochures – Meetings, Notice, Minutes, Agenda, Quotations.

### **Module-IV** **06 hrs**

Job Application- Curriculum Vitae, Job Offering Letter- Job Acceptance Letter.

### **Module-V** **08 hrs**

Precise- Writing and Report Writing (Graph Sales Report/ Field Survey Report). Advertisement. Kinds – Interview Techniques. Preparing Situational Questionnaire. Speeches (General / Business) Analysis Of Inter Personal Problems – Writing Proposals.

### **Activities:**

1. Group Discussion
2. Interview
3. Extempore
4. Mock meetings
5. Role-play – Telephonic conversation
6. Facial / Body Gestures (language) Voice clarity
7. Listening and Observing

### **References:**

1. Communication and English, Bill VanPatten, 2015
2. Pursue English Through Communication- Communicative English, Bibi Anohar, Anohar John, 2018
3. High School English Grammars and Composition – Wren & Martin
4. Living English Structure – W. Standard Allen (Orient Longman)
5. Composition Exercises in Elementary English (Macmillan)- A.S. Mornby



# **DSC14A - INFORMATION TECHNOLOGY IN FORENSIC SCIENCE (THEORY)**

**Total Credits (L + T + P): 3 + 0 +2**

**Total Hours: 40hrs**

## **Objectives:**

- a. The basics of computer and internet workings..
- b. The steps of forensic utility of computer and internet.
- c. The emergence of computer crimes.

## **Learning Outcomes:**

- a. The characteristics of computer crime and criminals.
- b. The cyber space and cyber laws.

## **Module I**

**08hrs**

**Fundamentals of Computer and Internet:** Introduction, Computer generations, Software and Hardware.

Operating systems including: DOS, Windows, NT/2000/XP, Linux. Internet: Basics setup and internetworking, Forensic utility of computer and internet.

## **Module II**

**08hrs**

**Computer Forensics:** Introduction, Nature of digital evidence, Retrieval and analysis of digital evidence, Sources of digital evidence, Computer security and its relationship to computer forensics.

## **Module III**

**08hrs**

**Computer Crimes:** Classification of computer crimes, computer virus and types, computer worms, Trojan Horse, trap door, super zapping, logic bomb, salami logic, characteristics of computer crime and criminals.

## **Module IV**

**08hrs**

**Imaging Investigation:** Investigating on various imaging methods. Lay down the image provided onto a hard disk and provide a disk map of the suspect drive. Extraction of all relevant information from a hard disk. Cell phone/mobile forensics: Introduction, Forensic toolkit, EnCase, Ilook Investigator. Digital signature and cryptography: signature in paper based society, Transfer of computer based documents, digital signature and authentication, digital signature generation and verification, certification of public keys, certification of authority.

## **Module V**

**08hrs**

**Image Processing:** Computer Scanners, Imaging Software (Photoshop, Paint etc.) Introduction and Process, Image Enhancement and restoration, the investigation of erased tapes and analysis of signals (Analog video image Processing), Compression, encryption methods.

## **DCS14B INFORMATION TECHNOLOGY IN FORENSIC SCIENCE (PRACTICAL)**

**Total Credits: 02**

**Total Hours: 20hrs**

### **Practical**

1. Recording, editing, processing, and conversion of audio files using Goldwave v 5.63 software.
2. Speech acquisition and analysis of speech samples using CSL-4500 and Multispeech software.
3. Detection of tampering in audio files, audio restoration and speech enhancement using CEDAR Cambridge TM.
4. Working procedure of SIS.
5. Working procedure of Voice net software.
6. Video analysis and detection of tampered video files using Videofocus.

### **References:**

1. Eoghan Casey BS MA(2001) Handbook of Computer Crime Investigation: Forensic Tools and Technology
2. The Indian IT Act 2000.
3. Steve Bunting (2007) The Official EnCE – EnCase Certified Examiner Study Guide.
4. Robert C. Newman (2007) Computer Forensics: Evidence, Collection and Management
5. Eoghan Casey BS MA(2001) Handbook of Computer Crime Investigation: Forensic Tools and Technology
6. Eoghan Casey (2009) Handbook of Digital Forensics and Investigation
7. Tewari, R.K., Sastry, P.K. and Ravikumar, K.V. (2003) Computer Crime & Computer Forensics select
8. Publisher, New Delhi.
9. Mahajan T.S. and Singh, Didar (2003) : Computer Networking and HTML; Gurunanak Publication, Patiala.

