SHIVAJI UNIVERSITY, KOLHAPUR.

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Reaccredited by NAAC 2014

NEW SYLLABUS FOR

B.Sc. Part III

Forensic Science (Entire)

SYLLBUS TO BE IMPLEMENTED FROM JUNE 2015.

Syllabus For Bachelor of Science Part - III : . Forensic Science (Entire)

1.**TITLE** : . Forensic Science (Entire).

2.**YEAR OF IMPLEMENTATION** : Syllabus will be implemented from June 2015 onwards.

3. **PREAMBLE**:

This syllabus is framed to give sound knowledge with understanding of to Forensic Science undergraduate students of three years of B.Sc. degree course. Students learn Forensic Science as a separate subject from B.Sc. I. The goal of the syllabus is to make the study of Forensic Science popular, interesting and encouraging to the students for higher studies including research. The new and updated syllabus is based on a basic and applied approach with vigor and depth. At the same time precaution is taken to make the syllabus comparable to the syllabi of other universities and the needs of industries and research.

The syllabus is prepared after discussion at length with number of faculty members of the subject and experts from industries and research fields. The units of the syllabus are well defined, taking into consideration the level and capacity of students.

4. **GENERAL OBJECTIVES OF THE COURSE** :

1) To make the students knowledgeable with respect to the subject and its practicable applicability.
2) To promote understanding of basic and advanced concepts in Forensic Science.
3) To expose the students to various emerging areas of Forensic Science.
4) To prepare students for further studies, helping in their bright career in the subject.
5) To expose the students to different processes used in industries and in research field.
6) To develop their ability to apply the knowledge of Forensic Science.in day to day life.
7) To prepare the students to accept the challenges in all sciences.
8) To develop skills required in various industries, research labs and in the field of human & society health.

5. **DURATION** : The course shall be a full time course .

6. **PATTERN**: Pattern of Examination will be Semester.

7. **MEDIUM OF INSTRUCTION** :The medium of instruction shall be in English.

8. **STRUCTURE OF EXAM & MARKS ALLOTMENT FOR BSC III FORENSIC SCIENCE ENTIRE**

B. Sc. III : Total Number of Papers 8 for Main Course + practical + project+ 2 Papers of English As per general BSc.III

Sr.No.	Subjects	Marks
	SEMISTER V	
1.	FSC- 501	40+10
2.	FSC - 502	40+10
3.	FSC - 503	40+10
4.	FSC - 504	40+10
5.	English As per general BSc.III	40+10
	SEMISTER VI	
6.	FSC - 601	40+10
7.	FSC - 602	40+10
8.	FSC - 603	40+10
9.	FSC - 604	40+10
10.	English As per general BSc.III	40+10
11.	**PRACTICAL** FSC – 505, FSC- 506	100
12.	**PROJECT** FSC – 507	100
Total		700

2) Structure and Titles of Papers of B.Sc. III Course:

SEMESTER V

Paper

FSC - 501 – Applied Forensic Science - I

FSC - 502 – Applied Forensic Chemistry and Forensic Physics - I

FSC - 503 – Applied Forensic Psychology and Forensic Biology - I

FSC - 504 – Applied Digital and Cyber Forensics – I

English As per general BSc.III

SEMESTER VI

Paper

FSC - 601- Applied Forensic Science - II

FSC - 602- Applied Forensic Chemistry and Forensic Physics - II

FSC - 603 – Applied Forensic Psychology and Forensic Biology - II

FSC - 604 – Applied Digital and Cyber Forensics – II
English As per general BSc.III

9. **SCHEME OF TEACHING AND EXAMINATION:**

[The scheme of teaching and examination should be given as applicable to the course/paper concerned.

If change is required do necessary as per course]

Sr. No.	**Subject/Paper**	**Teaching Scheme (Hrs/week)**			
		L	T	P	Total
1	Paper- FSC 501and502	3			
2	Paper- FSC 503and504	3			
3	Paper- FSC 601and602	3			
4	Paper- FSC 603and604	3			12
5	Practical			20	20
	Total				32

10. SCHEME OF EXAMINATION:

- The examination shall be conducted at the end of each semester of academic year.
- Each theory paper shall carry 50 marks.
- The evaluation of the performance of the students in theory papers shall be on the basis of each Semester Examination .
- The evaluation of the performance of the students in practical shall be on the basis of annual examination of 200 marks
- Question Paper will be set in view of the / in accordance with the entire Syllabus and Preferably covering each unit of syllabi.

