

Semester V
BSCBOP 333: Ecology, Environmental Biology and Plant
Physiology

Part A: List of Practicals in Ecology and Environmental Biology
(10 Practicals of 2hr each)

Practical No.	Experiments
1	Determination of pH of different types of Soils
2	Estimation of salinity of soil/water samples.
3	Study of Ecological instruments – Wet and Dry thermometer, Altimeter, Hygrometer, Soil thermometer, Rain Gauge, Barometer, etc
4	Hydrophytes: Morphological adaptations in <i>Pistia</i> , <i>Eichhornia</i> , <i>Hydrilla</i> , <i>Nymphaea</i> . Anatomical adaptations in <i>Hydrilla</i> (stem) and <i>Nymphaea</i> (petiole).
5	Xerophytes: Morphological adaptations in <i>Asparagus</i> , <i>Casuarina</i> , <i>Acacia</i> , <i>Aloe vera</i> , <i>Euphorbia tirucalli</i> . Anatomical adaptations in phylloclade of <i>Casuarina</i> .
6	Epiphytes: Morphological adaptations in <i>Acampe</i> , <i>Bulbophyllum</i> , <i>Drynaria</i> . Anatomical adaptations in epiphytic root of <i>Acampe/ Vanda</i> . Halophytes: study of Vivipary in mangroves, Morphology and anatomy of Pneumatophores.
7	Study of local vegetation types by field trips
8	Project work
9	Project work
10	Project work

***PROJECT WORK ON ECOLOGY:**

Students should undertake a short project related to any of the following ecological aspects, either individually or in groups, and submit the report at the time of practical examination along with the certified class record.

Project Reports to be prepared according to the Format provided.

Projects may be undertaken on:

- Structure of local ecosystems - pond ecosystem /forest ecosystem/grassland ecosystem/river ecosystem/marine ecosystem.

- Enumeration/documentation of local biodiversity
- Listing of local RET species of plants, assessment of their population status, etc.
- Documentation of local conservation practices
- Documentation/Assessment of local pollution issues, etc.

Part B: List of Practicals in Plant Physiology (10 Practicals of 2hr each)

Practical No	Experiments
	Major Experiments:
1	Experiment to measure the solute potential of the cell sap by plasmolytic method.
2	Demonstration/ Determination of rate of transpiration using Ganong's Potometer
3	Demonstration of transpiration pull/Suction force due to transpiration.
4	Separation of plant pigments by paper chromatography method.
5	Determination of RQ of germinating seeds using Ganong's Respirometer
6	Demonstration of activity of Peroxidase/Catalase enzyme
7	Estimation of Protein by colorimetric method
8	Estimation of sugar by colorimetric method
	Minor Experiments/Demonstrations
1	Potato osmoscope /Thistle funnel experiment to demonstrate osmosis
2	Demonstration of unequal transpiration from leaf surfaces using Garreaus Potometer
3	Demonstration of imbibition pressure using germinating seeds
4	Demonstration of O ₂ liberation during photosynthesis by bubbling method
5	Measurement of growth using arc auxanometer
6	Demonstration of plant movements – Heliotropism, Geotropism, Hydrotropism
7	Demonstration of transpiration using bell jar
8	Demonstration of fermentation using Kuhn's Fermentation vessel

Semester VI:
**BSCBOP 383: Cytogenetics, Molecular Biology, Plant Propagation
and Biotechnology**

Part A: List of practicals in Cytogenetics and Molecular Biology (10 practicals of 2 hr each)

Practical No.	Experiments
1	Study of Cell structure from Onion /Rheo leaf peel under light compound microscope
2	Study of ergastic substances - starch (potato), aleurone (wheat grain), calcium oxalate (Pistia), calcium carbonate (Ficus leaf), oil globules (castor seed) and Raphides (Colacasia petiole).
3	Measurement of length and Breadth of cells by micrometry technique (Using Onion or Rheo leaf cells)
4	Study of different stages of mitosis by squash technique using Onion root tip cells
5	Study of different stages of meiosis using Rheo or Onion flower buds
6	Observation of permanent slides of mitosis and meiosis
7	Genetic problems related to laws of Mendel (Minimum 04 problems)
8	Genetic problems related to incomplete dominance and multiple allelism (Minimum 04 problems)
9	Genetic problems related to interaction of genes (Minimum 02 problems each for 9:7 and 9:3:4 ratio)
10	Genetic problems related to interaction of genes (Minimum 02 problems each for 12:1 ratio and Polygenic interaction)

**Part B: List of Practicals in Plant Propagation and Biotechnology
(10 Practicals of 2 hr each)**

Practical No.	Experiments
1	Study of plant propagation methods-Cutting, Layering and Grafting
2	Techniques of emasculation, artificial pollination and bagging
3	Estimation of percentage of pollen viability (In-vitro method) by hanging drop method.
4	Study of tissue culture lab equipments – autoclave, laminar air flow cabinet, hot air oven, incubator
5	Preparation of Synthetic seeds by alginate encapsulation
6	Preparation of tissue culture media (MS), surface sterilization, Inoculation and callus induction.
7	Demonstration of DNA isolation from plant tissues.
8	Demonstration of Electrophoresis.
9	Study of transgenic plants and their production with the help of charts.
10	Study of designs of waste water treatment plants

Field Activities:

1. Visits to waste water treatment plants and composting sites to study the operations involved.
2. Visits to biofertiliser and biopesticide production sites in the locality to study the production methods.
3. Visits to local nurseries and institutions involved in plant breeding to study the various methods and techniques employed.