## **DSC15A - FORENSIC MEDICINE (THEORY)**

**Total Credits (L + T + P): 3 + 0 + 2**

**Total Hours: 40hrs**

### **Objectives:**

- a. The duties of the first responding officer who receives a call on homicide or suicide case.
- b. The steps involved in processing the death scene.
- c. The importance of ascertaining whether the crime was staged to appear as suicide or accident.

### **Learning Outcomes:**

- a. The importance of bloodstain patterns in reconstructing the crime scene.
- b. The importance of autopsy.
- c. The importance of forensic odontology.

### **Module I:**

**08hrs**

**Death Investigations I:** 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.

### **Module II:**

**08hrs**

**Death Investigations II:** Suspect in custody – initial interrogation and searching for evidence. Miranda warning card. Assessing the crime scene. Request for forensic team. Importance of command post and log book. Management of crowd and media. Importance of taking notes. Items to be a part of noting. Documenting the death scene.

### **Module III:**

**08hrs**

**Death Investigations III:** 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, Assessing the psychological state of victim, suicide notes.

### **Module IV:**

**08hrs**

**Autopsy:** 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. Ante-mortem and post mortem injuries. Aging of injuries. Artificial injuries.

### **Module V:**

**08hrs**

**Forensic Odontology:** 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.

## **DSC15B - FORENSIC MEDICINE (PRACTICAL)**

**Total Credits: 2**

**Total Hours: 20**

### **Practical**

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.

### **References:**

1. Parikh C.K. (1972). Forensic Medicine and Toxicology. India, Medical Publications.
2. Polson C.J., Gee D.J. & Knight B. (1985). The Essentials of Forensic Medicine, France, Pergamon Press.
3. Simpsen K. & Knight B. (1996). Forensic Medicine 11th edit. USA, Taylor & Francis.
4. Kimball & John W. (1974). Biology. New Delhi, Arvind Publishing Co.
5. Oates D.W., Brown C.W. & Weigel D.L. (1974). Blood and Tissue Identification of Selected Birds and Mammals. JPR Study Projects Lincoln NE Nebraska Game and Perks Commission. Philadelphia, Staff Research Publications.
6. Walker J.M. & Rapley R. (2009). Molecular Biology and Biotechnology. London, Royal Society of Chemistry.
7. Williams P. L. & Warwick R. (1980). Gray's anatomy. London, Churchill Livingstone.
8. Lewis. B. (1980). Gene IV. England, Oxford University Press.

## DCS16 A - FORENSIC BIOLOGY AND SEROLOGY (THEORY)

**Total Credits (L + T + P): 3 + 0 +1**

**Total Hours: 40hrs**

### **Objectives:**

- a. The significance of biological and serological evidence.
- b. The forensic importance of hair evidence.

### **Learning Outcomes:**

- a. The importance of biological fluids – blood, urine, semen, saliva, sweat and milk – in crime investigations.
- b. The importance of bloodstain patterns in reconstructing the crime scene.

### **Module I:**

**08hrs**

**Biological Evidence I:** Nature and importance of biological evidence. Structure of human hair. Morphology and biochemistry of human hair. Significance of hair evidence. Transfer, persistence and recovery of hair evidence. Comparison of hair samples. Comparison of human and animal hair.

### **Module II:**

**08hrs**

**Biological Evidence II:** Nature and importance of biological examination of skeletal remains. Types and identification of microbial organisms of forensic significance. Identification of wood, leaves, pollens and juices as botanical evidence. Diatoms and their forensic significance.

### **Module III:**

**08hrs**

**Forensic Importance of Body fluids I:** Identification of body fluids. Composition and functions of blood. Collection and preservation of blood evidence. Distinction between human and non-human blood. Determination of blood groups. Antigens and antibodies. 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.

### **Module IV:**

**08hrs**

**Forensic Importance of Body fluids II:** Composition, functions and forensic significance of saliva, sweat, milk and urine. Tests for their identifications.

