

LESSON PLAN

B.Sc. 1st Semester – BOTANY

Paper: Diversity of Microbes, Algae, Fungi and Archegoniates

Paper code:- B23- BOT -101

Semester: I

AUGUST

- Bacteria and Viruses
- Bacteria: Structure, nutrition, reproduction and economic importance.
- Viruses: General account of viruses, including structure of TMV and bacteriophages.
- Algae

General characteristics of algae.

Introductory classification of algae.

Economic importance of algae.

- Life cycle of Nostoc (Cyanophyceae), excluding development.
- Life cycle of Volvox (Chlorophyceae), excluding development.
- Life cycle of Vaucheria (Xanthophyceae), excluding development.

SEPTEMBER

Algae – Continued

- Life cycle of Ectocarpus (Phaeophyceae), excluding development.
- Life cycle of Polysiphonia (Rhodophyceae), excluding development.
- Comparative discussion of the major algal groups and their economic importance.
- Fungi

General characteristics of fungi.

Introductory classification and economic importance.

- Life history of Phytophthora (Mastigomycotina), excluding development.

- Life history of *Penicillium* (Ascomycotina), excluding development.
- Life history of *Puccinia* (Basidiomycotina), excluding development.
- Life history of *Colletotrichum* (Deuteromycotina), excluding development.

OCTOBER

- Lichens

General account of lichens.

Types of lichens.

Ecological and economic importance of lichens.

- Bryophyta

General characteristics of bryophytes.

Classification up to classes (Smith, 1935).

Alternation of generations.

Structure and reproduction of *Marchantia* (Hepaticopsida), excluding development.

Ecological and economic importance of bryophytes.

- Pteridophyta

General characteristics of Pteridophyta.

Classification up to classes (A.R. Smith, 2006).

Structure and reproduction of *Rhynia* (Psilopsida), excluding development.

Structure and reproduction of *Pteris* (Pteropsida), excluding development.

- Heterospory and seed habit.
- Stelar evolution.

Ecological and economic importance of Pteridophyta.

NOVEMBER – FIRST WEEK

Gymnosperms

General characteristics of Gymnosperms.

Classification up to classes (Smith, 1955).

Morphology of *Cycas*.

Anatomy of *Cycas*.

Reproduction of *Cycas* (developmental details not to be included).

Distribution and economic importance of Gymnosperms.

Geological time scale.

B.Sc. 3rd Semester – BOTANY

Paper: Plant Physiology

Course Code: B23-BOT-301

Semester: III

AUGUST

- Plant Water Relations

Concept of plant-water relations.

Absorption of water by plants.

Mechanism of water absorption.

Movement of water in plants.

- Concept of water potential.

Components of water potential.

Movement of water in relation to water potential.

- Transpiration

Concept and types of transpiration.

Mechanism of transpiration.

Significance of transpiration.

Factors affecting transpiration.

- Mineral Nutrition

Essential mineral elements in plants.

Classification of mineral nutrients.

Role and functions of macronutrients.

Role and functions of micronutrients.

Physiological significance of mineral nutrition.

SEPTEMBER

- Photosynthesis

Introduction and significance of photosynthesis.

Photosynthetic pigments.

Basic mechanism of photosynthesis.

Physiological aspects of photosynthesis.

- Plant Growth Regulators

Auxin

Biosynthesis of Auxin.

Mechanism of action of Auxin.

Physiological roles of Auxin.

Gibberellin

Biosynthesis of Gibberellin.

Mechanism of action of Gibberellin.

Physiological roles of Gibberellin.

Cytokinin

Biosynthesis and mechanism of action.

Physiological roles of Cytokinin.

Abscisic Acid

Biosynthesis and mechanism of action.

Physiological roles of Absciscic Acid.

Ethylene

Biosynthesis and mechanism of action.

Physiological effects and significance of Ethylene.

- Nitrogen Metabolism

Importance of nitrogen in plants.

Nitrogen assimilation.

Nitrogen metabolism and related physiological processes.

OCTOBER

- Phytochromes

Structure of phytochromes.

Functions of phytochromes.

Role of phytochromes in plant growth and development.

- Stomatal Movement

Structure and function of stomata.

Mechanism of stomatal opening and closing.

Regulation of stomatal movement.

Physiological significance of stomatal movement.

- Photoperiodism

Concept of photoperiodism.

Types of photoperiodic responses.

Physiological significance of photoperiodism.

- Biological Clocks

Concept of biological clocks.

Role of biological clocks in plants.

Relationship between biological clocks and plant physiological responses.

Flowering

Mechanism of flowering.

