

**STUDY & EVALUATION SCHEMS**  
**OF**  
**BACHELOR OF SCIENCE IN FORENSIC SCIENCE**  
**(BFS)**  
**(BFS- V- SEMESTER)**

**[Applicable w.e.f. Academic Session 2020-21]**



**INTEGRAL UNIVERSITY, LUCKNOW**  
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**Syllabus approved by Board of Study, Faculty Board, Academic Council,  
Executive Council of the Integral University, Lucknow**

# INTEGRAL UNIVERSITY, LUCKNOW

## INTEGRAL INSTITUTE OF ALLIED HEALTH SCIENCES & RESEARCH DEPARTMENT OF PRAMEDICAL SCIENCES

### STUDY & EVALUATION SCHEME BACHELOR OF SCIENCE IN FORENSIC SCIENCE (B.FS) (w.e.f. July 2020)

#### III- Year

#### V- Semester

Sr. No.	Code	Name of the Subject	Period			Credits	Evaluation Scheme				Subject Total
			L	T	P		Sessional			Exam	
							CT	TA	Total	ESE	
1.	FS301	Forensic Toxicology	3	1	0	4	25	15	40	60	100
2.	FS302	Forensic Ballistics	3	1	0	4	25	15	40	60	100
3.	FS303	Digital & Cyber Forensics-II	3	1	0	4	25	15	40	60	100
4.	FS304	Research Methodology	3	1	0	4	25	15	40	60	100
5.	FS305	Forensic Toxicology-Lab	0	0	2	1	40	20	60	40	100
6.	FS306	Forensic Ballistics-Lab	0	0	2	1	40	20	60	40	100
7.	FS307	Digital & Cyber Forensics-II-Lab	0	0	2	1	40	20	60	40	100
8.	FS308	Seminar	0	4	0	4	50	50	100	00	100
<b>Total</b>			<b>12</b>	<b>08</b>	<b>06</b>	<b>23</b>	<b>270</b>	<b>170</b>	<b>440</b>	<b>360</b>	<b>800</b>

**L:** Lecture

**T:** Tutorials

**P:** Practical

**C:** Credit

**CT:** Class Test

**TA:** Teacher Assessment

**ESE:** End Semester Examination

**Sessional Total:** Class Test + Teacher Assessment

**Subject Total:** Sessional Total + End Semester Examination (ESE)

# **SUBJECT- FORENSIC TOXICOLOGY**

## **SUBJECT CODE- FS301**

**(w.e.f July 2020)**

**L. T. P**

**3. 1. 0**

**LEARNING OBJECTIVE:**to provide understanding about the different types of poisons&toxicological evidences, their forensic significances and importance of proper examination.

### **UNIT-I:**

**Toxicology:** Introduction, concept and history, forensic toxicological examination and its significance.

**Drugs of abuse:** introduction, classification of drugs of abuse, drug of abuse in sports, narcoticsdrugs and psychotropic substances, designers drug and their forensic examination, Drugs andCosmetic Act, Excise Act, NDPS Act.

### **UNIT-II**

**Poison-**Administration, action of poison, classification of poisoning, types of poisons, collection, isolation, sign and symptoms of poisoning, mode of action and its effect on vital functions,classicalidentification techniques, modern technique Chromatography, mass spectroscopy,spectrophotometry, x-ray diffraction.

### **UNIT-III**

Organic Poisons, Inorganic Poisons, Synthetic poisons, Individual Poison (Barbiturate, Arsenic, Organophosphorus Compound)- classification, nature, administration, symptoms, detection, Post mortem finding, estimation, toxicological material.

### **UNIT-IV**

Vegetable poison- Dhatura, oleander, madar (Aak, Akdo) Nature, use, system, fatal dose, fatal period, Post mortem finding, isolation, detection, estimation.

Pesticides, Natural organic insecticides: pyrethroids and pyrethrins, Corrosive poisons, Poisonous gases- classification, nature,administration, symptoms, detection, Post mortem finding, estimation, toxicological material.