### **Module V:**

**08hrs**

**Bloodstain Pattern Analysis:** 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.

## **DCS16 B - FORENSIC BIOLOGY AND SEROLOGY (PRACTICAL)**

**Total Credits: 01**

**Total Hours: 10**

### **Practical (Any Five)**

1. To examine hair morphology and determine the species to which the hair belongs.
2. To prepare slides of scale pattern of human hair.
3. To examine human hair for cortex and medulla.
4. To determine blood group from fresh blood samples.
5. To carry out chemical identification of human blood.
6. To carry out crystal test of human blood.
7. To carry out identification of saliva.
8. To carry out identification of urine.

### **References:**

1. Thomas Kubic, Nicholas Petraco Forensic Science Laboratory Manual and Workbook, Third Edition 2009
2. Laboratory Protocols CIMMYT Applied Molecular Genetics Laboratory Third Edition
3. Vogel Textbook of Practical organic Chemistry including Qualitative organic analysis By Kathy Mirakovits, Gina Londino, The Basics of Investigating Forensic Science: A Laboratory Manual 2015

## DSE1 & DSE2 (CHOOSE ANY TWO)

### A. FORENSIC EXAMINATION OF EXPLOSIVE (FEE)

**Total Credits (L + T + P): 5 + 0 + 0**

**Total Hours: 50**

#### **Objectives:**

- a. The significance of explosives history.
- b. The forensic importance of explosive.

#### **Learning Outcomes:**

- a. The importance of detection of hidden explosive and bomb scene.
- b. The evaluation and assessment of scene of explosion.

#### **Module: I**

**08hrs**

**Fundamentals of Explosives:** Definition of Explosives, Definition as per Indian Explosive Acts. History of Explosives

#### **Module: II**

**10hrs**

**Chemistry of Explosives:** Deflagration and Detonation phenomenon - Redox Chemistry, Kinetics and Molecular Theory of gases & Gas Laws.

#### **Module: III**

**12hrs**

**Types of Explosives:** Characteristics of high and low impact explosives, Dust explosion, Gas/vapour explosion, BLEVE, Effect of blast wave on structures and human and Pyrotechnics. Improvised Explosive Device: Definition and Components of IED, Explosives Initiation (Explosive Trains); Types (Molotov cocktail, Letter bomb, Pipe bomb, VBIED and CBRN),

#### **Module: IV**

**10hrs**

**Detection of Hidden Explosives:** Bomb Scene: Specific approach to scene of explosion, Reconstruction of sequence of events, Evaluation and assessment of scene of explosion, role of animals in detection of hidden explosive.

#### **Module: V**

**10hrs**

**Analysis of Explosive:** Pre-blast and Post blast residue collection, Systematic examination of explosives and explosion residues in the laboratory using chemical and instrumental techniques and interpretation of results.

#### **References**

1. Saferstien: Forensic Science, Handbook, Vol. I, II & III, Prentice Hall Inc. USA 15.
2. Yinon Jitrin (1993) Modern Methods & Application in Analysis of Explosives, John Wiley & Sons ,England 16.
3. J A Siegel, P.J Saukko (2000) Encyclopedia of Forensic Sciences Vol. I, II and III, Acad. Press.

## **B. FORENSIC EXAMINATION OF NARCOTICS AND DRUGS (FEND)**

**Total Credits (L + T + P): 5 + 0 + 0**

**Total Hours: 50**

### **Objectives:**

- a. The classification of drug and psychotropic substances.
- b. The forensic importance of collection and preservation of drug evidence.

### **Learning Outcomes:**

- a. The importance of isolation techniques of narcotics substances.
- b. The analysis of narcotics, drugs and psychotropic substances.

### **Module: I**

**10hrs**

**Fundamentals of Narcotics and Drugs:** Definition of narcotics, drugs and psychotropic substances. Broad classification – Narcotics, stimulants, depressants and hallucinogens. General characteristics and examples. Natural, synthetic and semi-synthetic narcotics, drugs and psychotropic substances.

