

ZOO062 - INTRODUCTION TO FORENSIC SCIENCE (GE) - 45 hrs

1. Forensic Science 5 hrs

Definition of Forensic Science, Scope of Forensic Science, Need for forensic Science, Basic Principles and significance, Tools and Techniques of Forensic Science, History & Development of Forensic Science, CFSL, FSL, GEQD, NICFS, Central detective training school, NCRB (Maintenance of crime records), NPA, Mobile Forensic Science Laboratory.

2. Branches of Forensic Science

6 hrs

Forensic Physics, Forensic Ballistic & Photography, Forensic Toxicology, Forensic Biology, Forensic Chemistry, Forensic Psychology, Forensic Dentistry, Forensic Engineering
Crime Definition and Causation, Modus Operandi and its role in crime investigation crime scene, types of crime scene, crime scene characteristics Protection and recording of Crime scene, Search of physical clues, preservation, Packing and forwarding of physical clues, processing of crime scene, blood spattering and pattern analysis.

3. Forensic Biology

9 hrs

History and nature of Forensic Biology, General Definitions and concepts, Historical developments, Animals, Plants and Microorganisms in Legal Investigations.

The Microscope: Parts of compound microscope, Application of Polarized light methods to hair and fiber analysis. Koehler illumination, refractive index determination, crystal morphology and optics, and birefringence. Particle characterization, including fibers and hair. Magnification, field of view, working distances and depth of focus Crystallography of fibers, isotropy vs. anisotropy, polarized light, refractive index, color and pleochroism Crossed polars, birefringence, Forensic biological applications of scanning electron microscope, Electrophoresis General overview, Principles and modes of electrophoresis, Application of capillary electrophoresis in DNA typing.

4. Forensic Entomology

6 hrs

Introduction, general entomology and arthropod biology, Insects of forensic importance, Collection of entomological evidence during death investigations, The role of aquatic insects in forensic investigations, Insect succession on carrion and its relationship to determine time since death, its application to Forensic Entomology.

5. Wild Life Forensics

6 hrs

Scope & importance, Protected and endangered species of animals and plants, Identification of wild life materials such as skin, fur bones, nails, horn and teeth by conventional and modern methods, identification of pug marks of various animals

6. Forensic Botany

7 hrs

Introduction, types, location, collection evaluation and forensic significance Wood: Type of wood and their identification and comparison, Leaves: Identification of various types of leaves and their anatomy, methods of comparison, Pollen : Structure, function, methods of identification and comparison, Diatoms: Nature, location structure, extraction from various body

tissues, including bone marrow, preparation of slides, methods of identification and comparison, forensic significance.

7. Hair and Fibres

6 hrs

Morphology of hair Cuticle cortex and medulla area of hair, Three phases of hair growth, Distinction between animal and human hair, Hair features useful for microscopic comparison of human hair, Collection of forensic hair evidence, Difference between natural and synthetic fibres, Properties of fibers useful for forensic comparison, Collection of fiber evidence

Practicals

15Hrs

Crime Science

6 Hrs

1. Sketching of crime scene
2. Photography of crime scene
3. Collection and packing of physical evidence at the scene of crime
4. Forwarding of physical evidence
5. Reconstruction and evaluation of indoor crime scene
6. Reconstruction and evaluation of outdoor crime scene
7. Restoration of erased numbers on metallic surfaces
8. Restoration of registration numbers on plates

Fingerprints

3 Hrs

1. To take plain and rolled inked fingerprints and to identify patterns
2. To perform ridge tracing and ridge counting
3. To identify ridge characteristics
4. To compare the finger prints
5. To develop latent fingerprints with powder, fuming and chemical methods.
6. Lifting of fingerprints. (Ear/Lip prints to be mentioned)

Impressions

2 Hrs

1. Foot print tracing, casting and comparing
2. Tyre print tracing, casting and comparing

Forensic Biology

4 Hrs

1. Identification of human and animal hair.
2. Identification of natural and artificial fibers
3. Identification of pollen grains and starch granules.
4. Determination of age from skull and teeth.
5. Determination of sex from skull and pelvic girdle and stature from long bones

References:

1. Nanda, B.B. and Tewari, R.K; Forensic Science in India- A vision for the twenty first century, Select Publisher, New Delhi (2001)
2. James, S.H. and Nordby, J. J.; Forensic Science; An Introduction to Scientific and Investigative Techniques, CRC Press, USA (2003)
3. Saperstein: Criminalities – An Introduction to Forensic Science, Prentice Hall Inc. USA (1995)
4. C. G. G. Aitken and D. A. Stoney; The use of statistics in Forensic Science, Ellis Harwood Limited, England (1991)
5. Bridges BC; Criminal Investigation, Practical Finger Printing, Thumb Impressions, Hand writing Expert testimony opinion Evidence, University Book Agency, Allahabad (2000)
6. Essential Forensic Biology: Animals, Plants and Microorganisms in Legal Investigation by Allen Gunn
7. The biochemistry of semen and male reproductive tract Thaddeus Mann Methuen &Co. Ltd. London 1964
8. Biology methods Manula Metropolitan Police Forensic Science Laboratory London
9. Mathew's textile fibres their physical, microscopic and chemical properties Herbert R. Mauersberger John Wiley New York 1954
10. Plant Anatomy B.P. Pandey
11. Forensic Examination of Hair (Taylor & Francis Forensic Science Series)by James R. Robertson (Editor)
12. Forensic entomology: the utility of arthropods in legal investigations By Jason H. Byrd, James L. Castner Published by CRC Press, 2001
13. Forensic botany: principles and applications to criminal casework By Heather Miller Coyle Published by CRC Press, 2004
14. Pillay, V.V., Handbook of Forensic Medicine and Toxicology , 12th ed., Paras Publication 2001.
15. Modi, J. P., Textbook of Medical Jurisprudence &Toxicology , M.M. Tripathi Publication, (2001)
16. Parikh, C.K. , Textbook of Medical Jurisprudence & Toxicology
17. Reddy Narayn, . M., Textbook of Medical Jurisprudence & Toxicology
18. James, P.J.: Encyclopedia of Forensic and Legal Medicine, Elsevier, 2005