B.Sc. III Year

Semester – VI

BBO-E602

DSE-2 Research Methodology

MM : 100
Time : 3 hrs

Sessional : 30
ESE : 70
Pass Marks : 40

Learning objective:

- To understand the basic information and techniques used in research methodology, research-definition and types of research.
- To acquire an overall knowledge on data collection and documentation.
- To become familiar with methods to study plant cell and plant micro techniques.
- To learned technique and acquire the information on scientific writing and presentation.

Learning outcomes:

At the end of course student will be able

- The student will be able to familiar with the research methodology, literature survey and its consolidation, library research; field research; laboratory research, techniques and common calculations in botanical laboratories.
- The student will be able to understand the various methods used for key biology research areas, model organisms in biology, methods of used in whole mounts, peel mounts, squash preparations, clearing, maceration and sectioning; tissue preparation.
- The student will be learned various techniques such asreactive dyes and fluorochromes, scientific writing and ethics, introduction to copyright-academic misconduct/plagiarism.
- The student will be able take the decisions for carrier point of views in research, industries and academia entrepreneurships etc.

Unit 1: Basic Concepts: **(22 Lectures)**

Research-definition and types of research (descriptive vs analytical; applied vs fundamental; quantitative vs qualitative; conceptual vsempirical). Research methods vs methodology; literature-review and its consolidation; Library research; field research; laboratory research. Common calculations in botany laboratories; understanding the details on the label of reagent bottles. Molarity and normality of common acids and bases; preparation of solutions. Dilutions. Percentage solutions; molar and normal solutions; technique of handling micropipettes; knowledge about common toxic chemicals and safety measures in their handling.

Unit 3: Data Collection and Documentation: **(6 Lectures)**

Maintaining a laboratory record; tabulation and generation of graphs; imaging of tissue specimens and application of scale bars; art of field photography.

Unit 3: Biological Problems **(6 Lectures)**

History; key biology research areas, model organisms in biology (brief overview): genetics, physiology, biochemistry, molecular biology, cell biology, genomics, proteomics-transcriptional regulatory network.

Unit 4: Methods to Study Plant Cell and Plant Micro-techniques: **(18 Lectures)**

Whole mounts, peel mounts, squash preparations, clearing, maceration and sectioning; tissue preparation: living vs fixed, physical vs chemical fixation, coagulating fixatives, non-coagulant fixatives; tissue dehydration using graded solvent series; paraffin and plastic infiltration; preparation of thin and ultrathin sections. Staining procedures, classification and chemistry of stains. staining equipment. Reactive dyes and fluorochromes (including genetically engineered protein labeling with GFP and other tags). Cytogenetic techniques with squashed plant materials.

Unit 5: Scientific Writing and Presentation: **(8 Lectures)**

Numbers, units, abbreviations and nomenclature used in scientific writing; writing references; power point presentation; poster presentation; scientific writing and ethics, introduction to copyright-academic misconduct/plagiarism.

17.4.21

Practical

1. Experiments based on chemical calculations.
2. Plant micro-technique experiments.
3. The art of imaging of samples through microphotography and field photography.
4. Poster presentation on defined topics.
5. Technical writing on topics assigned.