

M.A./M.Sc. in Forensic Science (Self-Finance Programme)

Semester One

Paper- I : Fundamentals of Forensic Science

100

Unit - I

Forensic Science:History and Development of Forensic Science,Definition, Aims,Branches,Role and functions of different specialties in the modern context.

Unit - II

Basic Principles of Forensic Science: Law of individuality, Principle of exchange, Law of progressive exchange,Principle of comparison, Principle of analysis, Law of probability. Ethical laws and duties in Forensic Science

Unit - III

Evidence: meaning and its several forms, Presentation of Expert Evidence: Data, Reports, Evidence in the Court, presenting counsel's contributions, defense counsel's role, court's participation. Evidentiary clue. Awareness of Forensic Science in crime investigation, Role of Media, Human Rights

Unit – IV

Criminal Justice System: Police personnel, experts and laboratories. Forensic Science Laboratories in India: CFSL, FSL, GEQD, FPB, NICFS, Central Detective Training School, NCRB (Maintenance of Crime Records), Mobile Forensic Science Laboratory.

Suggested Books

- Sharma B.R.(2005) Forensic Science in Criminal Investigation and Trials. (4thEdition), Universal Law Publishing Co. New Delhi.
- Sharma B.R.(2006). Scientific Criminal Investigation, Universal Law PublishingCo. New Delhi.
- Nanda, B.B. and Tewari, R.K. (2001) : Forensic Science in India : A vision for the twenty first century Select Publisher, New Delhi.
- James, S.H and Nordby, J.J.. (2003) Forensic Science : An introduction to scientific and investigative techniques CRC Press, USA.
- Barnett (2001) : Ethics in Forensic Science.
- Osterburg : Crime Laboratory.
- Saferstien : Forensic Science, Handbook, Vol. I, II & III, Prentice Hall Inc. USA.
- Lundquest&Curry : Forensic Science, Vol I to IV, 1963, Charls C. Thomas, Illinois, USA.

Paper-II : Forensic Anthropology I

100 Marks

Unit -I

Forensic Anthropology: Meaning, Aims & Objectives, Historical Development, and its relevance in forensic science.

Unit -II

Anthropometry and Anthroposcopy: Bertillonage system of Identification, scope and present status. Applications of cephalo-facial and post-somatometry in forensic science, Anthroposcopy and its application in individual identification.

Unit -III

Forensic Osteology: elementary study of human skeleton, personal identification from bones, determination of age, sex, stature, reconstruction of skull and face.

Forensic Odontology: definition, personal identification from teeth, morphological variations and bite marks.

Unit -IV

Human Physique and its classification, Viola's and Kretschmer's classification, Carter, Sheldone method of somatotyping and its evaluation. Somatotyping criteria : Heath-Carter anthropometric Method of Somatotyping. Somatochart and Somatoplot, Categories of Somatotypes

Suggested Books

- Steward, T.D. (1979). Essentials of Forensic Anthropology, Thomas, Springfield.
- Krogman, W.M. (1962) Human Skeleton in Forensic Medicine, Thomas, Springfield, Illinois.
- Krogman, W.M. and Iscan M.Y. (1986) Human Skeleton in Forensic Medicine, Thomas, Springfield, Illinois.
- Wheeler R.C. (1964) A Text Book of Dental Anatomy and Physiology. W.B. Saunders Co. London.
- Mantague M.F.A. (1960). Introduction to Physical Anthropology. Thomas Springfield.
- Comas J. (1960) Manual of Physical Anthropology, Charles C. Thomas, Springfield, Illinois.
- Burns K.R. (1999) Forensic Anthropology training Manual, prentice Hall Inc.
- Govindiah, D. (1999) Colour Atlas of Forensic Medicine, Jaypee Brothers Medical Publishers.
- Stimson, P.G. and Mertz C.A. (1997) Forensic Dentistry CRC Press.

- Dix, J. and Ernst, M.F. (1999) Handbook for Death Scene Investigators, CRC Press.
- El-Najjar M.Y. and McWilliams K.R. (1978). Forensic Anthropology: The Structure, Morphology and Variation of Human Bone and Dentition, Charles C. Thomas, Springfield, Illinois.
- Taylor R.M.S. (1978). Variation in Morphology of Teeth: Anthropological and Forensic Aspects: Thomas, Springfield, Illinois

Paper- III : Criminalistics and Photography

100 Marks

Unit - I

Concept and Definition of Crime, Causes of Crime, Social Change and Crime, Control and Prevention of Crime in context with Organization, Industrialization, and Family set up. Criminal Profiling: Introduction, Importance, Profile of the victim and culprit, Understanding Modus Operandi and its role in Criminal Investigation, investigative strategy, limitations.