### **Module: II**

**10hrs**

**Psychological Enquiry and Investigation:** Designer drugs. Tolerance, addiction and withdrawal symptoms of narcotics, drugs and psychotropic substances. Crime scene search for narcotics, drugs and psychotropic substances – searching a suspect, searching a dwelling, searching a vehicle.

### **Module: III**

**10hrs**

**Clandestine drug laboratories:** Collection and preservation of drug evidence. 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 (in brief).

### **Module: IV**

**10hrs**

**Testing for Narcotics and Drugs:** 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. Dope tests.

### **Module: V**

**10hrs**

**Analysis of Narcotics and Drugs:** Psychotropic substances in postmortem blood. Postmortem changes affecting the analysis of narcotics, drugs and psychotropic substances.

### **References:**

1. A Glencoe Program Physics principles and problems: Forensic Laboratory Manual Student edition
2. Thomas Kubic, Nicholas Petraco Forensic Science Laboratory Manual and Workbook, Third Edition 2009
3. Laboratory Protocols CIMMYT Applied Molecular Genetics Laboratory Third Edition



4. Kathy Mirakovits, Gina Londino, The Basics of Investigating Forensic Science: A Laboratory Manual 2015
5. Washington state patrol Forensic Laboratory services: Crime Laboratory: Technical & Training Manuals
6. G.H. Stout & L.H. Jensten, X-ray Structure Determination – A practical Guide; 2<sup>nd</sup>Edn. Wiley, New York, 1989

## C. CYBER CRIME LAWS

**Total Credits (L + T + P): 5 + 0 + 0**

**Total Hours: 50**

### **Objectives:**

- a. The concept of jurisdiction and cyber jurisdiction.
- b. The legal system and specific cyber laws.

### **Learning Outcomes:**

- a. The importance of intellectual property rights.
- b. The cyber Incident Statistics.

### **Module I**

**10hrs**

**Fundamentals of Cyber Crime Laws:** Understanding Cyber Space, Defining Cyber Laws, Scope and Jurisprudence, Concept of Jurisdiction, Cyber Jurisdiction,

### **Module II**

**10hrs**

**Cyber Law – Global Scenario:** Indian Legal System, Introduction to IT Act 2000, Amendments in IT Act, Cyber Laws of EU – USA – Australia - Britain, other specific Cyber laws.

### **Module III**

**10hrs**

**Cyber Laws and Patents:** Understanding Patents, Understanding Trademarks, Trademarks in Internet, Domain name registration, Software Piracy, Legal Issues in Cyber Contracts, Authorship and Document Forgery.

### **Module IV**

**10hrs**

**Cyber Laws and Copyrights:** Jurisdiction Issues and Copyright Infringement, Multimedia and Copyright issues, WIPO, Intellectual Property Rights.

### **Module V**

**10hrs**

**Cyber Laws and IT:** Cyber Incident Statistics, Computer Security Incident, Information as Business Asset, Data Classification, Information Warfare, Key Concepts of Information Security, Vulnerability, Threat.

### **References**

- 1.R.K. Tiwari, P.K. Sastry and K.V. Ravikumar, Computer Crimes and Computer Forensics, Select Publishers, New Delhi (2003).
- 2.C.B. Leshin, Internet Investigations in Criminal Justice, Prentice Hall, New Jersey (1997).
- 3.R. Saferstein, Criminalistics, 8th Edition, Prentice Hall, New Jersey (2004).
- 4.Casey, Digital Evidence and Computer Crime, Academic Press, London (2000).

## D. FORENSIC BALLASTICS

**Total Credits (L + T + P): 5 + 0 + 0**

**Total Hours: 50**

### **Objectives:**

- a. The concept classification of firearms.
- b. The various factors affecting the internal ballistics.

### **Learning Outcomes:**

- a. The importance of external ballistics.
- b. The methods of analysis of gunshot residues.

### **Module I:**

**08hrs**

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

### **Module: II**

**08hrs**

**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.

### **Module: III**

**12hrs**

#### **External and Terminal Ballistics:**

**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.

**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.

### **Module: IV**

**10hrs**

**Ammunition:** 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.

### **Module: V**

**12hrs**

**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.

**References:**

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).
3. A.J. Schwoeble and D.L. Exline, Current Methods in Forensic Gunshot Residue Analysis, CRC Press, Boca Raton (2000).
4. Elaad in Encyclopedia of Forensic Science, Volume 2, J.A. Siegel, P.J. Saukko and G.C. Knupfer (Eds.), Academic Press, London (2000).