11. OTHER FEATURES :

(A) LIBRARY : Reference and Text Books, Journals and Periodicals, Reference Books for Advanced studies. - List Attached

(B) SPECIFIC EQUIPMENTS : Necessary to run the Course - OHP, Computer, L.C.D., Projector

(C) LABORATORY SAFETY EQUIPMENTS :

1) Fire extinguisher
2) First aid kit
3) Fumigation chamber
4) Stabilized power supply
5) Insulated wiring for electric supply.
6) Good valves, distribution pipes & regulators for gas supply.
7) Operational manuals for instruments.
8) Emergency exits.

SHIVAJI UNIVERSITY, KOLHAPUR

B. Sc III. Forensic Science (Entire)

Semester - V

Course Code	Title of Course	Theory Marks	Internal Marks
FSC 501	Applied Forensic Science - I	40	10
FSC 502	Applied Forensic Chemistry and Forensic Physics - I	40	10
FSC 503	Applied Forensic Psychology and Forensic Biology - I	40	10
FSC 504	Applied Digital and Cyber Forensics - I	40	10
	English (As per general BSc.III)	40	10

Semester – VI

Course Code	Title of Course	Theory Marks	Internal Marks
FSC 601	Applied Forensic Science II	40	10
FSC 602	Applied Forensic Chemistry and Forensic Physics II	40	10
FSC 603	Applied Forensic Psychology and Forensic Biology II	40	10
FSC 604	Applied Digital and Cyber Forensics II	40	10
	English (As per general BSc.III)	40	10
FSC 505	Practical of Applied Forensic Physics, Chemistry and Biology	Practical 50	----

FSC 506	Practical of Applied Forensic Science, Psychology and Cyber Crime	Practical 50	-----
FSC 507	Project Study- Part I & II (Forensic Science, Cyber and Digital Crime)	100	----

[**Note:** Practical Examination will be Annual]

FORENSIC SCIENCE (Semester - V)

Paper FSC 501
Applied Forensic Science - I

Max. Marks: 50
45 lectures

Sr. No.	Topic	No. of Lectures
Unit-I	**History of Forensic:** Global history and development of forensic science, Sir Arthur Conan Doyle, Important Contributors, Forensic Science in India and Maharashtra. National and International Perspective, education and future. **Agencies in India** : DDFSL, DFS, FSL, RFSL, MFSL, CFSL, GEQD, NFB, NCRB, CID, CBI, IB, RAW, NIA etc. **International and other Agencies** CPO, FBI, CIA, CSI, DAB, DEA,BATF, Ameripol, Europol, Frontex and Interlope. **Forensic Experts, Scientist and Investigator:** Duties Role and there qualification. Ethics and professional standards. Code of conduct for expert witnesses, Sanction against expert for unethical Conduct.	**15**
Unit-II	**Forensic Science and Laboratory:** Introduction to Forensic science – nature, need and function Laws and Principles, basics of Forensic Science, Forensic Laboratory : Organization Structure Ranks and hierarchy of staff, Divisions (Departments), important instruments and tools, Cases' resaved and facility provided **Quality Management in FSL:** Introduction, scope and Need and general Requirements for standardization Laboratory. Quality management: Testing and calibration procedures, total quality assurance, quality control, quality planning. Quality Audit:- Internal & External Audit. **Accreditation & certification:** NABL, ISO, IEC, BIS,	**15**

	SCLD/LAB, ABC, IAI. Laboratory management procedures: - Lab information management system, validation of equipments and safety protocols.	
Unit-III	**Policing System**: Police system in India and State. Structure and setup of police. Criminal investigation and stages in criminal proceedings: FIR, Investigation, punchnama, prosecution and trial stage. Remand and bail processes. Role of media, Role & Functions of Police. **Classification of offences**: Cognizable and Non cognizable offence, billable and non billable offences, compoundable and non-compoundable offences. IPC: 299,300,302,304A/B, 307,319,320,339,340, 351,375,376,377,378,390 and 391. **Special Acts:** Explosive and explosive substance Act, Arms Act, Narcotic and Psychotropic Substance Act. Drugs and Cosmetic Act, Prohibition Act.	**15**

FORENSIC SCIENCE (Semester - V)
Paper FSC 502
Applied Forensic Chemistry and Forensic physics - I

