

# GOVERNMENT COLLEGE BAHADURGARH

## LESSON PLAN FOR SESSION -2023-24

Subject Name with code and semester: - BOT.1.1 & 1.2 (I Semester)

Teacher Name: Dr. Mukesh Kumar

Months	Topic
January	<b>Bacteria:</b> Structure, nutrition, reproduction and economic importance <b>Cyanobacteria:</b> General characters; life-history of <i>Nostoc</i> <b>Algae:</b> General characters, classification (upto classes) and economic importance; General account of algal blooms Important features and life-history (excluding development) of <i>Volvox</i> , <i>Oedogonium</i> (Chlorophyceae), <i>Vaucheria</i> (Xanthophyceae), <i>Ectocarpus</i> (Phaeophyceae) and <i>Polysiphonia</i> (Rhodophyceae)
February	<b>Viruses:</b> General account of Viruses including structure of TMV and Bacteriophages <b>Fungi:</b> General characters, classification (upto classes) and economic importance; General account of Lichens, Important features and life-history of <i>Phytophthora</i> (Mastigomycotina), <i>Mucor</i> (Zygomycotina), <i>Penicillium</i> (Ascomycotina), <i>Puccinia</i> , <i>Agaricus</i> (Basidiomycotina), <i>Colletotrichum</i> (Deuteromycotina)
March	<b>The Cell Envelopes:</b> Structure and functions of Cell Wall, Plasma Membrane, Golgi Apparatus, Endoplasmic Reticulum, Lysosomes, Peroxisomes and Vacuoles <b>Ultra-structure and function:</b> Chloroplast, Mitochondria, Nucleus and Nucleolus <b>Chromosome:</b> Morphology, ultra-structure - kinetochore, centromere and telomere
April	<b>Cell Cycle:</b> General account <b>Cell Division:</b> Mitosis and Meiosis - Stages and Significance, <b>Chromosomal aberrations:</b> Structural and Numerical - deletions, duplications, translocations, inversions, aneuploidy, polyploidy Sex chromosomes and Sex determination in Plants

# GOVERNMENT COLLEGE BAHADURGARH

## LESSON PLAN FOR SESSION -2023-24

Subject Name with code and semester: - BOT. 3.1 & 3.2 (II Semester)

Teacher Name: Dr. Mukesh Kumar

Months	Topic
January	General characters, origin and evolution of Gymnosperms Geological Time Table; Evolution of Seed Habit. Pilger and Melchior's (1954) system of classification of Gymnosperms Palaeobotany- Fossils and Fossilization (Process involved, types of fossils and importance of fossils); Reconstruction of the following fossil plants: <i>Lyginopteris</i> , <i>Williamsonia</i> , <i>Cycadeoidea</i> (= <i>Bennettites</i> )
February	Morphology and anatomy of root, stem, leaf/leaflet and reproductive parts including mode of reproduction, life-cycle and economic importance of following plants: <i>Cycas</i> , <i>Pinus</i> Morphology and anatomy of root, stem, leaf/leaflet and reproductive parts including mode of reproduction, life-cycle and economic importance of <i>Ephedra</i> Economic importance of Gymnosperms General characters, origin and evolution of Angiosperms
March	Tissues - meristematic and permanent (simple, complex and secretory) Tissue systems (Epidermal, ground and vascular) The Shoot system - shoot apical meristem and its histological organizations., Cambium - structure and functions. Secondary growth in dicot stem; characteristics of growth rings; sap wood and heart wood, periderm; Anomalous secondary growth ( <i>Dracaena</i> , <i>Boerhaavia</i> and <i>Achyranthes</i> )
April	Leaf: Types of leaves (simple and compound); phyllotaxy. Epidermis-uniseriate and uliseriate, epidermal appendages and their morphological types. ,Anatomy of typical Monocot and Dicot leaf and cell inclusions in leaves, ,leaf abscission, Stomatal apparatus and their morphological types Root system: Root apical meristem; histological organization Secondary growth in dicot root. Structural modifications in roots: Storage ( <i>Beta</i> ), Respiratory ( <i>Rhizophora</i> ), Epiphytic ( <i>Vanda</i> ).