Unit – II

Criminal Procedure Code-291,292,293. Constitution of Courts-Hierarchy of Courts and their Powers, Evidence in Enquiries and Trials, Expert Witness (291-93) Lok Adalats, Lok Ayukts and Juvenile Courts. Indian Penal Code and criminal behaviour

Unit - III

Theories of criminality. The hereditary and environmental components of criminal behaviour and insanity. Psychology of Criminal predisposition and criminal behaviour. Mental defect. Hostile, manic and violent manifestations and criminality. Truth & Deception, Psychology of lying, Various methods of lie detection, Principles of Polygraph, Legal aspects.

Unit - IV

Photography: Basic principles and techniques, Exposing, Developing and Printing, Modern Developments in Photography, Digital Photography, Videography/High speed videography, Crime scene and Laboratory photography.

Facial reconstruction techniques including superimposition

Suggested Books

- Kleiner, Munay (2002) : Handbook of Polygraph testing. Academic Press.
- Hess, A.K. and Weiner, I.B. (1999) Handbook of Forensic Psychology 2nd Ed. John Wiley & sons.
- Bruce A. Arrigo (2000) Introduction to Forensic Psychology Academic Press, London

- N. Gilbert; Criminal Investigation; Third edition, Macmillan Publishing company, 1993.
- Joe Nicharrs; (1999) Investigative Forensic Hyponsis CRC Press LLC, 1999.
- Bernard Robertson and G.A. Vignaur; (1995) Interpreting evidence John Wiley and Sons Ltd. 1995.
- William J. Bodziak (1989) Footwear Impression Evidence Elsevier Science Publishing Co. New York, 1989.
- Saferstein : Forensic Science Handbook, Vol I, II & III, Prentice Hall Inc. USA.
- Saferstein : Criminalistics, 1976, Prentice Hall Inc. USA..
- Deforest, Gaenssellen&Lee : Introduction to Criminalistics..
- Criminology and Criminal Law Ahuja, R. 1996. Sociological Criminology. New Delhi: Rawat.
- Siddique, A.1993. Criminology: Problem and Prospective. Lucknow: Eastern Book Company.
- Criminal Procedure Code.
- Indian Penal Code.
- Indian Evidence Act.
- Indian Constitution.
- Paul, T., 1960. Crime, Justice and Correction. McGraw Hill: New York.
- Rao, S.V., 1981. Dynamics of Crime: Spatial and Socio Economic Aspects of Crime in India. New Delhi: I.I.P.A.
- Saxena, N.S., 1987. Law and Order in India. New Delhi: Abhinav.
- Sutherland, E.H. and Cressey.1978. Criminology. London: Lippincott Company.

Paper-IV : Practical

100 Marks

Paper - V : Practical

A. Introduction to human skeleton. personal identification through skeletal/anatomical features. Dental, cranial and post cranial features.

B. Introduction to the practice of Human Somatometry and Somatoscopy and its applications in Forensic Sciences. Somatoscopy and Somatometry (cranio-facial and other body measurements

Semester Two

Paper V : Forensic Anthropology – II

100 Marks

Unit-I

Dermatoglyphics: History and development of finger prints as a science for personal, identification, Development of volar pads, ridges, factor affecting alignment of ridges, and transition of configuration, types, and variations in finger, palmar and sole prints. Basics of taking inked prints, other devices and material for recording prints.

Unit-II

Chance Finger Prints: Latent prints, plastic prints, causes, Development of latent finger prints: Conventional methods, Chemical methods, enhancement of latent prints, Biological methods of development of latent prints on skin. Basis of comparison: class characteristics, individual characteristics, various types of ridge characteristics. Automatic Finger Print Identification system (AFIS), digital Image processing of finger prints and their enhancement

Unit-III

Hair: morphology of hair, distinction between human and animal hair, differentiation of scalp, body of head hair and hair of other body surface including pubic hair; determination of age and sex from hair; individual and population differences.

