

Institute for Excellence in Higher Education (IEHE), Bhopal
Department of Forensic Science

Syllabus
2021-2022

B.Sc. Forensic Science (Honour)
B.Sc. Forensic Science (Subsidiary)

Institute for Excellence in Higher Education (IEHE), Bhopal

Board of Studies Forensic Science Abstract of Syllabus

Date & Time of Meeting

Session: 2021-2022

B.Sc. Forensic Science (Honours)

Semester: I,II,III,IV,V& IV

B.Sc. Forensic Science (Subsidiary)

S. No.	Semester	Paper	Paper Title (Theory)	Paper Title (Practical)
1.	I st	Honour (I)	Instrumental Methods-Chemical	Instrumental Methods-Chemical
		Honour (II) (Subsidiary)	Criminalistics	Criminalistics
2.	II nd	Honour (I)	Instrumental Methods-Biological	Instrumental Methods-Biological
		Honour (II) (Subsidiary)	Fundamentals of Forensic Science	Fundamentals of Forensic Science
3.	III rd	Honour (I)	Forensic Medicine and Anthropology	Forensic Medicine and Anthropology
		Honour (II) (Subsidiary)	Forensic Biology and Serology	Forensic Biology and Serology
4.	IV th	Honour (I)	Forensic Physics and Ballistics	Forensic Physics and Ballistics
		Honour (II) (Subsidiary)	Cyber Forensic	Computer Forensic
5.	V th	Honour (I)	Criminal Law and Criminal Justice System	Criminal law and Criminal Justice System
		Honour (II) (Subsidiary)	Crime and Society	Crime and Society
6.	VI th	Honour (I)	Forensic Pharmacology and Drugs of Abuse	Forensic Pharmacology and Drugs of Abuse
		Honour (II) (Subsidiary)	Tools and Techniques in Forensic Science	Project

Members of Board of Studies (BOS)

Name

Signature

Name

Signature

1. Dr M. P Bhaskar - 

5. Dr Anjali Acharya 

2. Dr. Vinay Mishra

6. Dr Rajendra Pawar 

3. Dr. Dewashish

7. Mr. Mohd. Athar 

Institute for Excellence in Higher Education (IEHE), Bhopal

B.Sc. (Honour) Part-I

Semester- I

Subject: Forensic Science

Title: Instrumental Methods- Chemical

Paper: Honour-I

Max. Marks: 100

SYLLABUS

Sample Preparation Techniques

Evaporation, Filtration, Crystallization, Decantation, Precipitation, Membrane Separation etc. General Idea and Principle of Centrifuge and its types, Distillation, Various Types of Distillation, Distribution Law and Solvent Extraction, Acid Dissolution & Digestion, Dry Ashing etc.

Basic Concept of Spectroscopy

General Idea on Spectroscopy, Electromagnetic Spectrum, Various Source of Radiation Their Utility and Limitation. Interaction of Radiation with Matter i.e., Reflection, Absorption, Fluorescence, Phosphorescence, Diffraction, Refraction etc. *Transmittance*

Basic Principle, **Instrumentation and Forensic Application** of Ultraviolet-Visible and Infrared Spectroscopy, Atomic Absorption, Atomic Emission, X-Ray Spectrometry, NMR, NAA.

Chromatographic Techniques

Principles
General Idea of Chromatography, theory and classification of chromatography, planar and column chromatography, adsorption and partition chromatography, ion exchange chromatography, exclusion chromatography, affinity chromatography

Planer Chromatography

Introduction, basic principle, procedure and forensic application of Paper chromatography, thin layer chromatography, high performance thin layer chromatography

Column Chromatography

Introduction, basic principle, procedure and forensic application of High performance liquid chromatography and gas chromatography



References:

1. Sharma B.K., (2000). Instrumental Methods of Chemical Analysis. India, Krishna Prakashan Media.
2. Skoog D.A., Holler F.J. & Stanley R.C. (2017). Principles of Instrumental Analysis, USA, Cengage Learning.
3. Willard H.H., Merrett L. L. Frank J.A.D. & Settle A. (1986). Instrumental Methods of Analysis. USA, CBS Pub. & Distributors.
4. Chatwal and Anand. (2016). Instrumental Methods of Chemical Analysis. India, Himalaya Publishing House Pvt. Ltd.
5. Lindsay, S. (1992). High Performance Liquid Chromatography. New York: Wiley Pub.
6. Robards K. Jackson P.E. & Haddad P.A. (2012). Principles and Practice of Modern Chromatographic Methods. Germany, Elsevier pub.
7. Saferstein R. (2001). Forensic Science Handbook Vol. I. London, Prentice Hall.
8. Shrivastava & Shrivastava (1991). Introduction to Chromatography. India, S. Chand & Co.
9. Silverstein R.M. & Webster F.X., (1997). Spectrometric Identification of Organic Compounds. USA, John Wiley & Sons, Inc.
10. Smith and Bogusz M. (2007). Handbook of Analytical Separation. Germany, Elsevier Pub.
11. Srivastava M. (2010). High-Performance Thin-Layer Chromatography (HPTLC). Germany, Springer Science & Business Media.
12. Stahl E. (2013). Thin Layer Chromatography. Germany, Springer Science & Business Media.
13. Subrahmanyam N. & Brij Lal (2004). A Text Book of Optics. India, S. Chand & Co
14. Thompson K.C. & Renolds R.J. (1978). Atomic Absorption Fluorescence & Flame Emission Spectroscopy: Practical Approach. London, Charles Griffin & Co.
15. Willard H. & Lynne L.M. (1986). Instrumental Methods of Analysis. USA, CBS Publishers & Distributors.