**GOVERNMENT COLLEGE BAHADURGARH LESSON  
PLAN FOR SESSION -2023-24**

Subject Name with code and semester: - BOT. 2.1 & 2.2 (II Semester)

Teacher Name: Dr. Mukesh Kumar

Months	Topic
January	General Characters, Classification of Bryophytes, alternation of generation, evolution of sporophytes, economic importance, <i>Marchantia</i> (Structure and Reproduction)
February	<i>Anthoceros</i> (Structure and Reproduction), <i>Funaria</i> (Structure and Reproduction), General characters of Pteridophytes, Classification of Pteridophytes, alternation of generation, Heterospory, apospory, apogamy, and economic importance of pteridophytes, General account of stellar evolution, <i>Selaginella</i> (Structure and Reproduction)
March	<i>Equisetum</i> (Structure and Reproduction), <i>Pteris</i> (Structure and Reproduction), DNA-the Genetic Material, DNA structure and replication, DNA-Protein Interaction, The Nucleosome Model, Genetic Code, Satellite DNA and Repetitive DNA, Law of Segregation, Independent Assortment, Linkage
April	Allelic and non-allelic interaction, Presence and function of Mitochondrial and Plastid DNA, Plasmids, Mutations-spontaneous and induced, Transposable genetic element, DNA damage and repair, Modern concept of gene, RNA, Ribosome, Transfer of genetic information, Transcription and translation, Structure of protein, Regulation of gene expression in prokaryotes and eukaryotes

# Lesson Plan

**Name of the Teacher :** Dr. Mukesh Kumar

**Class and Section :** IV semester of B.Sc II year

**Subject :** Paper-I Biology and Diversity of Seed Plants

Paper-II Plant Embryology

Subject Code: BOT 4.1 &4.2

<b>Months</b>	<b>Topics</b>
January	Taxonomy and Systematics, fundamental components of taxonomy (identification, classification, description, nomenclature and phylogeny), Role of chemotaxonomy, cytotaxonomy and taxometrics in relation to taxonomy, Botanical Nomenclature, principles and rules, principle of priority, Keys to identification of plants.
February	Type concept, taxonomic ranks, Salient features of the systems of classification of angiosperms proposed by Bentham & Hooker and Engler & Prantl, Floral Terms and Types of Inflorescence, Diversity of Flowering Plants: Diagnostic features and economic importance of the following families: Ranunculaceae, Brassicaceae, Malvaceae, Euphorbiaceae, Rutaceae, Fabaceae, Cucurbitacea
March	Diversity of Flowering Plants: Diagnostic features and economic importance of the families: Apiaceae, Asclepiadaceae, Lamiaceae, Solanaceae, Asteraceae, Liliaceae and Poaceae, Flower-a modified shoot, Microsporangium, its wall and dehiscence mechanism. Microsporogenesis, pollen grains and its structure (pollen wall).
April	Pollen germination (microgametogenesis), Male gametophyte, Pollen-pistil interaction; self incompatibility, Pollination: types and agencies, Structure of Megasporangium (ovule), its curvatures; Megasporeogenesis and Megagametogenesis, Female gametophyte (mono, bi and tetrasporic), Double fertilization, Endosperm types and its biological importance  Embryogenesis in Dicot and Monocot; Polyembryony, Structure of Dicot and Monocot seed, Fruit types; Dispersal mechanisms in fruits and seeds

GOVERNMENT COLLEGE BAHADURGARH LESSON  
PLAN FOR SESSION -2021-22

Subject Name with code and semester: - BOT. 5.1 &5.2 (V Semester)