Unit-IV

Composition of blood, genetics of ABO, MN, Rh blood group systems, ABH secretion and other genetic traits; application of sero-genetic, biochemical and immunological markers in personal identification and paternity disputes.

Molecular anthropology & basics of DNA profiling technique and its application in Crime detection.

Essential Readings:

Cumings H. and Midlo C. (1961) Fingerprints, Palm and Sole. New York Dover.

Race R.R. and Sanger R. (1975). Blood groups of Man, Balchwell Scientific Publications, Oxford.

Boorman K.E. and Dood, B.E. (1961) Introduction to Blood Group Serology-Theory Techniques, Practical Applications, Apparatus, Little, Brown U.S.A.

Bridges, B, (1942) Practical Fingerprinting. Funk and Wagnalls Co. New York.

3. James F. Cowger; Friction Ridge skin CRC Press London, 1993.
4. Cummins & Midlo : Finger Prints, Palms and Soles, 1943, The Blakiston office London.
5. Cherril, F.R. : The Finger Prints. System at Scotland Yard, 1954; Her Majesty's office, London.

6. Wentworth & Wilder : Personal Identification, 1948. R. G. Badger. Boston.
7. Mehta, M. K. : Identification of Thumb Impression & Cross Examination of Finger Prints, 1980 N. M. Tripathi (P) Ltd. Bombay.
8. Moenssens : Finger Prints Techniques, 1975, Chitton Book Co., Philadelphia, New York.
9. Chatterjee S.K. and Hagne R.V. (1988) : Finger Print or Dactyloscopy and Ridgeoscopy.
10. Robertson, J. (1996): Forensic Examination of Hair. Taylor and Francis, USA.

Paper VI : Medical Jurisprudence & Toxicology

100 Marks

Unit- I

Medical Jurisprudence: Forensic Medicine, meaning and its branches of medicine namely- anatomy, pathology, therapeutics etc. The application of knowledge gained from the sub-disciplines of Forensic medicine.

Unit- II

Death investigations: time and cause of death, Post-mortem examination. The scientific assembly of evidences borne by the dead body and construction of reasonable inferences. Medical matters and their interaction with law. Collection and preservation of viscera for various types of poisons: Choice of preservatives, containers and storage

Unit – III

Forensic Toxicology: Introduction, Role of the toxicologist, significance of toxicological findings, poisons, definition, classification on the basis of their origin, physiological action and chemical nature, poisons and poisoning in India,

Unit- IV

Management of Toxicological cases in the hospital: Signs and symptoms of common poisons, antidotes. Alcoholism, and Drug-addiction. Narcotics: The nature of narcotics and other substances producing intoxicating and hallucinatory effects.

Suggested Readings

1. Ret Newman, Micheal Gilbert, Kevin Lothridge; GC-MS Guide to Ignitable Liquids, CRC Press, LLC, 1999.
2. Modi's: Medical Jurisprudence & Toxicology, M. M. Trirathi Press Ltd. Allahabd, 1988.
3. S.N. Tiwari: Analytical Toxicology, Govt. of India Publications, New Delhi, 1987.
4. Saferstein, R: Forensic Science Hand Book, Vol I, II and III, Pretince Hall, NI, 1982.
5. Curry: Analytical Methods in Human Toxicology, Part II, 1986.