Physiological factors involved in flowering.

Regulation of flowering in plants.

- Plant Growth

Concept of plant growth.

Factors affecting plant growth.

Major physiological aspects of plant growth.

NOVEMBER – FIRST WEEK

- Seed Germination and Dormancy

Factors affecting seed germination.

Physiological aspects of seed germination.

Seed dormancy.

Causes and significance of seed dormancy.

- Senescence and Abscission

Concept of senescence.

Physiological and biochemical changes associated with senescence.

Concept and mechanism of abscission.

Physiological significance of abscission.

B.Sc. 5th Semester – BOTANY

Paper: Economic Botany and Plant Biotechnology

Course Code: B23-BOT-501

Semester: V

AUGUST

Economic Botany – Food Plants

- Cereals and Millets

Introduction to cereals and millets.

Origin, distribution and botanical description of Rice.

Cultivation and uses of Rice.

Origin, distribution and botanical description of Wheat.

Cultivation and uses of Wheat.

Origin, distribution and botanical description of Maize.

Cultivation and uses of Maize.

Protein Crops (Pulses)

General account of protein-yielding crops.

Gram – origin, distribution, botanical description, cultivation and uses.

Arhar – origin, distribution, botanical description, cultivation and uses.

Peas – origin, distribution, botanical description, cultivation and uses.

- Vegetables

Potato – origin, distribution, botanical description, cultivation and uses.

Tomato – origin, distribution, botanical description, cultivation and uses.

Onion – origin, distribution, botanical description, cultivation and uses.

- Fibres

Introduction to fibre-yielding plants.

Cotton – origin, distribution, botanical description, cultivation, processing and uses.

Jute – origin, distribution, botanical description, cultivation, processing and uses.

Flax – origin, distribution, botanical description, cultivation, processing and uses.

SEPTEMBER

- Oil-Yielding Crops

Groundnut – origin, distribution, botanical description, cultivation and uses.

Mustard – origin, distribution, botanical description, cultivation and uses.

Coconut – origin, distribution, botanical description, cultivation and uses.

- Spices and Condiments

General account of spices and condiments.

Coriander.

Black Pepper.

Ginger.

Turmeric.

Cloves.

Morphology of plant parts used, cultivation and uses of important spices.

- Medicinal Plants

Cinchona

Rauvolfia.

Atropa.

Opium.

Cannabis.

Indian Gooseberry.

Withania.

Botanical features, cultivation and medicinal importance of the prescribed medicinal plants.

- Other Economically Important Plants

Tea – botanical description, processing and uses.

Coffee – botanical description, processing and uses.

Hevea – botanical description and processing of rubber.

Sugarcane – botanical description, cultivation and harvesting.

Processing of sugar.

Important timber-yielding plants and their uses.

OCTOBER

PLANT BIOTECHNOLOGY

- Plant Tissue Culture – Basic Concepts

Concept and history of plant tissue culture.

Scope and applications of plant tissue culture.

Totipotency.

Organogenesis.

Cryopreservation.

Types of Culture

Seed culture.

Embryo culture.

Callus culture.

Suspension culture.

Organ culture.

Cell culture.

Protoplast culture.

- Micropropagation and Related Techniques

Micropropagation / clonal propagation.

Stages and applications of micropropagation.

- Synthetic seeds.
- Applications and significance of tissue culture techniques.
- Haploid Production
- In vitro haploid production.
- Anther culture.
- Microspore culture.
- Androgenic methods.
- Gynogenic haploids.

Factors affecting gynogenesis.

- Somatic Hybridisation and Variation

Somatic hybridisation.

- Cybrids.

Somaclonal variations.

Applications and significance of these techniques.

Genetic Engineering in Plants – Introduction

Concept and scope of genetic engineering in plants.

Applications of genetic engineering.

- Introduction to gene transfer techniques.

Direct and indirect methods of gene transfer.

NOVEMBER – FIRST WEEK

- Methods of Gene Transfer

Microprojectile bombardment.

Electroporation.

Liposome-mediated gene transfer.

Calcium phosphate-mediated gene transfer.

- Restriction Endonucleases and Cloning Vectors

Restriction endonucleases.

Concept and applications of restriction enzymes.

- Cloning vectors.

Ti plasmid.

BAC.

Lambda phage.

Cosmid.

Shuttle vector.

YAC.

- Plant Transformation

Plant transformation using *Agrobacterium tumefaciens*.

Plant transformation using *Agrobacterium rhizogenes*.

Strategies for gene transfer to plant cells.

Binary vectors.

Co-integrate vectors.