Faculty of Science

Skill Development Program in Crime investigation and Forensic Biology

COURSE DETAILS	NAME COURSE	DURATION	TEACHING HOURS	EXAM		STUDY LEVEL	COURSE CONTENTS
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Short term Certificate Course	crime investigation and Forensic biology	30 Day's	30 hrs 24 T 6 P	1	1	Starter / Basic Level	Introduction to Basic concepts

COURSE OBJECTIVE:

- Introduce Bio-Science students to the different disciplines of forensic science and trained them in applied area of biological examination for various types of evidence.
- To provide add on skill in forensic biology and DNA analysis.
- To give practical experience of learning and evaluating of biological evidence in criminal matters using DNA technologies.
- To give Bio-Science students including paramedical and other worker of the investigation group a exposure to molecular and forensic science including the methods routinely used for the isolation of DNA from cells and techniques applied to DNA quantitation, electrophoretic separation, as well as data analysis, interpretation and reporting.
- Help students to correlate their subject with forensic biology and molecular investigation.
- Introduce students to the principles of immunology, immunological techniques, and their application to forensic analyses
- Introduce students to genetics in context with forensic science, forensic DNA analysisand human molecular genetics

Syllabus Content:

Theory

- **Forensic Science and Legal Procedures**

  Introduction to Forensic science and historical development, Forensic Medicine, Cyber Crime, Locard's Law, Forensic Science laboratory, Legal Procedure, Medical Law and ethics, Medical Aspects, Crime detection and Medical Evidence.

- **Crime Scene Investigation and Biological Material**

  Assessment of crime scene, collection ,packing and despatch of evidentiary material, recording of evidence at crime scene, Biological sample, collection and preservation of Blood, saliva, swabs ,smear, hair and nails .

- **Forensic Immunology/Serology**

The Basics of Immunology, Antibodies, Antigen Capture, Presentation and Recognition, Cell Mediated and Humoral Immune Responses ,Diversity, Assembly, Switching and Maturation ,Complement System, Activation and Regulation, Immune Response Disorders Module 8 Immunology and Serology Laboratory Methods

- **Forensic Examination of Blood**

  Blood, basic genetic principles, Blood groups as hereditary factors, different blood group system, Red cell antigen, Grouping based on blood protein, Grouping based on enzymes, White cell antigen, Blood group in stain, Blood group in semen, Serological examination, Serum Allotype and legal aspects

- **Forensic DNA Typing**

  DNA structure, chemical nature, nomenclature, properties, collection and forwarding of forensic samples for DNA typing, Principles of DNA typing, genes and chromosomes, Isolation of DNA from blood, detection methods, PCR (Polymerase Chain Reaction), RFLP (Restriction Fragment Length Polymorphism), STR (Short Tandem Repeats), Mitochondrial DNA Analysis, Rapid DNA ID Microchip Based Genetic Dectectors.

Practicals:

1. Crime Scene Investigation -Indoor and Outdoor
2. Collection , preservation and transportation of Blood and Blood stain sample
3. Physical Examination of Blood stain and Blood sample collected from crime scene
4. Chemical examination of Blood stain ; Amidopyrine test, Benzidine test, Phenolphthalein Test, Guaiacum test, Leucomalachite green test and Ortho-toludine test.(Any two)
5. Microscopic examination: RBCs, Histochemical tests (haemochromogen crystal test and teichmann's haemin crystal test) .(Any one)
6. Serological Tests; Precipitin test, Haemagglutination inhibition test, Gel diffusion test, immunoelectrophoresis and Isoenzyme methods. (Any one)
7. Blood Groups Identification based on Red Cell antigen (ABO, MN system, Rh system, I system , Kell, Kidd, Duffy, Diago, Lutheran, Lewis, P factor, and Xg system). .(Any two)
8. Blood Groups Identification by White Cell antigen (HLA)-Human Leucocyte antigen
9. Blood Groups Identification based on Serum protein polymorphism (serum haptoglobins, Gc Group specific components globulin, Ag groups –Albumin globin, Gm system-Grubb's factor, Km system- Kappa markers, Serum lipoproteins and abnormal haemoglobins). .(Any two)
10. Isolation of DNA from Blood and Blood stains (DNA extraction methods)
11. PCR Amplification
12. DNA Quantitation (Gel Electrophoresis)
13. **One or two visit to Forensic Science Lab (FSL)/Crime spot/Molecular Lab/Field visit for Biological Sample collection**