10. Casarett& Doll Toxicology : The Basic Science of poisons.
 11. Curry, A.S. : Poison Detection in Human Organs, 1976.
 12. Holfmann, F.G.: Handbook of Drug and Alchoho Abuse.
 13. Arena Poisoning: Chemistry, Symptoms and Treatment.
 14. Froede, R.C.: The Laboratory Management of the Medico-Legal, Specimen Analytical Chemical Laboratory Sciences.
 15. Connors, K.: A text book of Pharmaceuticals analysis, Interscience, New York, 1975.
 16. Gleason, M.N. et. al.: Clinical Toxicology of Commercial products, Williams and Williams, Baltimore USA, 1969.
1. Curry : Analytical Methods in Human Toxicology, Part II, 1986.
 2. Casarett& Doll Toxicology : The Basic Science of poisons.
 3. Clark, E.G.C. : Isolation and identification of Drugs, VI and Vol. II, 1966, 1975-1986.
 4. Curry, A.S. : Poison Detection in Human Organs, 1976.
 5. Curry, A.S. : Advances in Forensic Chemical Toxicolo, 1972.
 6. Holfmann, F.G. : Handbook of Drug and Alchoho Abuse.
 7. Turner : Drugs & Poisons.
 8. Samford : Poisons Their Isolation Identification.
 9. Dubois and celling : Textbook of Toxicology.
 10. Arena : Poisoning Chemistry, Sympto Treatment.
 11. Stoleman : Progress in Chemical Toxicology.
 12. Sunshine, I : Guidelines for Analytical ToxicologiProgramme, Vol. I, CRC Press, 1950.
 13. Sunshine, I : Handbook of Analytical Toxicology, Press, 1969.
 14. Sunshine : Methods for Analytical Toxicology, Press USA, 1975.
 15. Mule, S.J et. al. : Immunoassays for Drugs subjects to ab, CRC Press, 1974.
 16. Curry, A.S. : Poison Detection in Human Organs, C. ThoSpringfeild, Illinois USA, 1963.
 17. Froede, R.C. : The Laboratory Management of the Medico-Legal, Specimen Analytical Chemical Laboratory Sciences.
 18. Connors, K. : A text book of Pharmaceuticals analysis, Interscience, New York, 1975.
 19. Gleason, M.N. et. al. : Clinical Toxicology of Commercial products, Williams and Williams, Baltimore USA, 1969.

Paper VII : Questioned Document Examination

100 Marks

Unit-I

Document and Questioned Document: meaning, Importance, Classification and Preliminary Examination. Determination of Age of Document: Absolute and relative age. Forgery; definitions, types and characteristics. Indented and Invisible Writings, Alterations in the document: erasures, additions, overwriting and obliterations.

Unit-II

Handwriting Characteristics: General Characteristics, Individual Characteristics, Development of Individuality in Handwriting, Brief introduction of Comparison of Handwriting: Natural Variations, Fundamental Divergences, Standards for Comparison.

Unit-III

Comparison of type written matter: Working of typewriter, Printing and Machine Defects, alterations in typed text, various type of typewriting devices- check writing machines, electronic typewriter and proportional spacing typewriter, Comparison of Printed matter: Various Printing Processes like offset, Intaglio, Lithography.

Unit-IV

Plastic currency: Examination of credit cards and similar material, Holographic marks and their examination

Disguise in handwriting, anonymous letters, Handed ness and ambidexterity, examination of numeral and initials. Composition of ink, paper and their examination

Suggested readings

1. Huber, A. R. and Headride, A.M. (1999) : Handwriting identification : facts and fundamental CRC LLC
2. Ellen, D (1997) : The scientific examination of Documents, Methods and techniuges. 2nd ed., Taylor & Francis Ltd.
3. Morris (2000) : Forensic Handwriting Identification (fundamental concepts and Principals)
4. Manning, C.A (1999) : Financial Investigations and Forensic Accounting CRC Press.
5. Harrison, W.R. : Suspect Documents & their Scientific Examination, 1966, Sweet & Maxwell Ltd., London.
6. Hilton, O : The Scientific Examination of Questioned Document, 1982, Elsaevier North Holland Inc., New York.

7. Brewster, F. : Contested Documents and Forgeries, The Eastern Law House, Calcutta. 1932.
8. Ames : Ames on Forgery, 1900, Ames Rellingson Co., New York.
9. Conway, J.V.P. : Evidential Documents, 1959, Charles C. Thomas, Illinois.
10. Mehta, M. K. : The identification of Handwriting & Cross Examination of Experts, N.M. Tripathi, Allahabad. 1970.
11. Sulner, H.F. : Disputed Document, 1966 Oceana Publications Inc., New York.
12. Saxena's : Saxena's Law & Techniques Relating to Finger Prints, Foot Prints & Detection of Forgery, Central Law Agency, Allahabad (Ed. A.K. Singla).
13. Quirke, A.J. : Forged, Anonymous & Suspect Documents, 1930, George Rontledge & Sons Ltd., London.
14. Osborn, A. S. : Questioned Documents 1929, Boyd Printing Co., Chicago.
15. Baker, J.N: Law of Disputed and Forged Documents, 1955, The Michie Company, Virginia.