Max. Marks: 50
45 lectures

Sr. No.	Topics	No. of Lectures
Unit-I	**Separation techniques :** Capillary electrophoresis, Crystallization, Distillation, Drying, Electrophoresis, **Extraction -**Liquid-liquid extraction, Solid phase extraction, Filtration, Fractional distillation Magnetic separation, Sublimation , Vapor-liquid separation etc. D**etection technique: Chromatography**- Gas, liquid, ion exchanges chromatography: principle, working, instrumentation, detectors and hyphenated, Forensic Application and limitation. **Elemental Analysis :** Atomic absorption spectroscopy (AAS) Atomic emission spectroscopy (AES) Atomic fluorescence spectroscopy (AFS) Alpha particle X-ray spectrometer (APXS) - Principles, working , instrumentation, detectors, Forensic application and limitation. **Forensic Toxicology:** Toxicology, branches of toxicology , Forensic Toxicology- Nature, needs and scope of Forensic Toxicology, Concept of forensic toxicology, important definitions, classification of poisons on the bases of state, mode of action, forensic analysis. Collection and preservation of toxicological samples. Symptoms of poisons on human body and antidotes universal and specific antidotes. Poisons – Plant, Animal and, Metallic Poisons.	**15**
Unit-II	**2.1 Forensic Chemistry :** Arson and Fire investigation : Nature & Chemistry of Fire, Smouldering, Spontaneous Combustion, Fire scene investigation, safety, witness, Scene Examination, Establishing the Origin, Establishing the Cause, Arson, Excavation & Reconstruction, Electrical Fires, Upholstery Fires, Flashover, Outdoor Fires, Evidence Collection & Analysis in case of arson and accidental fire. **Adulteration:** Definition, nature and current scenario, types of adulteration, food adulteration and food safety, drug adulteration, Petroleum adulteration method of detection and analyses of adulated samples. **2.2 Experimental Techniques** Forensic Photography; Introduction, 35 mm film / Digital SLR	**15**

	camera, Digital photo imaging, ISO number, Exposure Index, Photo imaging evidence; angle, scale, depth of field, light, ambient light, color temperature, flash/ strobe. Crime scene investigation report writing. Magnetic Measurement; (magnetic susceptibility). Electric Measurements; (Hall voltage, Resistivity measurement & FET Characteristics), Radiation Detection; Geiger Muelier counter, Optical fiber communication system, Piezoelectricity and piezoelectric measurements. .	
Unit-III	**3.1 Exterior Ballistics** Introduction, General consideration, Parabolic trajectory of a bullet, Vacuum trajectory and calculation of remaining velocity, Air resistance, Bullet drop, Wind deflection, Gyroscopic drift, Twist verses stability, Canting, Shooting up/ down, Velocity of falling shot and falling bullet, Escape velocity, Maximum horizontal and vertical range of shot pellets, Ricochet . **3.2 Causes and Investigation of Vehicular Accidents** **Automobile accidents-** Introduction, sources of information, eye witnesses, Tire and other mark, Pedestrian impacts and vehicle speed, vehicle condition, vehicle speed and damage, curved scuffmarks, Time and distance, reaction time, Photography and plans; Rail Accidents- Investigation of rail crash: criminal and safety investigation,	**15**

FORENSIC SCIENCE (Semester - V)
Paper FSC 503
Applied Forensic Biology and Forensic psychology I

Max. Marks: 50
45 lectures

Sr. No.	Topics	No. of Lectures
Unit-I	**1.1 FORESIC SEROLOGY:** Determination of human and animal origins from bones, hairs, nails, skin, body tissue, fluids / strains viz. blood, menstrual blood, semen, saliva, sweat, pus, vomit, etc., through immune diffusion and immune – electrophoresis. Serogenetic markers:- Blood groups – biochemistry and genetics of ABO, Rh, Mn systems, stains and other fluids / stains viz. menstrual blood, semen, saliva, sweat, tear, pus, vomit, hair, bone, nail blood specific ABH substances. **1.2 FORENSIC MICROBIOLOGY AND PALYNOLOGY:** Development of forensic microbiology, Types and identification of microbial organisms / fungi of forensic significance, Techniques in forensic microbiology. Understanding Bioterrorism:- Types of biological agents – Category A, B, C. Planning and response to bioterrorism – Preparedness Biosurveillance, Biodefence. Epidemiology of Bioterrorism.	**15**
Unit-II	**2.1 WILD LIFE FORENSIC AND FORENSIC ORNITHOLOGY:** Introduction and importance of wild life, Protected and endangered species of Animals and Plants. Identification of wild life materials such as skin, fur, bones, nails, horns, teeth, flowers and plants by conventional and modern methods. Identification of Pug marks of various animals census of wild life population. Birds flight and means of locomotion, Strikes and collisions, Quarantine issues, Crime Scenes, Confiscated Bird Goods, Anthropological Arte facts. **2.2 Investigative psychology:** Criminal psychological profiling-Nature, definition. Psychological tests used Criminal psychological profiling**,** Psychological autopsy**,** Forensic hypnosis (Narco analysis)**,** Polygraph**,** Stalking The Psychology	**15**