## SEC1 SKILL DEVELOPMENT – I

**Total Credits (L + T + P): 4 + 0 + 0**

**Total Hours:**

### **Objective:**

- a. The importance of interpersonal communication.
- b. The role of soft skills in contemporary world.

### **Learning Outcomes:**

- a. The decision making and problem solving skills.
- b. The stress and stress management techniques.

### **Module: I**

**05hrs**

**Soft Skills:** Introduction – Definition and Significance of Soft Skills; Process, Importance and Measurement of Soft Skill Development.

### **Module: II**

**10hrs**

**Interpersonal Communication:** Interpersonal relations; communication models, process and barriers; team communication; developing interpersonal relationships through effective communication; listening skills; essential formal writing skills; corporate communication styles – assertion, persuasion, negotiation.

### **Module: III**

**05hrs**

**Decision-Making and Problem-Solving Skills:** Meaning, Types and Models, Group and Ethical Decision-Making, Problems and Dilemmas in application of these skills.

**Conflict Management:** Conflict - Definition, Nature, Types and Causes; Methods of Conflict Resolution.

### **Module: IV**

**10 hrs**

**Stress and Stress Management:** Definition, Nature, Types, Symptoms and Causes; Stress Analysis Models and Impact of Stress; Measurement and coping with stress - techniques.

### **Module: V**

**15hrs**

Tutorials: Seminar/ Group Discussion/Assignment.

### **Reference Books:**

1. Managing Soft Skills for Personality Development – edited by B.N.Ghosh, McGraw Hill India, 2012.
2. English and Soft Skills – S.P.Dhanavel, Orient Blackswan India, 2010

## SEMESTER – VI

### DSC 17 and DSC 18 - TRAINING COMPONENTS

**DSC 17 - Internship in Forensic related Institutions (04 Weeks)**

**No. of Credits: 5**

**DSC 18 - Training Report Evaluation (TRE)**

**No. of Credits: 5**

The training period shall be of 04 weeks and only 200 marks (DSC17 & DSC18 – 100 marks each) are to be awarded.

Any student who is not able to complete these training components will not be awarded degree.

#### SCHEME OF EVALUATION TOTAL MARKS: 200 (DSC 17 and DSC 18)

**DSC 17: Industrial Training (IT):**

The total mark allotted for DSC 17 is 100.

Students have to submit completed Training logbooks. The IT logbook has to be duly signed by the departmental head or sectional heads in the organization. Completed IT log book carries 50 marks and 4 weeks Industrial training completion certificate has to be submitted with Job Training Performance Appraisal Form (The form has to be filled by the departmental head or sectional heads. - Model enclosed) which carries 50 marks.

#### JOB TRAINING PERFORMANCE APPRAISAL FORM SAMPLE (Similar Criteria can be followed)

Name of Student: \_\_\_\_\_

Name of the Org.: \_\_\_\_\_

Name of Department: \_\_\_\_\_

From: \_\_\_\_\_ To \_\_\_\_\_

1. ATTENDANCE /PUNCTUALITY: 20
2. PRESENTABILITY: 20
3. SUPERVISORS REPORT: 20
4. WORK ATTITUDES: 20
5. COMMUNICATION SKILLS: 20

Name of Appraiser: \_\_\_\_\_ Signature \_\_\_\_\_

Designation of Appraiser: \_\_\_\_\_ Date: \_\_\_\_\_

Signature of Student: \_\_\_\_\_ Date: \_\_\_\_\_

**Note:** Sample report format any suitable format can be followed

**DSC 18: Training Report Evaluation:**

The total mark allotted for DSC 18 is 100.

Students should prepare the detailed training report which carries 50 marks and Presentation on Training 25 marks, Viva Voce 25 marks.

A PowerPoint presentation on that department (based on the report) should be made. This will be presented in front of examiners. It should be based on the same department that the report is being made in.