Paper VIII : Practical

100 Marks

Collection of Finger, palm and Sole inked prints. Development of latent finger prints: Conventional methods (fluorescent powder, magnetic powder, Fuming methods, Iodine and cyanoacrylate methods). Chemical methods (Ninhydrin and silver nitrate), enhancement of latent prints, metal deposition method. Biological methods. Hair and fibers; microscopic observation and identification

Semester Three

Paper- IX : Forensic Biology and Physiology

100

Marks

Unit- I

General physiology: human body systems; the digestive, circulatory, respiratory, excretory and central nervous system in man-structure and function.

Unit-II.

The fats, proteins, carbohydrates, enzymes, and hormones ; their biochemistry and assimilation in human body.

Fibres: Importance, nature, location, collection, evaluation and tests for their identification. Forensic significance of pollen grains, wood, leaves and seeds.

Unit-III

Biological evidences: Importance, nature, location, collection and evaluation.

Blood stains and grouping, Bodyfluids analysis by Absorption-inhibition, Absorption-elution and mixed agglutination techniques.

Unit-IV

Body fluids: Semen, Saliva, sweat, milk, Urine and their forensic significance, location, collection, evaluation and tests for identification.

Suggested readings

1. Fraser, Roberts J.A (1965): An introduction to Medical Genetics.
2. Chatterjee, C. C- (1975): Human Physiology.
3. Boorman, K. E: Blood Group Serology, Churchill, and Lincoln, P. J. (1988)
4. Race, R. R. and Sangar, R. (1975): Blood Groups in Man. Blackwell Scientific, Oxford.
5. Saferstein, R. (1982): Science Handbook, Vol. I, II and III, Prentice Hall, New Jersey.
6. Barris, H. and Hopkinson, D. A. (1976): Handbook of Enzyme, Electrophoresis, Elsevier, North, Holland, New York.
7. Gilblet, E. (1969): Marker's in Human Blood, Davis, Pennsylvania.
8. Culliford, B. E. (1971), The examination and Typing of Blood Stains, US Deptt. of Justice, Washington.
9. Chowdhuri, S. (1971): Forensic Biology, B P R & D, Govt. of India.
10. Dunsford, I. and Bowley, C. (1967): Blood Grouping Techniques, Oliver & Boyd, London.
11. Eckert, W. G. & James, S.H. (1989): Interpretation of Blood Stain, Evidence, Elsevaier, New York.
12. H. James, William G. Eckert; (1999) Interpretation of Blood stain evidence at crime scene stuart Second edition, CRC Press, 1999.
13. Richard saferstein; Forensic Science Hand book, Vol (I); Prentice Hall, Publications.
14. Jason H. Byrd and James L. Castner; Forensic entomology, CRC Press LLC, 2001.
15. Forensic Science Hand book by Richard saferstein Vol (II); Prentice Hall, Publications.
4. Robertson (1996) : Forensic examination of Hair. Francis & Taylor, USA.
5. Robertson (1999) : Forensic examination of Hair. Francis & Taylor, USA.
6. Safersstein, R. (1982) Science Handbook; Vol. III, Prentice Hall, New Jersey.
7. Curry, A. S. (1965) Methods of Forensic Science, Vol. IV, Interscience, New Youk.
8. Chowdhuri, S. (1971) : Forensic Biology, B P R & D Govt. of India.

Paper-X : Explosives and Forensic Ballistics

100 Marks

Unit-1

1. Firearms : Early history of firearms, the earliest firearms, the fifteenth century Match lock, sixteenth & seventeenth century small arms, The age of the Flint lock, the percussion lock firearms.
2. Classification, Characteristics and firing mechanism of smooth bored firearms (M.L., B;L.) Rifled firearms (Pistol, Revolver, Rifles, Machine Guns), Classification, nomenclature and construction of country made firearms.
3. Ammunition: Types, Cartridge Components (Cartridge case primer propellant, Bullets, Pellets and wads).

Unit-II

4. Internal Ballistics: Definition, Ignition of the propellant, manner of burning, Piobett's law, Shape and Size of the propellant, pressure space curve, shot start pressure. All burnt point, Velocity, Space curve, Le Due's formula, muzzle velocity, Factors affecting muzzle velocity, theory of recoil.
5. External Ballistics: Definition-trajectory drop in the flight of the projectiles force of gravity, air resistance-base drag, Yaw, Shape of bullet (Spherical ball, Cylinder-conical, Soft nose, round nose etc.) effective range, extreme range.
6. Terminal Ballistics: Definition, behavior of various type of bullets on hitting the target, remaining velocity, stopping power, Ricochet.