	of violence.	
Unit-III	**3.1 Essentials of Forensic Psychology:** Development of forensic psychology Ethical standards of forensic psychology Scientific methods used in forensic psychology Importance of study of forensic psychology**.** **3.2 Causes of criminal behavior and Psychological theories(in brief):** Psychological Factor & delinquency ADHD & conduct disorders Psychopathy & antisocial personality disorders Sexual disorders Substance abuse Treatment **Psychological Theories:** Learning behavioral theory Psycho analytic theory Cognitive theory REBT	**15**

FORENSIC SCIENCE (Semester - V)
Paper FSC 504
Applied Digital and Cyber Forensic - I

Max. Marks: 50
45 lectures

Sr. No.	Topics	No. of Lectures
Unit-I	**Data and Evidence Recovery:** Computer and cyber forensic basics, Cell Phones / Mobile Forensics, Blue-Tooth, Computer Ethics and Application Programs. Data and Evidence Recovery- Formatted Partition Recovery, Data Recovery Tools, Data Recovery Procedures and Ethics, Fine Transfer Protocol (FTP), Preserve and safely handle original media, Document a "Chain of Custody", Complete time line analysis of computer files based on file creation, file modification and file access, Recover Internet Usage Data, Recover Swap Files/Temporary Files / Cache Files, Introduction to Encase Forensic Edition, Forensic Tool Kit (FTK) etc, Use computer forensics software tools to cross validate findings in computer evidence related Cases.	**15**
Unit-II	**Cyber Forensics Investigation:** Technical issues – Security Technologies: Certification and key Distribution, Cryptographic Applications, Digital Signature Protocols for Transactions, SSL-Secure Socket Layer, SET-Secure Electronic Transaction. Cyber Forensics Investigation-Introduction to Cyber Forensic Investigation, Investigation Tools, eDiscovery , Digital Evidence Collection, Evidence Preservation, E-Mail Investigation, E-Mail Tracking, IP Tracking, E-Mail Recovery, Encryption and Decryption methods, Search and Seizure of Computers, Recovering deleted evidences, Password Cracking.	**15**
Unit-III	**Security Issues:** Security Issues –Types of Attacks (Active and Passive) Stealing Passwords, Social Engineering, Bugs and Backdoors, Illegal accessing Authentication Failures, Protocol Failures, Information Leakage, Viruses and Worms, Denial-of-Service, etc. Firewalls, Packet Filters, Application-	**15**

	Level Filtering, Circuit-Level Gateways, Dynamic Packet Filters, Distributed Firewalls; Digging for Worms, Packet Filtering, Implementing policies (Default allow, Default Deny) on proxy, etc. Introduction to Cyber Security, Implementing Hardware Based Security, Software Based Firewalls, Security Standards, Threats, crimes, etc. Why require a security? Picking a Security Policy, Strategies for a Secure Network, Ethics of Computer Security, Security Threats, and levels, Security Plan (RFC 2196).	

