LESSON PLAN

BOTANY (2025-2026)

Sem.1

Unit	Topics
August	**Bacteria:** Structure, nutrition, reproduction and economic importance. **Viruses:** General account of Viruses including structure of TMV and Bacteriophages. **Fungi:** General characters, Introductory classification; economic importance; and life history of *Phytophthora* (Mastigomycotina), *Puccinia* (Basidiomycotina), *Colletotrichum* (Deuteromycotina). Algae: General characters, Introductory classification; economic importance; and life cycle (excluding development) of *Volvox*, (Chlorophyceae), *Vaucheria* (Xanthophyceae), *Ectocarpus* (Phaeophyceae) and *Polysiphonia* (Rhodophyceae).
Sept.	**Bryophyta:** Bryophytes: General characteristics, classification upto classes (Smith, 1935), alternation of generations, structure and reproduction (excluding development) of Marchantia (Hepaticopsida), Anthoceros (Anthocerotopsida), Funaria (Bryopsida), ecological and economic importance of bryophytes.
Oct.	**Pteridophyta:** General characters, classification upto classes (A. R. Smith, 2006), structure and reproduction (excluding development) of Rhynia (Psilopsida): Structure and reproduction (excluding development) of Equisetum (Sphenopsida) and Pteris (Pteropsida) heterospory and seed habit, stelar evolution; Ecological and economic importance.

November-Decmber	**Gymnosperms:** General characteristics, classification upto classes (Smith 1955), morphology, anatomy and reproduction of *Cycas*, *Pinus* (developmental details not to be included); Distribution and economi importance; General account of paleobotany and Geologicaltimescale.

Sem.3

Unit	Topics
August	Plant water relations: absorption, water potential and transpiration; role of micro and macro nutrients. Photosynthesis, Respiration.
Sept.	Biosynthesis, mechanism of action and uses of auxin, gibberellin,cytokinin, abscisic acid, ethylene, Lipid metabolism and Nitrogenmetabolism
Oct.	Structure, function and mechanisms of action of phytochromes; stomatal movement; photoperiodism and biological clocks; mechanism of flowering.
Nov.-Dec.	Concepts of plant growth; factors affecting germination and dormancy of seeds; physiological and biochemical changes associated with senescence and abscission.

Sem. 5

Unit	Topics
August	Food Plants: Introduction to Cereals and Millets, Origin, distribution, botanical description, brief idea of cultivation and uses of Rice, Wheat and Maize. Protein Crops (Pulses), Origin, distribution, botanical description, brief idea of cultivation and uses of Gram, Arhar, Peas Introduction to Vegetables; Origin, distribution, botanical description, brief idea of cultivation and uses of Potato, Tomato, Onion. Fibers: Introduction to natural fibers; Origin, distribution, botanical description, brief idea of cultivation, processing and uses of Cotton, Jute and Flax. Oil Yielding Crops: Origin, distribution, botanical description, brief idea of cultivation and uses of Groundnut, Mustard and Coconut.

Sept.	Spices and Condiments: Introduction to spices and condiments; Morphology of plant part used, brief idea of cultivation and uses of Coriander, Black Pepper, Ginger, Turmeric and Cloves. Indian Gooseberry and Withania. Medicinal Plants: Brief idea of Cultivation, botanical features and medicinal importance of Cinchona, Rauwolfia, Atropa, Opium, Cannabis, Rubber: Botanical description and processing of Hevea Sugar: Botanical description, cultivation and harvesting of Sugarcane: processing of Sugar. Beverages: Botanical description and processing of Tea and Coffee. Timber: Note on important timber yielding plants.
Oct.	Plant Tissue Culture: Concept, History, Scope and Applications; Totipotency Organogenesis Cryopreservation Types of culture: Seed, Embryo, callus, suspension, organs, Cell and protoplast culture. Micropropagation/clonal propagation (different routes of multiplication-axillary bud proliferation, somatic embryogenesis, organogenesis), Synthetic seeds (a brief account). In vitro haploid production Androgenic methods: Anther culture, Microspore culture Ando genesis Significance and use of haploids Gynogenic haploids, factors effecting gynogenesis Somatic hybridization, Cybrids, Somaclonal variations
Nov.-Dec.	Genetic Engineering in plants: Introduction and applications Direct DNA transfer/Physical methods of gene transfer in plants micro projectile bombardment, electroporation, liposome mediated, Calcium phosphate mediated etc. Restriction Endonucleases: Types and role; brief idea about cloning vectors- Ti plasmid, BAC, Lambda phage, cosmid, shuttle vector, eukaryotic vectors (YAC) Plant transformation by *Agrobacterium tumefaciens* and *A. rhizogenes*, Strategies for gene transfer to plant cells. Binary and co-integrate vectors. spectrophotometer); Familiarization with basic equipments in tissue culture.