Teacher Name: Dr. Mukesh Kumar

Month	Topic
January	Plant-water relations: Importance of water to plant life; physical properties of water; imbibition, diffusion and osmosis; absorption and transport of water; transpiration; physiology of stomata. Mineral nutrition: Essential macro and micro elements and their role; mineral uptake; deficiency symptoms. Transport of organic substances: Mechanism of phloem transport; source-sink relationship; factors affecting translocation. Photosynthesis : significance; historical aspects; photosynthetic pigments; action spectra and enhancement effects; concept of two photosystems; Z-scheme; photo-phosphorylation; Calvin cycle; C4 pathway; CAM plants; photorespiration.
February	Growth and development : Definitions; phases of growth and development; seed dormancy; plant movements; the concept of photoperiodism; physiology of flowering; florigen concept; physiology of senescence; fruit ripening; 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.
March	Introduction to Ecology: Definition; scope and importance; levels of organization . Environment: Introduction; environmental factors- climatic (water, humidity, wind, light, temperature), edaphic (soil profile, physico-chemical properties), topographic and biotic factors (species interaction), Adaptations of plants to water stress and salinity (morphological and anatomical features of hydrophytes, xerophytes and halophytes). Population ecology: Basic concept; characteristics; biotic potential, growth curves; ecotypes and ecads.
April	Community ecology: Concepts; characteristics (qualitative and quantitative analytical and synthetic); methods of analysis; ecological succession. Ecosystem: Structure (components) and functions (trophic levels, food chains, food webs, ecological pyramids and energy flow) ,Biogeochemical cycles: Carbon, nitrogen, phosphorus and hydrological cycle. ,Phyto-geography: Phyto- geographical regions of India; vegetation types of India (forests). Environmental pollution: Sources, types and control of air and water pollution. Global change: Greenhouse effect and greenhouse gases; impacts of global warming; carbon trading; Ozone layer depletion; Biomagnification

GOVERNMENT COLLEGE BAHADURGARH LESSON

PLAN FOR SESSION -2021-22

Subject Name with code and semester: - BOT. 6.1 (VI Semester)

Teacher Name: Dr. Mukesh Kumar

Month	Topic
January	Basic of Enzymology- Discovery and nomenclature, characteristics of enzymes, concept of holoenzymes, apoenzyme, coenzyme and co-factors, regulation of enzyme activity, mechanism of action
February	Respiration-ATP- the biological energy currency, aerobic and anerobic respiration, Krebs cycle, electron transport mechanism, redox potential, oxidative phosphorylation, pentose phosphate pathway
March	Lipid Metabolism-Structure and function of lipids, fatty acid biosynthesis, beta oxidation, saturated and unsaturated fatty acids, storage and mobilization of fatty acids, Nitrogen metabolism-biology of nitrogen fixation, importance of nitrate reductase and its regulation, ammonium assimilation
April	Genetic engineering and biotechnology: Tools and techniques of recombinant DNA technology, cloning vectors, genomic and cDNA library,  transposable elements, aspects of plant tissue culture, cellular totipotency, differentiation and morphogenesis, biology of <i>Agrobacterium</i> vectors for gene delivery and markers  genes

## Lesson Plan

Name of the Associate Professor : Dr. Mukesh Kumar

Class and Section : VI semester of B.Sc III year

Subject : Paper-II Economic Botany

Subject Code: BOT 6.2

Months	Topics
January	Vavilov's centres of origin of crop plants, Origin, distribution, botanical description, brief idea of cultivation and economic uses of the following: Food plants - cereals (rice, wheat and maize), pulses ( gram, arhar and pea), vegetables ( potato, tomatoand onion).
February	Origin, distribution, botanical description, brief idea of cultivation and economic uses of the following: Fibers- cotton, jute and flax. Oils- groundnut, mustard, sunflower and coconut.
March	Morphological description, brief idea of cultivation and economic uses of the following: Spices- coriander, ferula, ginger, turmeric, cloves.
April	Medicinal plants- Cinchona, Rauwolfia, Atropa, Opium, Cannabis, Azadirachta, Withania, General account and sources of timber; energy plantations and bio-fuels
May	Botanical description, processing and uses of: Beverages- tea and coffee; Rubber - Hevea; Sugar- sugarcane