FORENSIC SCIENCE (Semester - VI)
Paper FSC 601
Applied Forensic Science II

Max. Marks: 50
45 lectures

Sr. No.	Topics	No. of Lectures
Unit-I	**Crime Scene Investment &Management:** Components of Crime Scene Management – Information management, Manpower, technology & logistics management, role of crime scene managers and first responding officers, educational background & hierarchy. Crime scene security, contamination control, documentation protocols and maintaining health & safety procedures. **Crime Scene Reconstruction:** Defining crime scene reconstruction, nature & stages of crime scene reconstruction, reconstruction Based on blood spatter patterns, shooting range of firearm projectile and gunshot residue, linking cases by MO and Signatures. Defining Crime Scene Analysis, interpretation of exhibits, role of a Crime scene analyst, theory & principles of analysis, arguments and ethics in crime scene analysis and data interpretation.	**15**
Unit-II	**Questioned Documents:** Document expert/ examiner: Role, duets, Required qualification and training of experts. Standard protocol for collection of suspected document and handwriting samples. **Handwriting and Signature:** principle in handwriting Features of handwriting and stages in handwriting development. General and individual characteristics of handwriting. Forensic examination of Handwriting in case of dispute letters , suicidal/ homicidal letters, Anonymous and other writings. Forensic Stylistics/Linguistics: Principle in examination of signature. **Document examination :** built-up documents, sequence of strokes, Alteration, addition and obliteration of examination. Examination of erasers. Age of documents, Identification and comparison of typescripts and typist. Decipherment of secret writings, indentations & charred Documents. Examination of counterfeit currency notes, Indian Passports/Visas, Stamp Papers, Postal Stamps etc. **Forgery Examination** : Forgery , types of forgery , Identification and examination of forgery in handwriting, signature, finical document, academic and other printed or Xerox documented etc.	**15**

Unit- III	**Forensic Medicine**: definitions, Inquest (its types) medical certificate, medico legal reports, dying declaration and deposition. **Personal identification:** Determination of race, religion, sex, age, height and weight, tattoo marks, scars etc. identification in case of mass disaster. **Medico legal Autopsy :** Authorisation and objective of a autopsy, **Medico legal aspects of death:** - Diagnosis of death, somatic & molecular, Early, intermediate and late changes. Specially algor mortis, postmortem lividity, rigor mortis, decomposition changes. Determination of cause of death and manner of death. Medico legal examination in case of highly decomposes body. Medico legal investigation of sexual offences. **Causes of death:** Asphyxia, electrocution, thermal trauma, heat burns, starvation, natural death, sudden death, and death by accident. Medico legal aspects of wounds, Difference suicidal, homicidal and accidental wounds.	**15**

FORENSIC SCIENCE (Semester - VI)
Paper FSC602
Applied Forensic Chemistry and Forensic Physics - II

Max. Marks: 50
45 lectures

Sr. No.	Topics	No. of Lectures
Unit- I	**1.1 Narcotic Drug and Psychotropic Substances:** Analysis of Narcotic Drugs and Psychotropic Substances, Drug effects, drug Hazards, Tolerance and dependence of drugs, Problems of drug addiction, Identification of drug addict, Drug addicts and crimes, Classification of Narcotics and other drugs, Analytical techniques for identification of drugs. Types of Pharma drugs. **1.2 Study of Analysis of Beverages:** Introduction, Definition of alcohol and illicit liquor, Alcoholic and nonalcoholic beverages and their composition, Proof spirit, absorption, de-toxication and excretions of alcohol, problems in alcohol cases and difficulties in diagnosis, Alcohol and prohibition, Consequences of drunken driving, Analytical techniques in the analysis of alcohol and other articles. Case study.	**15**
Unit-II	**2.1 Forensic chemistry Related Law :** The Poisons Act, 1919, and Section 284 of IPC, 1860 (Negligent Conduct with respect to poisonous substance). Explosives Act 1984, (Definition, Powers of Central Govt. and Licensing Authority, Offences and Penalties) and Section 286 of IPC, 1860, (Negligent conduct with respect to explosive substance), Explosive Substances Act 1908, (Definition, Offences and Penalties) Prevention of Food Adulteration Act 1954 (Definition, Power of Food Inspector, Offences and Penalties), Narcotic Drugs & Psychotropic Substances Act 1985 (Definition, Licit Opium Cultivation, Minimum and Commercial Quantity in Narcotic Drugs, Offences and Penalties), Prevention of Illicit Trafficking in NDPS Act 1985 (Detention of a Person Under the Act), Drugs & Cosmetics Act 1945 (Definition, Adulterated, Misbranded, Spurious Drugs and Cosmetics, Offenses and Penalties) **2.2 Forensic Trace Analysis**: Review of physical properties of materials: temperature, weight and mass, density, refractive index; methods of comparing refractive indices, Composition of glass, Comparison of glass fragments, Measuring and comparing density and refractive index of glass,	**15**

	classification of glass samples, Glass fractures.	
Unit-III	**3.1 Terminal (Wounds) Ballistics:** Introduction, Stopping power of bullet, Injuries and the quantity of energy of projectiles, Shock wave and cavitations effect, Wounding mechanism, Elements of wound Ballistics; Nature of target. Velocity of projectile, Constructional features of projectile. Range; Classification of range (maximum horizontal / vertical, effective, dangerous, safe and legal sense). **3.2 Forensic Microscopy:** Basics of microscope, Compound microscope: parts and properties, Comparison microscope, Polarizing microscope- polarization and applications, Micro spectrophotometer, Scanning Electron Microscope (SEM). Transmission Electron Microscope (TEM).	**15**