Institute for Excellence in Higher Education (IEHE), Bhopal

B.Sc. (Honour) Part-I

Semester- I

Subject: Forensic Science

Title: Instrumental Methods- Chemical (Practical)

Paper: Honour-I

Max. Marks: 100

SYLLABUS

1. Isolation of non-volatile poison by solvent extraction.
2. Extraction of ethanol by simple distillation.
3. Measurement of absorption maxima of some organic solvents by UV visible spectrophotometer.
4. To know the concentration of given liquid by colorimeter.
5. Separation of some metal ions by paper chromatography.
6. Separation of some basic drugs by thin layer chromatography.
7. Separation of some pesticide by thin layer chromatography.
8. To know practical working and handling of low voltage and high voltage electrophoresis.



Institute for Excellence in Higher Education (IEHE), Bhopal

B.Sc. (Honour) Part-I

Semester- I

Subject: Forensic Science

Paper: Honour-II/ Subsidiary

Title: Criminalistics

Max. Marks: 100

SYLLABUS

Crime scene management- I

Meaning of crime scene management, crime scene management- information management, technology management, logistic management, man power management, crime scene search methods.

Crime scene management- II

Classification of scene of crime, security of scene of crime, first responding officer at the scene of crime, duties of first responding officer, coordination between police personals and forensic scientists at crime scene, safety measures at crime scene, legal considerations at crime scenes.

Processing the crime scene

Processing the crime scene- Plan of Action, Note Taking, Crime Scene Search, Crime Scene Photography, Types of Cameras, Admissibility of Photographs. Videotape, Sketching the Crime Scene Information Included in Crime Scene Sketches, Equipment, Types of Sketches, Locating Objects in the Sketch, Computer Programs, Admissibility of Sketches, Collection of Evidence

Organizational set up of Forensic Science Laboratories –

Introduction of forensic science laboratories, set up of Central Forensic Science Laboratories, state of forensic science laboratories, Mobile unit, examiners of questioned document, Fingerprint Bureaus, police academies, other services.

Elementary Police Science

Police science: definition and scope, investigator and his qualities, interview of witness, interrogation of suspect, Investigation: FIR, Case diary, Cognizable and non-cognizable offences and their investigation.



References:

1. Saferstein: Criminalistics – An Introduction to Forensic Science, Prentice hall Inc. USA 91995)
2. James, S.H. and Nordby, J.J.; Forensic Science; an Introduction to Scientific and Investigative Techniques, CRC Press, USA (2003)
3. O' Hara & Osterberg: An Introduction to Criminalistics.
4. Sharma J D: Apradhon ka Vigyanik Anveshan.
5. Sharma B R: Forensic Science in Criminal Investigation and trials.

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Institute for Excellence in Higher Education (IEHE), Bhopal

B.Sc. (Honour) Part-I

Semester- I

Subject: Forensic Science

Paper: Honour-II/ Subs

Title: Crime Scene Management (Practical)

Max. Marks: 100

SYLLABUS

1. Fundamentals of sketching of scene of crime
2. Location of physical evidence at scene of crime
3. Role of investigating officer at scene of crime
4. Indoor scene of crime
 - (A) Sketching of a theft case
 - (B) Sketching of a dacoity case
 - (C) Sketching of homicidal case
5. Outdoor scene of crime
 - (A) Sketching of an accidental case (hit & run)
 - (B) Sketching of a loot case
 - (C) Sketching of homicide case
6. Report writing of case by investigating officer i.e. Case Diary, Panchnama



Institute for Excellence in Higher Education (IEHE), Bhopal

B.Sc. (Honour) Part-I

Semester- II

Subject: Forensic Science

Title: Instrumental Methods- Biological

Paper: Honour-I

Max. Marks: 100

SYLLABUS

Forensic Microscopy

Introduction, definition & history of microscopy, types of microscopes, working principles and components of various types of microscopes i.e. simple, compound, comparison, stereo microscope etc. **Forensic application microscopy.**

Centrifuge

Basic principles of separation, introduction to centrifuge, and types of centrifuge i.e. density gradient centrifugation, prerogative centrifugation, refrigerated & ultra-centrifuge. **Forensic application of centrifugation.**

Enzyme techniques

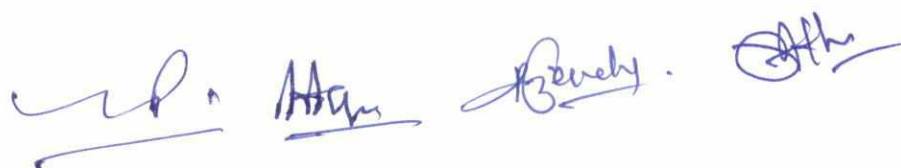
Introduction & definition of enzyme, classification of enzyme, nomenclature of enzyme, models of enzyme mechanism, enzyme kinetics, purification and protein estimation, enzyme assay techniques, UV-visible spectrophotometric methods, luminescence method, radioisotope methods, immuno-chemical method.