## DSC19 - DIGITAL FORENSICS

**Total Credits (L + T +P): 4 + 0 + 0**

**Total Hours: 50**

### **Objectives:**

- a. The basics of digital forensics.
- b. The cases which fall under the purview of digital crimes.

### **Learning Outcomes:**

- a. The types of digital crimes.
- b. The elements involved in investigation of digital crimes.

### **Module I:**

**10hrs**

**Fundamentals of Digital Forensics:** 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, MAN, VAN and SAN.

### **Module II**

**10hrs**

**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 and mobile related crimes and investigation.

### **Module III**

**10hrs**

**Computer Virus and Computer Worm** – Trojan horse, trap door, super zapping, logic bombs. Types of computer crimes – computer stalking, pornography, hacking, crimes related to intellectual property rights, trolling, private and national security in cyber space - An overview of spamming, phishing and stalking.

### **Module IV**

**10hrs**

**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 - Treatment of exhibits. Creating bitstream of the original media. Collection and seizure of magnetic media.

### **Module V**

**10hrs**

**Legal and Privacy Issues:** Examining forensically sterile media. Restoration of deleted files. Password cracking and E-mail tracking. Encryption and decryption methods. Tracking users. Legal implications.

### **References**

1. R.K. Tiwari, P.K. Sastry and K.V. Ravikumar, Computer Crimes and Computer Forensics, Select Publishers, New Delhi (2003).
2. C.B. Leshin, Internet Investigations in Criminal Justice, Prentice Hall, New Jersey (1997).
3. R. Saferstein, Criminalistics, 8th Edition, Prentice Hall, New Jersey (2004).
4. Casey, Digital Evidence and Computer Crime, Academic Press, London (2000).



## DSE 3 & DSE 4 (CHOOSE ANY TWO)

### A. PROJECT REPORT

**Total Credits: 05**

#### **The Content**

1. Outer cover
2. Attestation and Certificate from the Guide
3. Acknowledgment
4. Index / Chapter page
5. Introduction
6. Review of Literature
7. Research Methodology
8. Survey Report / Result & Analysis
9. Conclusion and Suggestions
10. Scope for Future Research
11. Appendix
12. Bibliography

**C1 and C2 to be awarded** (each 10 marks) by respective project guides based on Periodic Progress and Reporting of the Student.

<b>C1</b>	
Synopsis	5
Presentation	5
<b>Total</b>	<b>10</b>

<b>C2</b>	
Draft Report	5
Presentation	5
<b>Total</b>	<b>10</b>

**C3 Components of the Project** (Report Evaluation and Viva) will be assessed for 80 marks.

1. 50 Marks for the Project Report
2. 20 Marks for Evaluation
3. 10 Marks for Viva-Voce

## **B. FORENSIC ANTHROPOLOGY AND ENTOMOLOGY (FAE)**

**Total Credits (L + T +P): 5 + 0 + 0**

**Total Hours: 50**

### **Objectives:**

- a. Importance of forensic anthropology in identification of persons.
- b. Significance of somatoscopy and somatometry.

### **Learning Outcomes:**

- a. How forensic entomology assists in death investigations.
- b. Different techniques of facial reconstruction and their forensic importance.

### **Module: I**

**10hrs**

**Fundamentals of Forensic Anthropology:** Definition and Scope of forensic anthropology. Study of human skeleton. Nature, formation, and identification of human bones. Determination of age, sex, stature from skeletal material.

### **Module: II**

**10hrs**

#### **Personal Identification – Somatoscopy and Somatometry:**

**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.

**Somatometry** – measurements of head, face, nose, cheek, ear, hand and foot, body weight, height.

Indices - cephalic index, nasal index, cranial index, upper facial index.

### **Module: III**

**10hrs**

**Facial Reconstruction:** Portrait Parle/ Bertillon system. Photofit/identi kit. Facial superimposition techniques.

Cranio facial super imposition techniques – photographic super imposition, videosuperimposition, Roentgenographic superimposition.

### **Module: IV**

**10hrs**

**Advanced techniques in Facial Reconstruction:** Use of somatoscopic and craniometric methods in reconstruction. Importance of tissue depth in facial reconstruction.

Genetic and congenital anomalies – causes, types, identification and their forensic significance.