FORENSIC SCIENCE (Semester - VI)
Paper FSC 603
Applied Forensic Biology and Forensic Psychology - II

Max. Marks: 50
45 lectures

Sr. No.	Topics	No. of Lectures
Unit - I	**1.1 DNA PROFILING AND ITS FORENSIC SIGNIFICANCE:** History of DNA fingerprinting, Human genetics – Heredity, Alleles, Mutations & Population Genetic, Molecular Biology of DNA. Forensic Application of recombinant DNA technology/ Forensic Biotechnology, Human Genome Project, Variations, Polymorphism in DNA system – DNA markers RELP, RAPD, VNTRs, SNP, Autosomal – STR, Y-STR, Mitochondrial DNA. Forensic Significance of DNA Profiling:- Application in disputed paternity cases, child Swapping. **1.2 FORENSIC ANTHROPOLOGY & ODONTOLOGY:** Introduction & History of Anthropology, Physical Anthropology & Numan Variability, Understanding Archeology & Osteology, Scene Processing, Examining remains – Human or Animal / Old or New, Issues involved in development of biological profile, Issues in Identification, Age estimation in childhood and adulthood, Sexual Dimorphism, Population Ancestry, Stature estimation, Individualization & Identification, Evidence for cause and manner of death from bones, Documentation & Expert Witness Testimony. Portrait Parle, Bertillon system, Facial reconstruction, Super-imposition techniques, Reconstruction based on craniometrical and somatoscopic methods. Importance of tissue depth to reconstruct various facial features. Introduction & History of Odontology.	**15**
Unit-II	2.1 **FORENSIC ENTOMOLOGY:** Introduction & History, Identification of insects, Training required, Determination of Time elapsed since death, Dipterans Larval Development, Successional Colonization of	**15**

	Body, Determination of displacement and disturbance of the body, Presence and Position of wounds, Drugs consumption ante mortem Challenges in Entomology. **2.2 Psychology & Court:** Competency to stand trial Insanity Mc Naughten rule Sentencing evaluation Risk assessment Narcotic & provision (NDPC)	
Unit-III	**3.1 Police Psychology:** Psychological testing & selection of police officer aptitude test, intelligence test, personality test Fitness for duty evaluation Police suicide. **3.2 Counseling:** Nature, definition & scope, Type of counseling: legal, crisis, preventive, Characteristics of a counselor, Skill to counsel criminal. **3.3 Rehabilitation:** Rehabilitation of victim of crime, Type of rehabilitation Stress & stress management.	**15**

FORENSIC SCIENCE (Semester - VI)
Paper FSC 604
Applied Digital and Cyber Forensic - II

Max. Marks: 50
45 lectures

Sr. No.	Topics	No. of Lectures
Unit-I	**Electronic World:** E-Governance, Introduction, IT and business, EDI, E-Business, EBanking, Real Time Gross Settlement (RTGS), Mobile Banking E-commerce: Concerns for E-commerce Growth, Concepts Electronic Communication, PCs and Networking, E-mail, Internet and intranets. EDI, EDI to E-commerce, UN/EDIFACT Concerns for E-commerce Growth, Internet bandwidth, Technical issues, Security issues. India E-commerce Readiness, Legal issues, Credit Card Business Electronic Commerce providers. CyberCash, Digicash, VeriSign Software Package: EDI software developed by NIC for Customs.	15
Unit-II	**Forensic Auditing:** Forensics auditing – step-by-step, how-to process for securing, investigating, and auditing or assessing various IT environments. Introduction to Forensic Accounting: Introduction to Forensic Accounting and Fraud Examination; Principles of Forensic Accounting and Fraud Examination; Roles of the Forensic Accountant; Introduction to Fraud and Forensic Accounting; The Nature of Fraud, Why People Commit Fraud, Fighting Fraud, Fraud Prevention, Fraud Detection, Recognizing the Symptoms of Fraud; Data-Driven Fraud Detection, Fraud Investigation, Investigating Theft Acts;vInvestigating Concealment, Conversion Investigation Methods; Private Sources of Information,vInquiry Methods and Fraud Reports Honesty Testing, The Fraud Reports, Management Fraud; Financial Statement Fraud; Revenue- and Inventory-Related Financial Statement Frauds; Liability, Asset, and Inadequate	15