Electrophoretic techniques

Introduction, basic principles, classification of electrophoresis, factors affecting electrophoresis. Brief idea of low voltage electrophoresis, high voltage electrophoresis, gel electrophoresis, capillary electrophoresis, isoelectric focusing etc. **Forensic application of electrophoresis.**

Immunochemical methods

Introduction, Basic principles, production of antibodies, precipitation reaction, gel immunodiffusion, immune-electrophoresis.



References

1. Albert S., Bray B. Lewis D, Roberts K. & Watson J.D. (1989). Molecular Biology of Cell. New York: Garland Pub.
2. Ball S., (1991). Environmental Law – The Law and Policy relating to Protection of Environment. India: Universal Law Pub Co, Delhi.
3. Biology Methods Manual (1978). London: Metropolitan Police Forensic Science Laboratory.
4. Catts E.P. & Haskell N.H. (1990). Entomology and Death: A Procedural Guide. London: Joyce's Print Shop.
5. Clifford & B.J.(1971). The Examination and Typing of Bloodstains in the Crime Laboratory. USA: US Court Printing Press.
6. Edwin & Caney H. M. (1993). Human Genetics: The Molecular Revolution. London: Jones & Bartlett Pub.
7. Gardner E.J., Simmons M. I. & Snustad D.P.(1991). Principles of Genetics. New York: John Wiley.
8. Kimball & John W. (1974). Biology. New Delhi: Arvind Publishing Co.
9. Lewis. B. (1980). Gene IV. England: Oxford University Press.
10. Mauersberger H. R. (1954). Mathews Textile Fibres – Their Physical, Microscopic and Chemical Properties. New York: John Wiley.
11. Morrison & Robert D. (2000). Environmental Forensics Principles and Applications. New York: CRC Press.
12. 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.
13. Pandey R.P. (1998). Plant Anatomy. New Delhi: S. Chand.
14. Saferstein R. (1995). Criminalistics – An Introduction to Forensic Science. USA. Prentice Hall Inc.
15. Walker J.M. & Rapley R. (2009). Molecular Biology and Biotechnology. London: Royal Society of Chemistry.
16. Williams P. L. & Warwick R.(1980). Gray's anatomy. London: Churchill Livingstone.



Institute for Excellence in Higher Education (IEHE), Bhopal

B.Sc. (Honour) Part-I

Semester- II

Subject: Forensic Science

Paper: Honour-I

Title: Instrumental techniques- Biological (Practical)

Max. Marks: 100

SYLLABUS

1. To understand working and handling of simple microscope.
2. To understand working and handling of compound microscope.
3. To understand the handling of centrifuge
4. Separation of components of blood by centrifugation.
5. To perform experiment on low voltage electrophoresis
6. To perform experiment on high voltage electrophoresis



Institute for Excellence in Higher Education (IEHE), Bhopal

B.Sc. (Honour) Part-I

Semester- II

Subject: Forensic Science

Paper: Honour-II/ Sub

Title: Fundamentals of Forensic Science

Max. Marks: 100

SYLLABUS

Introduction to Forensic Science

Definition & historical development of forensic science in India as well as abroad, role of basic science in forensic science, need of forensic science, function of forensic science, basic principle of forensic science, **ethics in forensic science**, Forensic Scientist and the functions of a Forensic Scientist.

Branch and scope in Forensic Science

Branches of forensic science, **Application of forensic science in different sectors** i.e. Governmental, Private and NGO's, Forensic science in international perspectives **Code of conduct for forensic scientists**

Physical Evidence

Introduction and definition of physical evidence, classification of physical evidence- on the basis of class, nature and size, different search methods for physical evidences, collection, preservation, packaging, labelling, sealing and forwarding of physical evidences, chain of custody.

Evidences of Biological Origin

Different search methods for biological evidences, preservation, packaging, labelling, transportation and forwarding biological evidences, biological samples such as blood, semen, urine, saliva etc. precautions at the scene of crime while collecting evidences.

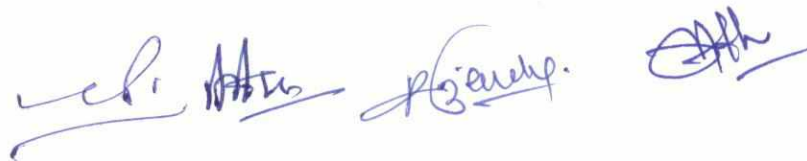
Evidences of Chemical Origin

Different search methods for chemical evidences, preservation, packaging, labelling, transportation and forwarding chemical evidences, biological samples such as blood, semen, urine, saliva etc. precautions at the scene of crime while collecting evidences



References:

1. Saferstein: Criminalistics – An Introduction to Forensic Science, Prentice hall Inc. USA 1995)
2. C.G.G. Aitken and D.A. Stoney; The use of statistics in Forensic Science, Ellis Harwood Limited, England (1991)
3. James, S.H. and Nord by, J.J.; Forensic Science; an Introduction to Scientific and Investigative Techniques, CRC Press, USA (2003)
4. O' Hara & Osterberg : An Introduction to Criminalistics.
5. Forest: Forensic Science, An Introduction.
6. Lee, Henry: Advances in Forensic Science.
7. Sharma J D: Vidhivigyan Avam Vish Vigyan
8. Sharma J D: Apradhonka Vigyanik Anveshan.
9. Sharma B R: Forensic Science in Criminal Investigation and trials.