Unit-III

7. Matching of crime & test Bullets and cartridge cases in regular firearms, Identification of Bullets, pellets & wads fired from improvised country made firearms. Automated method of cartridge case and bullet comparison.
8. Determination of Range of fire, time of fire. Visual and Chemical, instrumental methods with special reference to the applications of Neutron activation analysis, Atomic absorptions, Scanning Electron microscopy and other miscellaneous methods.
9. Gun Shot Residues (GSR) : Mechanism of formation of GSR, modern methods of analysis of GSR from the shooting hand & target with special reference to clothings.

Unit-IV

10. Firearm injuries : Ballistic aspect of firearm injuries, nature, Effect of target, Velocity, constructional features and range on the wounding, identification of firearm injuries. Evaluation of Firearm injuries, Reconstruction : Accident, Suicide, murder and self defence.

Suggested Readings

1. Hatcher Jury & Weller, 1987 : Firearm Investigation Identification and Evidence, The University Book Agency, Allahabad.
2. Gunther & Gunther, 1935 : The Identification of Firearms, Willies, New York.
3. Jauhri, M. 1980 : Monograph on Forensic Ballistics, Govt. of India Publication, New Delhi.
4. Burrad, 1951 : The Identification of Firearms and Forensic Ballistics.
5. Sharma, B.R. : Firearms in Criminal Investigation and Trails, 1990.
6. Dimado : Gunshot Wounds, 1987.
7. Kumar : Forensic Ballistics in Criminal Justice, 1987.

Paper –XI : Cyber Crime and Forensic Investigation

Unit-I

Cyber Crimes– definition, IT laws – Introduction, internet, hacking, virus, obscenity, pornography, programmemanipulation, software piracy, intellectual property and computer security etc, Encryption and Decryption methods.

Unit-II

Computer and Cyber crimes: Introduction, stand alone computer crimes-Printing of Counterfeit currency and other documents. Computer Scanners, Imaging Software (Photoshop, Photo paint etc.)Software piracy, Data recovery.Biometric methods with special reference to personal identification.

Unit-III

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

Cybercrimes against Persons Threats, *Cybercrime Procedure* Special Challenges of Computer.

Unit-IV

Cyber Security- Introduction to Cyber Security, Implementing Hardware Based Security, Software Based Firewalls, Security Standards, Assessing Threat Levels, Forming an Incident Response Team, Reporting Cyber crime, Operating System Attacks, Application Attacks, Reverse Engineering & Cracking Techniques and Financial Frauds

Suggested readings

1. Tewari, R.K., Sastry, P.K. and Ravikumar, K.V. (2003) : Computer Crime & Computer Forensics select Publisher, New Delhi.
2. Wold, G.H. : Computer Crime, Techniques of Prevention Goyal, R.M. and Pawar, M.S. : Computer crimes.
3. Stern D.L. Preventing Computer frands.
4. Nancy L. Pruitt, Larry S. Underwood, William Surver, Bioinquiry Learning System 1.0.
8. S.C. Rastogi, NamitaMendiratta Bioinformatics Concepts, Skills and Applications.
9. Irfan Ali Khan, AtiyaKhanum Fundamentals of Bioinformatics.
10. RunculBolle, Jonathan H Connell, SharathRankanliNaline K. Ratha, Andrew w. senior, Guide to Biometrics (2004)
11. Anil K. Jain, Patrick Flynn, Arun Abraham Ross, Hand book of biometrics (2007)
12. John D. Woodward (Jr.), John D. Woodward, Nicholas M.Orlans, Peter T. Higgins, Biometrics (2003)
13. Anil K. Jain, RundBolle, SharathRankanli, Biometrics - Personal Identification in networked society (1999)
14. John R. Vacca, Biometric technologies and verification system (2007).

Paper –XII : Practical

100 Marks

Serology based on ABO, Rh and MNs blood groups.Body fluids analysis by Absorption-inhibition, Absorption-elution and mixed agglutination techniques; to identify blood, semen and saliva stains. To determine species of origin from fresh blood and blood stains. Electrophoresis. Analysis of handwriting and, initials, to perform TLC of writing inks and writing papers,to study alterations in the document, to examine currency notes.