### **UNIT-V**

Features of toxicological analysis, Tests for the detection of poisons, Extraction of poisons, Extraction of poisons from biological matrices. medico-legal aspects of poisoning.

# **SUBJECT- FORENSIC BALLISTICS**

## **SUBJECT CODE- FS302**

**(w.e.f July 2020)**

**L. T. P**

**3. 1. 0**

**LEARNING OBJECTIVE**-to develop the understanding about the fire arms and ammunition as well as their forensic examination.

### **UNIT – I**

**History and background of firearms**:- Their classification and characteristics, various component of small arms, smooth bore and class characteristics, purpose of rifling, types of rifling trigger and firing mechanism, improvised / country-made / imitative firearm and their constructional features.

### **UNIT-II**

**Ammunition**: Definition, History and Classification, constructional features of different types of cartridges, types of primers and priming composition, propellants and their compositions, various types of bullet and compositional aspects.

### **UNIT-III**

**Internal and External Ballistics**-Definition, ignition of propellant, shape and size of propellant, manner of burning, various factors affecting the internal ballistics: lock time, ignition time, barrel time, erosion, corrosion and gas cutting. Equation of motion of projectile, principal problems of exterior ballistics, vacuum trajectory, effect of air resistance on trajectory, base drag, yaw, shape of projectile and stability.

### **UNIT-IV**

**Terminal Ballistics**: Effect of projectile on hitting target: function of bullet shape, striking velocity, striking angle and nature of target, tumbling of bullet, effect of intermediate targets  
Ricochet and wound ballistics, evaluation of injuries caused due to shot-gun,, rifle, handguns and country made firearms, post-mortem and anti-mortem firearm injuries.

### **UNIT-V**

**Principles and practice of identification** of firearms, ammunition and their components, different types of marks produced during firing process on cartridge- firing pin marks, breech face marks, chamber marks, extractor and ejector marks, number /direction of land and grooves, striation marks on land and grooves. Determination of range of fire- burning, scorching, blackening, tattooing and metal fouling, shot dispersion and GSRdistribution.

# **SUBJECT- DIGITAL & CYBER FORENSICS-II**

## **SUBJECT CODE- FS303**

**(w.e.f July 2020)**

**L. T. P**

**3. 1. 0**

**LEARNING OBJECTIVE:** Able to understand the importance of cyber forensics in corporate and electronic world with emphasis on forensic auditing and IT Act.

### **UNIT –I**

Data and Evidence Recovery – Computer and cyber forensic basics, Mobile Forensics, Blue- Tooth, Computer Ethics. Data and Evidence Recovery, Data Recovery Tools, Data Recovery Procedures and Ethics, File Transfer Protocol (FTP), 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.

### **UNIT -II**

Forensics Auditing- step-by-step process for securing, investigating, and auditing or assessing various IT environments. Introduction to Forensic Accounting and Fraud Examination; Principles of Forensic Accounting and Fraud Examination; Roles of the Forensic Accountant; Nature of Fraud, Fraud Prevention and Detection, Recognizing the Symptoms of Fraud.

### **UNIT-III**

Investigating Theft Acts; Investigating Concealment, Conversion Investigation Methods; Private Sources of Information, Inquiry Methods and Fraud Reports, Honesty Testing, The Fraud Reports, Management of Fraud; Financial Statement Fraud; Revenue-and Inventory- Related Financial Statement Frauds; Liability, Asset, and Inadequate Disclosure Frauds; Fraud Against Organizations, Consumer Fraud; Identification of 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 Fraud Standards; Avoiding common mistakes in fraud risk assessment and examination; Credit Card Frauds, Online Transaction Frauds, Cheque Frauds etc.

### **UNIT IV**

Electronic World – Introduction, EDI, E-Business, E-Banking, Online payment modes, Mobile Banking E-commerce: Concerns for Ecommerce 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, Security and Legal issues, Business Electronic Commerce providers

### **UNIT V**

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.

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

1. The significance of data recovery.
2. The importance of forensic auditing and accounting in corporate world.
3. About different services and issues in electronic world.
4. The importance and scope of IT Act 2000 in cyber world.