Institute for Excellence in Higher Education (IEHE), Bhopal

B.Sc. (Honour) Part-I

Semester- II

Subject: Forensic Science

Paper: Honour-II/ Subs

Title: Fundamentals of Forensic Science (Practical)

Max. Marks: 100

SYLLABUS

1. Collection, preservation, packing & Labelling of physical evidence according to its nature i.e. biological: Evidences of biological origin like blood, saliva, hair etc.
2. Collection, preservation, packing & Labelling of physical evidence according to its nature i.e. chemical: pharmaceutical products, food, cement, primary explosives, petroleum products etc.
3. Collection, preservation, packing & Labelling of physical evidence according to its nature i.e. toxicological: plant poison, pesticides etc.
4. Collection, preservation, packing & Labelling of glass, soil, fiber, paint etc.

Visiting of Forensic Science Laboratory, Institutions and preparation of report for the visit.



Institute for Excellence in Higher Education (IEHE), Bhopal

B.Sc. (Honour) Part-II

Semester- III

Subject: Forensic Science

Paper: Honour-I

Title: Forensic Medicine and Anthropology

Max. Marks: 100

SYLLABUS

Basics of Forensic Medicine

Introduction, definition and scope of forensic medicine, medico legal experts and their role in criminal investigation, Subpoena & oath of medical expert, types of medical evidence, kinds of witness and rules for giving evidence.

Personal Identification

Introduction, definition and importance of personal identification, parameters contributing to personal identification, Race, Sex, Age, Complexion, Features & Photographs, Fingerprints, Footprints, tattoo marks, lip prints, ear prints, scars, occupational Marks, handwriting, personal belongings, Voice & Speech, DNA, superimposition techniques for skull, disputed paternity

Injury

Introduction and definition of injury, classification of injuries and their characteristics, difference between anti mortem and post mortem injuries, medico legal importance of injuries

Death and Post Mortem Examination

Introduction, definition of Thanatology, modes of death (coma, syncope, asphyxia) and their characteristics, sign of death, time since death, post mortem changes, cause of death, suspended animation and medico legal importance of death

Post mortem examination, definition, classification, concepts and objectives, Precaution to be taken during Post Mortem Examination, exhumation and medicolegal importance of post mortem examination

Forensic Anthropology

Introduction and definition of forensic anthropology, historical background, nature and scope of forensic anthropology, somatometry, osteometry and craniometry their forensic importance recovery and identification of skeletal remains in accident cases and mass disasters, portrait parle, forensic odontology and bite marks examination, facial reconstruction, skull superimposition

References:

1. Aggrawal A. (2016). Textbook of Forensic Medicine and Toxicology. India: Avichal Publishing Company.
2. Parikh C.K. (1972). Forensic Medicine and Toxicology. India: Medical Publications.
3. Modi J.S. (2011). Medical Jurisprudence and Toxicology. India: Law Publishers.
4. Seth S. (2018). Review of Forensic Medicine. 6th edit. India: PeePee Publishers
5. Jason P. J. & Simpson K. (2014). Simpson's Forensic Medicine, NY: CRC Press.
6. Simpsen K. & Knight B. (1996). Forensic Medicine 11th edit. USA: Taylor & Francis.
7. Thompson T., Black S. (2006). Forensic Human Identification: An Introduction. NY: CRC Press.
8. Vij K. (2014). Textbook of Forensic Medicine & Toxicology: Principles & Practice. India: Elsevier Health Sciences.
9. Adams B. J. (2007). Forensic Anthropology. NY: Chelsea House Publishing.
10. Houck M. M. (2017). Forensic Anthropology. Academic press
11. Christensen A. M., Nicholas V., Passalacqua & Bartelink (2014). Forensic Anthropology: Current Methods and Practice USA: Elsevier Press.



Institute for Excellence in Higher Education (IEHE), Bhopal

B.Sc. (Honour) Part-II

Semester- III

Subject: Forensic Science

Title: Forensic Medicine and Anthropology (Practical)

Paper: Honour-I

Max. Marks: 100

SYLLABUS

1. Recording of bite marks and their comparison.
2. Recording of lip prints and their comparison.
3. Recording of ear prints and their comparison.
4. Individualization of a person by ABO and Rh blood grouping method.
5. Identification of bones of the human skeleton.
6. Measurements of long bones for the determination of sex differences.
7. Photographic superimposition of the skull.
8. Identification of nature of wound.



Institute for Excellence in Higher Education (IEHE), Bhopal

B.Sc. (Honour) Part-II

Semester- III

Subject: Forensic Science

Paper: Honour-II/ Subs

Title: Forensic Biology and Serology

Max. Marks: 100

SYLLABUS

Fundamentals of Biology

Cell: Definition, theories, cell organelles and their functions, difference between eukaryotic and prokaryotic cell, difference between plant and animal cell, difference between somatic and germinal cell.

