

KAHM UNITY WOMEN'S COLLEGE, MANJERI, MALAPPURAM

PG DEPARTMENT OF BOTANY

Certificate Courses: **Tools and Techniques in Life Science**

Course Code: **BOT5TTL**

Course coordinator: **Mr. Aleem Yoosuf N.**

OBJECTIVES

- To proactively contribute to a faster development and positive inclusion of science education institutions from under development or undeveloped countries under our main goal of "Science Education for All".
- To contribute to induce and facilitate the access of women to Science;
- To discuss and develop theoretical perspectives and practical approaches to Life science education sensitive to the diversity of backgrounds.
- To promote discuss and develop Inquiry Based Science Education.
- To assess, discuss and develop novel techniques in Life Science.

OUT COMES

- The students will be aware about the techniques used in Life Sciences
- The students will be knowing about the recent works in Life Sciences
- The students will be confident in undertaking personal researches

Module – I

8 Hours

1. Principles of microscopy and parts of microscopes.
2. Types of microscopes: Light microscope, Compound microscope, Phase contrast microscope, Fluorescent microscope, Electron microscope: Transmission Electron Microscopy (TEM) and Scanning Electron Microscopy (SEM).
3. Micrometry– Stage micrometer, Ocular micrometer, Calibration and working.
4. Preparation of illustrations using digital camera and photomicrography.

Module – II

12 Hours

1. General account of Killing and fixing, agents used for killing and fixing.
2. Common fixatives – Formalin – Acetic – Alcohol, Carnoy's fluids I & II, Chromic acid – Acetic acid – Formation (CRAF)
3. Dehydration and infiltration – general account of dehydration (Ethanol, Isopropyl alcohol, Acetone, Glycerine). Ethanol – Xylene series and Tertiary Butyl Alcohol Series.
4. Infiltration – paraffin wax method, embedding.
5. Free hand sectioning; Microtome (Rotary and sledge) serial sectioning and its significance.
6. Staining – General account, Classification: natural dyes, coaltar dyes. Double staining, Vital staining.
7. Mounting.
8. A brief account on whole mounting, maceration and smears.

Module – III**4 Hours**

1. Plant model systems used in mutational studies. Merit and demerit of each models (Brief)
2. Ame's test for mutational studies.
3. Comet assay for whole genome strand breaks.
4. CRISPR-Cas9

Practical**6 Hours**

1. Mitotic squash staining and preparation
2. Microtome sectioning
3. Biostatics calculations
4. Computer programmes for statical analysis
5. Tabulation and analysis of data using MS office

Reference

1. Keith Wilson and John Walker. Principles and techniques of biochemistry and molecular biology. Cambridge University Press.
2. R.K. Sharma and S.P.S. Sangha. Basic Techniques in Biochemistry and Molecular Biology. Wiley.
3. Chandal SRS. A handbook of agricultural statistics. Achal Prakashan Mandir, Kanpur, India
4. Das MN and NC Giri. Design and Analysis of experiment. Wiley Eastern Ltd.
5. Attwood TK and DJ Arry-Smith. Introduction to Bioinformatics. Person Eduction