**Suggested Reading:**

1. File System Forensic Analysis by Brian Carrier, Publisher: Addison-Wesley Professional, 1st Edition (2005)
2. Cyber Law & Crimes (IT Act 2000 & Computer Crime Analysis) by Barkha & Ram Mohan, Publisher: Asian Law House, Hyderabad
3. Firewalls and Internet Security: Repelling the Wily Hacker, Second Edition (2003) Addison
4. E-Commerce: The Cutting Edge of Business by Kamlesh K. Bajaj & Debjani Nag, Tata McGraw Hill 2nd Edition, 2005
5. Cyber Law and E-Commerce by David Baumer, J C Poindexter, TMG Cyberlaw Simplified Vivek Sood, TMG

# **SUBJECT- RESEARCH METHODOLOGY**

## **SUBJECT CODE- FS304**

**(w.e.f July 2020)**

**L. T. P**

**3. 1. 0**

**LEARNING OBJECTIVE:**The primary objective of this course is to develop a research orientation among the scholars and to acquaint them with fundamentals of research methods. Specifically, the course aims at introducing them to the basic concepts used in research and to scientific social research methods and their approach. It includes discussions on sampling techniques, research designs and techniques of analysis.

### **Unit-I**

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

### **Unit-II**

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

### **Unit-III**

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

### **Unit- IV**

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

### **UNIT –V**

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

**Learning Outcomes:** At the end of this course, the students should be able to:

1. Understand Some Basic Concepts Of Research And Its Methodologies
2. Identify Appropriate Research Topics • Select And Define Appropriate Research Problem And Parameters
3. Prepare A Project Proposal (To Undertake A Project)
4. Organize And Conduct Research (Advanced Project) In A More Appropriate Manner
5. Write A Research Report And Thesis
6. Write A Research Proposal (Grants)

### **Suggested Readings:**

1. Mausner & Bahn: Epidemiology-An Introductory text, 2nd Ed., (1985) W. B. Saunders Co.
2. Richard F. Morton & J. Richard Hebd: A study guide to Epidemiology and Biostatistics, 2nd Ed.(2012), University Park Press, Baltimore.

# **SUBJECT- FORENSIC TOXICOLOGY-LAB**

## **SUBJECT CODE- FS305**

**(w.e.f July 2020)**

**L. T. P  
0. 0. 2**

### **List of practices:**

1. Microscopic examination of Plantpoisons
2. Color Tests for identification of poisons,drugs.
3. To identify metallicpoisons.
4. To identify organicpoisons.
5. Extraction methods of drugs,Poisons.
6. To identify drugs of abuse by spottests.
7. To perform color tests forbarbiturates.
8. To separate drugs of abuse by thin layer chromatography.

# **SUBJECT- FORENSIC BALLISTICS-LAB**

## **SUBJECT CODE- FS306**

**(w.e.f July 2020)**

**L. T. P**

**0. 0. 2**

### **List of practices:**

1. Demonstration of Firearms- Rifle, Handguns (standard & Country made), Shot gun
2. To identify different types of marks on fired cartridge.
3. To co-relate the striking angle of the bullet with the impact on the target.
4. To estimate the range of firedbullets.
5. To identify gunshotresidue.
6. To correlate the nature of injuries with distance from which the bullet was fired.
7. To differentiate, with the aid of diagram, contact wounds, close range wounds and distant wounds.



# **SUBJECT- DIGITAL & CYBER FORENSICS-II-LAB**

## **SUBJECT CODE- FS307**

**(w.e.f July 2020)**

**L. T. P**  
**0. 0. 2**

### **List of practical:**

1. Data Recovery integrated with forensic technology.
2. Access Data e Discovery.
3. Creation & verification of Digital Signature.
4. Network Analysis.
5. Detail Analysis of E-mail, E-Mail Investigation, E-Mail Tracking, IP Tracking, Email Recovery.
6. Working on Encase Software.
7. Imaging of discs using various tools.
8. Image processing using tools like, Photoshop, Corel Photo paint etc.