	Disclosure Frauds; Fraud Against Organizations, Consumer Fraud; Identity Theft, Investment Scams, Money Laundering; Bankruptcy, Divorce, and Tax Fraud, Fraud in E-Commerce; Resolution of Fraud, Legal Follow-Up, Being an Expert Witness; Financial Statement FraudStandards.	
Unit-III	**Information Technology Law:** IT Act 2000: Scope, Objectives, E- Governance, Creation, Recognition and Verification of Digital Signature Digital Signature and Penalties under IT Act 2000, Certifying Authority and Controller. Emerging trends in Information Technology law. Amedment of IT acts.	**15**

Practical Course

Practical: Applied Forensic Physics (Any 05)

1. Comparison of glass fragments and Study of fractures in forensic material.
2. Examination of soil sample.
3. Determination of density of a given sample.
4. Determination of refractive index of a transparent material.
5. Examination of tire / other marks.
6. Study of scuffmarks.
7. Analysis of accident scene photography and Physical examination accidental vehicle.
8. Testing and examination of given electric components / parts / circuits.
9. To study the effect of magnetic field on aqueous solution of paramagnetic salt,
10. Measurement of resistivity by four probe method.
11. Measurement of Hall voltage.
12. Working with Gieiger Muelier counter.
13. Working with Compound microscope and Working with Comparison microscope.
14. Working with Stereomicroscope and Working with Polarizing microscope.
15. Working with Micro spectrophotometer.
16. Working with communication kit and Optical fiber parameters.
17. Simulation of bullet trajectory.
18. Development of 35 mm photograph.
19. Measurement of recoil (Sample calculations) and Determination of remaining velocity (Sample Calculations).
20. Twist versus muzzle velocity (Sample Calculations) and Muzzle velocity (Sample Calculations).
21. Determination of remaining velocity (Sample Calculations).
22. Identification of firearm injury.
23. Piezoelectric measurements.
24. Fiber strength measurements.
25. FET Characteristics

Practical: Applied Forensic Chemistry (Any 05)

1. Identification of food adulteration.-vegetable oil, Cold drinks etc. (2 nos).
2. Quantitative or qualitative study of drug opiates. (2 nos).
3. Examination of fire arson cases by GC, TLC. (1 nos).
4. Detection and determination of various adulterants in alcohol, by colour tests. (Qualitative analysis) (2 nos.)
5. Chemical analysis of explosive materials.(Gun powder)- Colour test, Microscopic examination.(2 nos.)
6. Analysis of alcohol from blood (quantitative by GC). (2 nos.)
7. Extraction methods of drugs, Poisons. (2 nos.)
8. Colour Tests for identification of poisons, drugs. (2 nos.)
9. Plant, animal, Metallic poison analysis. (2 nos.)

10. Polymer Testing. (1 nos.)
11. Separation of Sampling Material by TLC (drugs, poison etc.) (2 nos.)
12. Study of Steroids (separation by TLC).
13. Examination of chemicals used in Trap cases by UV-visible spectroscopy. (2 nos.)
14. Examination of other metal. (1 nos.)

Practical: Applied Forensic Biology (Any 05)

1. To determine titre of antisera.
2. To perform precipitin test for species of origin determination.
3. To perform Immunodiffusion test for species of origin.
4. To perform electrophoresis for separation of various polymorphic enzymes.
5. Extraction and isolation of DNA from blood.
6. Blood grouping from stains of blood, semen, saliva and other body fluids by Absorption inhibition, Absorption-elution and mixed agglutination technique, determination of secretor/ non-secretor status.
7. Identification of orders of insects and other arthropods of forensic significance.
8. Preparation of permanent slides by using maceration technique of various forensic material of Plant origin.
9. Determination of age from skull sutures.
10. Determination of age from Teeth.
11. Determination of sex from skull.
12. Determination of sex from Pelvis.
13. To examine Barr bodies from blood sample.
14. To identify blood strains.
15. To identify semen stains.
16. To identify saliva stains.
17. To determines species of origin from blood.
18. Identification and culture of bacteria of forensic significance.
19. Identification of wild life materials such as skin, fur, bones, nails, horn, teeth, flowers and plants
20. Identification of birds from feathers.
21. Study of pollen grains and spores of forensic significance.
22. Examination of fur, nails, horn, teeth.
23. Examination of hair of different animals such as Dogs, Cats, Cow, Horse, Goats etc.
24. Determination of human hair morphology.