General idea about anatomy and physiology of digestive, respiratory, circulatory, skeleton, nervous, excretory and reproductive system etc.

General idea about amino acids, proteins, carbohydrates

Forensic Biology

Hair: Structure, development, anatomy, pigmentation, identification characters, Forensic examination of Hair

Fibers: Definition, classification, characters, difference between plant and animal fiber and forensic aspects of fiber examination – density, microscopy, hot stage microscopy, fluorescent, refractive index, birefringence, dye analysis and spectroscopic techniques

Forensic Botany: Examination of plant exhibits by morphological features, identification and examination of pollen grains, diatoms and their forensic significance.

Forensic Entomology: Definition, forensically important species of insect, significance of entomology in forensic science.

Biological fluids and their examination

Blood: Composition, histology, different blood grouping methods, examination of blood and its stains.

Semen: Composition, structure of spermatozoa, methods of detection and identification of seminal stains

Composition of saliva, urine and other biological fluids and their examination

Determination of origin of species, antigens and antibodies, antigen-antibody reaction, biochemical markers of individuality, basic concept of DNA profiling



References

1. Saferstein R. (1995). Criminalistics – An Introduction to Forensic Science. USA. Prentice Hall Inc.
2. Gunn A. (2019). Essential Forensic Biology, 3rd edit. Wiley international
3. Li R. (2015). Forensic Biology 2nd edit. CRC Press
4. Albert S., Bray B. Lewis D, Roberts K. & Watson J.D. (1989). Molecular Biology of Cell. New York: Garland Pub.
5. Catts E.P. & Haskell N.H. (1990). Entomology and Death: A Procedural Guide. London: Joyce's Print Shop.
6. Clifford & B.J.(1971). The Examination and Typing of Bloodstains in the Crime Laboratory. USA: US Court Printing Press.
7. Mauersberger H. R. (1954). Mathews Textile Fibres – Their Physical, Microscopic and Chemical Properties. New York: John Wiley.
8. Pandey R.P. (1998). Plant Anatomy. New Delhi: S. Chand.
9. Walker J.M. & Rapley R. (2009). Molecular Biology and Biotechnology. London: Royal Society of Chemistry.
10. Williams P. L. & Warwick R.(1980). Gray's anatomy. London: Churchill Livingston.

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Institute for Excellence in Higher Education (IEHE), Bhopal

B.Sc. (Honour) Part-II

Semester- III

Subject: Forensic Science

Paper: Honour-II/ Subs

Title: Forensic Biology and Serology (Practical)

Max. Marks: 100

SYLLABUS

1. Primary examination of blood samples.
2. Primary examination of semen samples.
3. Primary examination of saliva samples.
4. Primary examination of urine samples.
5. Identification of species from different hair samples.
6. Examination of different fiber by physical methods.
7. Microscopic examination of pollen grains.
8. Collection and identification of forensically important insects.

Prof. Dr. P. J. Singh 

Institute for Excellence in Higher Education (IEHE), Bhopal

B.Sc. (Honour) Part-II

Semester- IV

Subject: Forensic Science

Paper: Honour-I

Title: Forensic Physics and Ballistic

Max. Marks: 100

SYLLABUS

Forensic Physics

Density, Refractive Index, Birefringence and Other Optical Properties of Crystalline Material. Examination of Fiber, Soil, Dust, Paints, Glass and Glass Fracture, Tool Marks and Explosives.

Restoration of Erased / Obliterated Marks, Examination of Wire/ Cables, Counterfeit Coins, Physical Matching of Severed / Broken Objects

Speaker Identification and Tape Authentication:

Voice Production Theory-Vocal Anatomy, Speech Signal Processing & Pattern Recognition- Basic Factors of Sound in Speech, Acoustic Characteristics of Speech Signal, Fourier Analysis, Frequency & Time Domain Representation of Speech Signal, Analogue to Digital Signal and Conversion, Fast Fourier Transform, Quantization, Digitization and Speech Enhancement, Analysis of Audio-Video Signal for Authenticity

General Idea about Firearms

History and Background of Firearms, Their Classification and Characteristics, Various Components of Firearms, Different Systems and Their Functions, Rifling - Purpose of Rifling, Types of Rifling, Trigger and Firing Mechanism, Cartridge-Firing Mechanism, Projectile Velocity Determination Identification of Origin, Improvised/Country-Made/Imitative Firearms and their Constructional Features

Ammunition

Types of Ammunition, Classification and Constructional Features of Different Types of Cartridges, Types of Primers and Priming Composition, Propellants and their Compositions, Various Types of Bullets and Compositional Aspects, Smooth Bore Firearm Projectile, Identification of Origin, Improvised Ammunition and Safety Aspects for Handling Firearms.

Internal & External Ballistics

Definition, Ignition of Propellants, Shape and Size of Propellants, Manner of Burning, Various Factors Affecting the Internal Ballistics, Principal Problems of Exterior Ballistics, Vacuum Trajectory, Effect of Air Resistance on Trajectory, Base Drag, Yaw, Shape of Projectile and Stability, Ballistics Coefficient and Limiting Velocity, Measurements of Trajectory Parameters.