Semester Four

Paper - XII : Techniques of Crime Scene Investigation

100 Marks

Unit – I

Crime Scene Investigation- Definition and causation of crime, Types of crime scene, Crime scene survey Protection of crime scene, Documentation (including photography and sketching), presentation in the court, processing and reconstruction of the crime/mock scene

Unit –II

Physical evidence: their types, significance, classification and stages in physical evidence analysis., admissibility of scientific evidence and importance of physical evidences, Collection, preservation, packaging and forwarding of different types of evidences to the laboratories

Unit – III

Methods of Lifting of latent Prints, Hairs Clothes, belongings, Physical analysis of the Soil, Glass, Paints, Lacquers, Cement, Inks, Paper, Tool marks, Lipsticks, Bangles, Track mark; foot print, tyre impression, skid marks, enhancement methods to develop impression. Forensic examination of vehicles in cases of accident

Unit – IV

Blood stain pattern analysis, Blood physics, dynamics of blood spattering, Hemodynamics and Blood as a medium, Impact spatter blood stains, Motion and directionality, Point of convergence and point of origin, Characteristic blood patterns. Preservation of blood evidence, procedures and precautions.

Criminal profiling, portrait parley, polygraphy, narcoanalysis, brain fingerprinting.

Recommended Books

Sharma, B.R. : *Forensic Science in Criminal Investigation and Trials*,

Swanson and Wendel: *Techniques of Crime Scene Investigation*.

Willard. H.H. et al: *Instrumental Methods of Analysis*. 1974.

Tandon, M.P. : Criminal Procedure Code.

Paper - XIII : Statistical Methods in Forensic Science

100 Marks

Unit-I

Selection of research Problem: hypothesis, Research proposal, literature search, hypothesis, report writing. Sampling method and sample size, sampling statistics, sampling and physical state, homogenization of samples, and hazards in sampling.

Unit-II

Statistics and Data Processing; Measures of central tendencies -Mean, Median and Mode, Measures of Dispersion-Range, Standard Deviation, Standard Error, Co-efficient of Variation, analysis of variance (ANOVA).

Unit-III

Test of significance, Degree of Freedom, t-test and Chi- square test, Test of Correlation (r). Correlation and linear regression, Correlation Coefficient, the number of replicate determination, Probability test.

Unit-IV

Matching Score, Validity Test, Accuracy Test, Likelihood Ratio, Univariate and Multivariate Analysis, Discriminant Analysis, Principal Component Analysis, Frequency Analysis

Paper - XIV : Introduction to Biometrics

100 Marks

Unit – I

Biometrics, meaning, Relation with anthropometry, biometric system, type of biometrics; physiological and behavioral. Introduction of biometric traits and its aim.

Unit – II

Image processing/pattern recognition/statistics, Error types. Image processing basic: what is image, acquisition, type, point operations, Geometric transformations. Biometric traits, fingerprint recognition, ear recognition, face recognition, hand geometry, iris recognition, retinal recognition

Unit – III

Molecular approaches of biometrics, vascular pattern recognition, keystroke recognition, signature recognition, voice recognition, gait recognition.

Unit - IV

Identification/verification, Threshold, Score distribution, FAR/FRR, System design issues. Positive/negative identification, Biometric system security, Authentication protocols, Authentication methods.

Recommended Books

RundBolle, Jonathan H Connell, SharathRanganli, Nalini K. Ratha, Andrew W. Senior, Guide to Biometrics (2004)

Anil K. Jain, Patrick Flynn, Arun Abraham Ross, Hand book of biometrics (2007)

John D. Woodward (Jr.), John D. Woodward, Nicholas M. Orland, Peter T. Higgins, Biometrics (2003)

Anil K. Jain, RundBolle, SharathRanganli, Biometrics - Personal Identification in networked society (1999)

John R. Vacca, Biometric technologies and verification system (2007)

Paper - XV : Project Report

100 Marks

Every student will have to submit a Project report based on the option and the actual work

carried out on the problem in the laboratory or Field or crime scene. The report will be evaluated in terms of quality of project work, experimental and performance in the viva-voce by internal and external examiners.