***LESSON PLAN* (BOTANY)**

Smester-2

***Jan 2025***-Botanical nomenclature and major rules of ICBN; Keys to

identification of plants.

General introduction and importance of herbaria and

botanical gardens.

Types of inflorescence, flower and parts of flower.

***Feb 2025***-Artificial, natural and phylogenetic classification systems.

Bentham and Hooker system of classification (upto series)

Diagnostic features and economic importance of the

following families: Brassicaceae, Malvaceae, Euphorbiaceae,

Solanaceae and Poaceae

***March 2025***- Ecology: Definition; scope and importance; levels of

organization.

Environmental factors- climatic factors, edaphic factors,

topographic; and Biotic factors.

Population Ecology: Basic concept; characteristics; biotic

potential, growth curves; ecotypes and ecads.

***April 2025***-Ecosystem: Structure and functions (trophic levels, food

chains, food webs, ecological pyramids and energy flow).

Environmental Pollution: Sources, types and control of air

and water pollution.

Global Change: Greenhouse effect and greenhouse gases;

impacts of global warming.

Biodiversity: levels, types, signific

Semester-4

***Jan 2025***: Cell as a unit of Life; The Cell Theory; Prokaryotic and eukaryotic cells; Eukaryotic Cell components

 \* Structure and functions of Cell Wall, Plasma Membrane, nucleus, Nuclear Envelope- structure of nuclear pore complex, Golgi Apparatus, Ribosome, Endoplasmic Reticulum, Chloroplast, Mitochondria and Vacuoles.

***Feb 2025***: Cell Division: Mitosis and Meiosis.

 \* Chromosome: structural organization, ultrastructure of Centromere, lampbrush and polytene chromosomes.

 \* DNA: structure, types and replication.

 \* RNA: structure and types.

 \* Genetic code.

***March 2025***: Mendel's laws of Inheritance.

 \* Lethal Genes; Codominance, incomplete dominance; Gene interaction (inter- and intra-allelic); Multiple allelism; Pleiotropism.

 \* Cytoplasmic Inheritance: leaf variegation in Mirabilis jalapa.

***April 2025***: Complete &incomplete linkage, recombination frequency, crossing over.

 \* Chromosomal aberrations- deletions, duplications, translocations, inversions; Variations in chromosome number- aneuploidy, polyploidy; sex chromosomes and sex determination.

Semester-6

***Jan 2025***

 \* Basics of Enzymology: Discovery and nomenclature; characteristics of enzymes, concept of holoenzyme, apoenzyme, coenzyme and co-factors, regulation of enzyme activity, mechanism of action.

 \* Growth and development: Definitions: phases of growth and development Plant hormones auxins, gibberellins, cytokinins, abscissic acid and ethylene, history of their discovery, mechanism of action; photo-morphogenesis, phytochromes and their discovery, physiological role and mechanism of action

 \* Lipid metabolism: Structure and functions of lipids, fatty acid biosynthesis; B-oxidation, saturated and unsaturated fatty acids; storage and mobilization of fatty acids

***Feb 2025***

 \* Nitrogen metabolism: Biology of nitrogen fixation; importance of nitrate reductase and its regulation; ammonium assimilation.

 \* Genetic engineering and Biotechnology: Tools and techniques of recombinant DNA technology, cloning vectors; genomic and DNA library; transposable elements, aspects of plant tissue culture, cellular totipotency, differentiation and morphogenesis; biology of Agro-bacterium; vectors for gene delivery and marker genes.

***March 2025***:

> Origin, distribution, botanical description, brief idea of cultivation and uses of the following:

> \*Food plants- Cereals (Rice, Wheat, and Maize).

> \* Pulses- (Gram, Arhar and Pea).

> \* Vegetables- (Potato, Tomato and Onion).

> \* Fibers- Cotton, Jute and Flax.

> \* Oils- Groundnut, Mustard and Coconut.

>

***April 2025***:

> Morphology of plant part used, brief idea of cultivation and uses of the following:

> \* Spices- Coriander, Ferula, Ginger, Turmeric, Cloves.

> \* Medicinal Plants- Cinchona, Rauwolfia, Atropa, Opium, Cannabis, Neem.

> Botanical description and processing of:

> \* Beverages- Tea and Coffee.

> \* Rubber- Hevea

> \* Sugar- Sugarcane.

> General account and sources of timber, energy plantations and bio-fuels.