References:

1. Bengold & Moryson N. (1999). Speech and Audio Signal Processing. USA, John Wiley & Sons.
2. Hatcher, Jury & Weller. (1977). Firearms Investigation, Identification and Evidence. Harrisburg, Stackpole Books.
3. Heard B.J. (1997). Hand book of Firearms and Ballistics. London, John Willey.
4. Johari M. (1980) Identification of Firearms, Ammunition and Firearms Injuries. India, BPR&D.
5. Nickolls, L.C. (1956).Scientific Investigation of Crime. London, Bulterwest.
6. O'Hara C.E. & Osterburg J.W. (1972). An Introduction to Criminalistics. Blomington, Indiana University Press.
7. OrdogG.J. (1983). Management of Gunshot Wounds. USA, Elsevier.
8. Rose P. (2001). Forensic Speaker Identification; Forensic Science Series. London, Taylor and Francis.
9. Saferstein R. (1988). Forensic Science Handbook. NJ: Prentice Hall, Eglewood Cliffs.
10. Sears F.W., Zemansky M.W. and Young H.D., (1988).University Physics. California, Addition- Wesley pub.
11. SellieretalK. G. (1994).Wound Ballistics and the Scientific Background. London, Elsevier.
12. Sharma B.R. (2003). Forensic Science in Criminal Investigation and Trials. India, Universal Law House.
13. Warlow T.A. (1996). Firearms-The Law and Forensic Ballistics. London, Taylor and Francis.
14. Working Procedures Manual: Ballistics. (2000) India, BPR & D Pub.



Institute for Excellence in Higher Education (IEHE), Bhopal

B.Sc. (Honour) Part-II

Semester- IV

Subject: Forensic Science

Paper: Honour-I

Title: Forensic Physics and Ballistic (Practical)

Max. Marks: 100

SYLLABUS

1. Identification and Matching of Dust/ Soil Sample by Physical Method (Including Density Gradient Method)
2. Calculation of Refractive Index of the Glass. *slab.*
3. Restoration of Erased Punched Mark on Metal Piece by Chemical Treatment.
4. Digital Matching of Suspected Tyre marks
5. Comparison of Tool Marks
6. Comparison of Fired Cartridge/ Bullet
7. Physical Matching of Cloth Sample.
8. Identification of Glass Fractures.
9. Identification of Shots and Pallets.



Institute for Excellence in Higher Education (IEHE), Bhopal

B.Sc. (Honour) Part-II

Semester- IV

Subject: Forensic Science

Paper: Honour-II/ Subs

Title: Cyber Forensic

Max. Marks: 100

SYLLABUS

Basics of Computer and internet

Introduction, History and development of computers, hardware, software and other accessories, operating system, use of computer in criminal activities, world wide web, search engine, email, chat etc. methods of storing data

Computer/ Cyber Crime

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. 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, computer terrorism, hate speech, private and national security in cyber space. An overview of hacking, spamming, phishing and stalking.

Cyber Crime investigation

Computer forensic experts and their role in cyber-crime investigation, challenges and limitations

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. Legal and privacy issues. Examining forensically sterile media. Restoration of deleted files. Password cracking and E-mail tracking. Encryption and decryption methods. Tracking users.

Computers and networking

Introduction to network, LAN, WAN and MAN. Concept of network security and cybercrime investigation. Basic of security planning: Multi layered security, intrusion triangle, removing intrusion opportunities, importance of physical security, protecting server, work station and network devices, protection of removable storage disks.

Concept of Network Security and Cyber-Crime Investigation, Relevant Section of Information Technology (IT) Act 2000.



References

1. Albert J. M. & Guillosoy F. (2012). Cyber Forensics: From Data to Digital Evidence. New Jersey: Wiley Corporate F&A.
2. Casey E. (2009). Handbook of Digital Forensics and Investigation. USA: Academic Press.
3. Marcella A. & Menendez D. (2007). Cyber Forensics: A Field Manual for Collecting, Examining, and Preserving Evidence of Computer Crimes. NY: CRC Press.
4. R.K. Tiwari, P.K. Sastry and K.V. Ravikumar, (2003). Computer Crimes and Computer Forensics, Select Publishers, New Delhi
5. C.B. Leshin, (1997). Internet Investigations in Criminal Justice, Prentice Hall, New Jersey
6. R. Saferstein, (2004). Criminalistics, 8th Edition, Prentice Hall, New Jersey
7. E. Casey, (2000). Digital Evidence and Computer Crime, Academic Press, London

Three handwritten signatures in blue ink are visible. The first signature on the left is stylized and appears to be 'ch. HAZ'. The middle signature is more fluid and cursive, possibly reading 'K. B. Sastry'. The signature on the right is also cursive and appears to be 'R. Saferstein'.

Institute for Excellence in Higher Education (IEHE), Bhopal

B.Sc. (Honour) Part-II

Semester- IV

Subject: Forensic Science

Paper: Honour-II/ Subs

Title: Computer Forensic (Practical)

Max. Marks: 100

SYLLABUS

1. Collection and Handling of Digital Evidences.
2. Software for Protection of Data & Security.
3. Software's in Detection of Various Types of Cyber Crime.
4. To trace routes followed by e-mails and chats.
5. To identify the IP address of the sender of e-mails.
6. Use of email, creating email sending and receiving of email with and without attachment.
7. To identify, seize and preserve digital evidence from crime scenes.
8. To detect deletions, obliterations and modifications of files using encase software.
9. Case study on cyber-crimes.