### **Module: V**

**10hrs**

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

### **References:**

1. L. Stryer, Biochemistry, 3<sup>rd</sup> Edition, W.H. Freeman and Company, New York (1988).

2. R.K. Murray, D.K. Granner, P.A. Mayes and V.W. Rodwell, Harper's Biochemistry, APPLETON & Lange, Norwalk (1993).
3. S. Chowdhuri, Forensic Biology, BPRD, New Delhi (1971).
4. R. Saferstein, Forensic Science Handbook, Vol. III, Prentice Hall, New Jersey (1993).
5. G.T. Duncan and M.I. Tracey, Serology and DNA typing in, Introduction to Forensic Sciences, 2<sup>nd</sup> Edition, W.G. Eckert (Ed.), CRC Press, Boca Raton (1997).

## C. DNA FORENSICS

**Total Credits (L + T +P): 5 + 0 + 0**

**Total Hours: 50**

### **Objectives:**

- a. The basic principle of DNA analysis.
- b. The forensic significance of DNA typing.

### **Learning Outcomes:**

- A. The importance of short tandem repeats and restriction fragment length polymorphism in DNA technique.
- b. Role of DNA typing in parentage testing.

### **Module I:**

**10hrs**

**Fundamentals of DNA Fingerprinting:** Definition, Importance of DNA Fingerprinting in Forensic Science, Structure of DNA, RNA, Chromosome, Nuclear DNA and Mitochondrial DNA.

### **Module II:**

**10hrs**

**DNA Isolation Techniques:** Collection and types of evidences for DNA fingerprinting. Different types of DNA Isolation techniques (Organic, Inorganic and Mechanical), FTA cards for isolation of DNA, DNA isolation from different evidences (blood, tissue, hair, bone, stains).

### **Module III:**

**10hrs**

**Techniques for DNA Fingerprinting:** Electrophoresis, Northern and Southern blotting. Polymerase Chain Reaction (Denaturation, annealing and extension, Detection by PCR products).

### **Module IV:**

**10hrs**

**Types of DNA Fingerprinting Techniques:** Mini satellites and Micro-satellites., VNTR and RFLP, AFLP, STRs, SNP and Genotyping.

### **Module V:**

**10hrs**

**Practical application of DNA Fingerprinting:** Paternity and maternity testing and Personal identification. DNA databank, Limitations of DNA Fingerprinting. Legality of DNA fingerprinting in India.

### **References:**

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

## D. FORENSIC TOXICOLOGY

**Total Credits (L + T +P): 5 + 0 + 0**

**Total Hours: 50**

### **Objectives:**

- The significance of toxicological studies in forensic science.
- The classification of poisons and their modes of actions.
- The absorption of poisons in body fluids.

### **Learning Outcomes:**

- The forensic identification of illicit liquors.
- The classification and characteristics of the narcotics, drugs and psychotropic substances.
- The menace of designer drugs.

### **Module I:**

**08hrs**

Introduction to Forensic Toxicology, Definition of Poison, Classification of Poison, Types of Poisoning, Sign and Symptoms of Poisoning, Mode of Action, Factors Modifying the Action of Poisons. Toxicological Exhibits in Fatal and Survival Cases and their Preservation, Treatment in Cases of Poisoning, Analysis Report.

### **Module II:**

**12hrs**

#### **Extraction, Isolation and Clean-Up Procedures:**

Non-Volatile Organic Poison: Stas-Otto, Dovbriey Nickolls (Ammonium Sulphate) Method, Acid Digest and Valov (Tungstate) Methods, Solid Phase Micro Extraction Techniques, Solvent Extraction Methods.

Volatile Poisons: Industrial Solvent Acid and Basic Distillation

Toxic Cations: Dry Ashing and Wet Digestion Process

Toxic Anions: Dialysis Method Total Alcoholic Extract

### **Module III:**

**12hrs**

**Chemical Analysis:** Drug: Barbiturates, Methaqualone, Hydromorphone, Methadone, Meprobamate, Mescaline, Amphetamines, LDS, Heroin, Cannabinoids, Phinothiazines. Insecticides: Types, General Methods for their analysis etc.