Practical: Applied Digital and Cyber Forensics: (Any 05)

1. Data Recovery integrated with forensic technology (2 nos.)
2. Mobile Forensic using cell phone forensic suit (2 nos.)
3. Computer Forensic Investigation Tools, Digital Forensics investigation Tools (2 nos.)
4. Access Data e Discovery (2 nos.)
5. Creation & verification of Digital Signature (2 nos.)
6. Hardware Data Recovery-Salvation DATA Tools (2 nos.)
7. Network Analysis (2 nos.)
8. Detail Analysis of E-mail, E-Mail Investigation, E-Mail Tracking, IP Tracking, E-Mail Recovery (2 nos.)
9. Working on En Case Software (2 nos.)

10. Imaging of discs using various tools (2 nos.)
11. Image processing using tools like, Photoshop, Corel Photo paint etc. (2 nos.)
12. E-Commerce (E-shopping of any product to understand the transaction and security issues) (2nos.)

Practical: Applied Forensic Science **(Any 05)**

1. Calibration of various instruments
2. Various safety methods
3. Report writing and interpretation
4. Scientific Report Writing
5. Presentation of expert evidence in a mock courtroom
6. Blood Spatter Analysis
7. Range of firing
8. Reconstruction of various types of crime scene
9. Identification of Handwriting General and individual characteristics.
10. Detection of various type of forgery.
11. Identification of Indented and Invisible writing.
12. Identification of typescripts and printing matter.

Practical: Applied Forensic Psychology (Any 05)

1. Minnesota multiphasic personality inventory
2. Standard progressive matrices by Raven./ Koh's Block test/Alexander Pass Along test
3. Picture Frustration study by Rosenswieg (Adult form)
4. 16.P.F. by R.B. Cattle
5. Nonverbal test of intelligence by Dr. Nafde
6. Differential aptitude test:
    1. Abstract reasoning
    2. Numerical
    3. Spatial
    4. Verbal
    5. Verbal
    6. Clerical
    7. Mechanical
    8. Differential aptitude test.
    9. Measuring Locus of control

PROJECT STUDY:- As per course requirement

Project Study – Part I

1. Searching of research topic.
2. Literature review.
3. Experimental or Methodology part

Part II

1. Result.
2. conclusion.
3. Submission

Practical Examination

A) The practical examination will be conducted on three (3) consecutive days for not less than 5 hours on each day of the practical exanimation.

B) Each candidate must produce a certificate from the Head of the Department in his/her college stating that he/she has completed in a satisfactory manner the practical course on the guidelines laid down from time to time by Academic Council on the recommendation of Board of studies and has been recorded his/her observations in the laboratory journal and written a report on each exercise performed. Every journal is to be checked and signed periodically by a member teaching staff and certified by the Head of the Department at the end of staff and certified by the Head of the Department at the end of the year. Candidates are to produce their journal at the time of practical examination. Candidates have to visit the least Two (2) places of interest and submit the report of their visit at the time of examination. The report should be duly certified by the Head of the Department.

List of the minimum equipments and related requirements for B. Sc. III

1) Rotary shaker	: One
3) Centrifuge (High Speed)	: One
4) Hot plate	: One
5) Hot air oven	: One
6) Incubator	: One
7) Spectrophotometer	: One
8) Water bath	: One
9) Separate room for fine instruments of size 10'x15' feet dimension	: One
10) Electrophoresis assembly	: one
11) Distillation assembly	: One (Glass)
12) Reflux assembly	: Four
13) Refrigerator	: One
14) Colorimeter	: One
15) Chromatography assembly	: Four
16) Chromatography column	: Four
17) pH meter [digital]	: Two
18) Viscometer	: Four
19) Homogenization	: One
20) Sonicator	: One
21) Spectrophotometer	: One
22) Glucometer.	: One
23) Western blotting assembly	
24) PCR	
25) HPLC	

NATURE OF QUESTION PAPER THEORY- COMMON PATTERN , as per university rule.

The Nature of question paper for B.Sc. Part III Practical Examination will include

Q. Major Experiment

Q. Minor Experiment

Q. Journal

Q. Project Report:

Q. Study Tour Report

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