SYLLABUS

Basics of Criminology

Definition, brief history of criminology, aims and scope of criminology.

Theories of criminal behavior – classical and neo-classical theory, Italian and body type, sociological, psychological theory.

Criminal profiling, understanding modus operandi. Investigative strategy.

Role of media and mass communication in

Crime

Elements, nature, causes and consequences of crime. Deviant behavior. Hate crimes, organized crimes and public disorder, domestic violence and workplace violence. White collar crimes.

Victimology. Juvenile delinquency. Social change and crime.

Psychological disorders and Criminality. Situational crime prevention.

Types of Criminals

Violent criminals, property offenders, offenders of public morality, career and occupational criminals.

Etiology of Crime

Biological factors, Psychological factors, cultural areas as factors of crime, home and family factors, social institution, public agencies of communication

Criminal Justice System

Broad components of criminal justice system. Policing styles and principles. Police's power of investigation. Filing of criminal charges. Community policing.

Policing a heterogeneous society. Correctional measures and rehabilitation of offenders. Human rights and criminal justice system in India.



Institute for Excellence in Higher Education (IEHE), Bhopal (M.P.)

B.Sc. (Honour) Part - III

Semester- V

Subject: Forensic Science

Paper Title: Crime and Society - Practical

Paper: Honour-I

Max. Marks: 100

SYLLABUS

1. To review past criminal cases and elucidate which theory best explains the criminal behavior of the accused.
2. To review crime cases where criminal profiling assisted the police to apprehend the accused.
3. To cite examples of crime cases in which the media acted as a pressure group.
4. To correlate deviant behavior of the accused with criminality (take a specific example).
5. To examine a case of juvenile delinquency and suggest remedial measures.
6. To review the recommendations on modernization of police stations and evaluate how far these have been carried out in different police stations.
7. To visit a 'Model Police Station' and examine the amenities vis-à-vis conventional police stations.
8. To prepare a report on interrogation cells and suggest improvements.



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9. J.L. Jackson and E. Barkley, *Offender Profiling: Theory, Research and Practice*, Wiley, Chichester (1997).
10. R. Gupta, *Sexual Harassment at Workplace*, LexisNexis, Gurgaon (2014).



Institute for Excellence in Higher Education (IEHE), Bhopal (M.P.)

B.Sc. (Honour) Part - III

Semester- V

Subject: Forensic Science

Paper Title: Criminal Law and Criminal Justice System - Theory

Paper: Hon-II/Subs

Max. Marks: 100

SYLLABUS

Law to Combat Crime

Classification – civil and criminal cases. Essential elements of criminal law. Constitution and hierarchy of criminal courts in India. Organization of courts at block, district and state level, organization of Supreme Court of India, introduction to Labor Court, Juvenile Court etc. and their power Criminal Procedure Code. Cognizable and non-cognizable offences. Bailable and non-bailable offences. Police and judicial custody.

Summary trials – Section 260 (2). Judgments in abridged forms – Section 355.

Indian Penal Code (1860)

Offences against persons – Sections 121A, 299, 300, 302, 304A, 304B, 307, 309, 319, 320, 324, 326, 351, 354, 359, 362. Sections 375 & 377 and their amendments.

Offences against property Sections – 378, 383, 390, 391, 405, 415, 420, 441, 463, 489A, 497, 499, 503, 511.

Indian Evidence Act (1872)

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.

Code of Criminal Procedure (1973) - Sections 26, 27, 29, 31, 144, 154-158, 176, 291-293.

Constitution of India - Preamble, Fundamental Rights Art. 13, 14, 15, 19, 20, 21, 22, 32, Directive Principles of State Policy. – Articles 14, 15, 20, 21, 22, 51A.

Acts Pertaining to Socio-economic and Environmental Crimes -

Narcotic Drugs and Psychotropic Substances (NDPS) Act (1985). Drugs and Cosmetics Act (1940). Essential Commodities Act (1955). Explosive Substances Act (1908).

Prevention of Food Adulteration Act (1954), Arms Act (1959), Dowry Prohibition Act (1961), Wildlife Protection Act (1972). Environment Protection Act (1986). Prevention of Corruption Act (1988). IT Act (2000)

Institute for Excellence in Higher Education (IEHE), Bhopal (M.P.)

B.Sc. (Honour) Part-III

Semester- V

Subject: Forensic Science

Paper Title: Criminal Law and Criminal Justice System - Practical

Paper: Hon-II/Subs

Max. Marks: 100

SYLLABUS

1. To prepare a schedule of five cognizable and five non-cognizable offences.
2. To study the powers and limitations of the Court of Judicial Magistrate of First Class.
3. To study a crime case in which an accused was punished on charge of murder under Section 302.
4. To study a crime case in which an accused was punished on charge of rape under Section 375.
6. To cite example of a case in which the opinion of an expert was called for under Section 45 of the Indian Evidence Act.
7. To prepare a schedule of persons convicted under Narcotics, Drugs and Psychotropic Act statistically analyze the age group to which they belonged.
8. In light of Section 304B of the Indian Penal Code, cite a case involving dowry death.