### **Module IV:**

**08hrs**

**Poison Analysis:** Vegetable Poisons, Opium, Abrus, Cyanogenetic Glycosides, Dhatura, Marking Nuts, Nux-Vomica, Oleander and Aconite. Animal Poisons: Snake Venom and Others etc. and introduction to venom pharmacology.

### **Module V:**

**08hrs**

**Solvent and Metal Analysis:** Ethyl Alcohol in Blood and Urine, Illicit Liquor, Methanol, Acetone, Chloroform, Phenoletc. Forensic Examination of Metallic Poisons: Arsenic, Mercury, Lead, Bismuth, Copper, Aluminium, Iron, Barium, Zinc, Irrespirable Gases.

## References:

1. R. Saferstein, *Criminalistics*, 8<sup>th</sup> Edition, Prentice Hall, New Jersey (2004).
2. F.G. Hofmann, *A Handbook on Drug and Alcohol Abuse*, 2<sup>nd</sup> Edition, Oxford University Press, New York (1983).
3. S.B. Karch, *The Pathology of Drug Abuse*, CRC Press, Boca Raton (1996).
- a. Poklis, Forensic toxicology in, *Introduction to Forensic Sciences*, 2<sup>nd</sup> Edition, W.G. Eckert (Ed.), CRC Press, Boca Raton (1997).
4. A.W. Jones, Enforcement of drink-driving laws by use of per se legal alcohol limits: Blood and/or breath concentration as evidence of impairment, *Alcohol, Drug and Driving*, **4**, 99 (1988).
5. W.J. Tilstone, M.L. Hastrup and C. Hald, *Fisher's, Techniques of Crime Scene Investigation*, CRC Press, Boca Raton (2013).

## SEC2 - SKILL DEVELOPMENT-II

**Total Credits (L + T + P): 4 + 0 + 0**

**Total Hours: 45 Hrs**

### **Objective:**

- a. The importance of beliefs and values.
- b. The significance of time management.

### **Learning Outcomes:**

- a. The leadership skills.
- b. The positive thinking and attitude.

### **Module: I**

**5hrs**

**Self-Discovery:** Discovering the Self; Setting Goals; Beliefs, Values, Attitude, Virtue.

### **Module: II**

**10hrs**

**Non-Verbal Communication:** Importance and Elements; Body Language.

**Teamwork and Leadership Skills:** Concept of Teams; Building effective teams; Concept of Leadership and honing Leadership skills.

**Positivity and Motivation:** Developing Positive Thinking and Attitude; Driving out Negativity; Meaning and Theories of Motivation; Enhancing Motivation Levels.

### **Module: III**

**10hrs**

**Etiquette and Manners** – Social and Business, **Time Management** – Concept, Essentials, Tips, **Personality Development** – Meaning, Nature, Features, Stages, Models; Learning Skills; Adaptability Skills.

### **Module: IV**

**12hrs**

**Group Discussion:** Importance, Planning, Elements, Skills assessed; effectively disagreeing, Initiating, Summarizing and Attaining the Objective.

**Leadership and Assertiveness Skills:** A Good Leader; Leaders and Managers; Leadership Theories; Types of Leaders; Leadership Behaviour; Assertive Skills.

**Emotional Intelligence:** Meaning, History, Features, Components, Intrapersonal and Management Excellence; Strategies to enhance Emotional Intelligence.

### **Module: V**

**08hrs**

Tutorials: Seminar/ Group Discussion/Assignment.

### **References:**

1. Barun K. Mitra, "Personality Development & Soft Skills", Oxford Publishers, Third impression, 2017.
2. ICT Academy of Kerala, "Life Skills for Engineers", McGraw Hill Education (India) Private Ltd., 2016.
3. Caruso, D. R. and Salovey P, "The Emotionally Intelligent Manager: How to Develop and Use the Four Key Emotional Skills of Leadership", John Wiley & Sons, 2004.
4. Kalyana, "Soft Skill for Managers"; First Edition; Wiley Publishing Ltd, 2015.

5. Larry James, "The First Book of Life Skills"; First Edition, Embassy Books, 2016.
6. ShaliniVerma, "Development of Life Skills and Professional Practice"; First Edition; Sultan Chand (G/L) & Company, 2014.