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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).
6. Criminal Procedure Code, 1973.
7. Indian Evidence Act, 1872.
8. Indian Penal Code, 1860.

The block contains four handwritten signatures in blue ink. From left to right: a signature that appears to be 'V.P. Sarthi', a signature that appears to be 'A.S. Pillia', a signature that appears to be 'R.C. Nigam', and a signature that appears to be 'M. Monir'.

Institute for Excellence in Higher Education (IEHE), Bhopal (M.P.)

B.Sc. (Honour) Part-III

Semester- VI

Subject: Forensic Science

Paper Title: Forensic Pharmacology and Drug of Abuse - Theory

Paper: Honour-I

Max. Marks: 100

SYLLABUS

General considerations

Definition of Drugs, difference between drugs and poisons, effect of dose, their behavior and their effects on the body

Legal considerations: Drug nomenclature, Drug classes, Drug modalities, Routes of administration and elimination.

Pharmacokinetics I : Absorption , Bioavailability, Distribution, Body compartments ,Volume of distribution , Phase 1 and 2 reactions, First-pass metabolism , Excretion, First- and zero-order kinetics Therapeutic window.

Pharmacodynamics: Receptor and ligand binding, Dose response relationships

Individual variation, Pharmacogenetics

Targets of Drug Action: Common drug mechanisms, Receptors, enzymes, ion channels, and transporters, New drug mechanisms, Protein-based, gene-based, and cell-based therapies

Drug of abuse in sports: Introduction, common prohibited substances, General Idea about NDPS Act, Drug and Cosmetics Acts, Sections 15-32, 37

Medicinal and synthetic medicinal chemistry of Drug of abuse, Understand the effects of drugs and alcohol on driving impairment.



Institute for Excellence in Higher Education (IEHE), Bhopal (M.P.)

B.Sc. (Honour) Part-III

Semester- VI

Subject: Forensic Science

Paper Title: Forensic Pharmacology and Drug of Abuse - Practical

Paper: Honour-I

Max. Marks: 100

SYLLABUS

1. To identify drugs of abuse by spot test
2. To separate the drug of abuse by thin layer chromatography
3. To perform color test of different substances of abuse like nicotine, cannabis etc.
4. Extraction of alcohol content from the country made liquor using simple distillation technique and its preliminary examination.
5. To carry out quantitative estimation of ethyl alcohol.
6. To carry out separation of amino acid by paper chromatography
7. To carry out separation of enzymes by electrophoresis techniques



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2. Bardale R. (2011). Principles of Forensic Medicine & toxicology. India: Jaypee Brothers Medical Publishers (P) Ltd.
3. R. S. Satoskar, S. D. Bhandarkar & nirmala N. Rege. (2009). Pharmacology and Pharmacotherapeutics. Popular Prakashan
4. K. D.Tripathi. (2013).Essentials of Medical Pharmacology. Jaypee Brothers Medical Publishers
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Institute for Excellence in Higher Education (IEHE), Bhopal (M.P.)

B.Sc. (Honour) Part-III

Semester- VI

Subject: Forensic Science

Paper Title: Tools and Techniques in Forensic Science - Theory

Paper: Hon-II/Subs

Max. Marks: 100

SYLLABUS

General considerations

Crime detection devices: UV, IR, X-ray, their nature and application, Detective dyes, speed detection devices

Tools: Basic Kits, Investigators Kit, Tools used in Mobile laboratory

Microscopy: Definition, types of Microscopes and their forensic significance

Chromatography: Definition, basic principles, types of chromatographic methods, detectors, forensic application Preparation of TLC Plates

Documents: Definition, Importance, nature problems and preliminary examination, Forensic significance of Question Documents

Forensic Photography: Basics Principle and application of photography in Forensic Science, 3D photography, photographic evidence, Digital photography, videography, crime scene & laboratory Photography

Fingerprints: Definition, History & Development, Fundamental principal Types of fingerprint, classification of fingerprint, Forensic application of fingerprint

Ballistics: definition of Ballistics, Forensic Ballistics, types of forensic Ballistics, firearms, History of firearms, classification of firearms, ammunition and its composition, GSR and its Examination, Forensic Significance

Recent Advanced techniques used in Forensic Science: Lie Detector, Voice examination, DNA Profiling, Narco analysis, Brain mapping

Institute for Excellence in Higher Education (IEHE), Bhopal (M.P.)

B.Sc. (Honour) Part-III

Semester- VI

Subject: Forensic Science

Paper Title: Tools and Techniques in Forensic Science - Practical

Paper: Hon-II/Subs

Max. Marks: 100

SYLLABUS

1. To take photographs of crime scene exhibits at different angles
2. To record videos of different crime scene.
3. To carry out thin layer chromatography of ink samples
4. To identify drugs sample using UV-Visible spectroscopy
5. To study addition, obliteration, and erasures in handwriting sample
6. To examine security features of currency notes, passports, stamps etc.
7. To investigate physical and chemical methods of fingerprint detection
8. To carry out ten digit classification of fingerprint

The block contains three handwritten signatures in blue ink. The first signature on the left is a cursive name, possibly 'Vijay'. The middle signature is also cursive and appears to be 'Rajendra'. The third signature on the right is a stylized, circular mark followed by a horizontal line.

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