

|| Jai Sri Gurudev||

Sri Adichunchanagiri First Grade College

Channarayapatna-573116

DEPARTMENT OF BOTANY

LESSON PLAN FOR THE ACADEMIC YEAR 2023-24

Programme: B.Sc (NEP)

Course/Paper Name: BOTANY (Plant Morphology and Taxonomy) – Paper I

Semester:5th

Total Hours:60

Sl. No	Month & Year	Sowmya C.V	Sowmya C. V	Practical's
1	Sep-Oct 2023-24	<p>Unit 1 Morphology of Root, Stem and Leaf. Their modifications for various functions. Inflorescence – types. Structure and variations of flower. Fruits–types. Floral diagram and floral formula. Introduction to Taxonomy: History, objectives, scope and relevance of Taxonomy. Systems of classification: Artificial, Natural and Phylogenetic; brief account of Linnaeus', Bentham & Hooker's, Engler and Prantl's system and APG System (IV-2016). Merits and demerits of classifications. Taxonomic literatures: Floras, Monograph, Revisions, Journals and Hortus Malabaricus. Herbaria and Botanical gardens: Important herbaria and botanical gardens of the world and India and their importance. Technique of Herbarium Preparation. Virtual herbarium; E-Flora- documentation and uses.</p>	<p>Unit 4:Plant identification: Taxonomic dichotomous keys; indented (yoked) and bracketed keys. (brief account only). Plant descriptions: Common terminologies used for description of vegetative and reproductive parts of the following families: Study of the diagnostic features of Angiosperm families: Annonaceae, Brassicaceae, Malvaceae, Rutaceae, Fabaceae (with sub Families), Myrtaceae, Apiaceae, Asteraceae, Apocynaceae, Solanaceae, Lamiaceae, Euphorbiaceae, Liliaceae, Arecaceae, Orchidaceae and Poaceae.</p>	<p>Practical No. Experiments 1. Study of root, stem and leaf structure and modifications. 2. Study of inflorescence types. Study of flower and its parts, Study of fruits. Floral diagram and floral formula. 3-10. Study of Dicot families mentioned in theory with at least two examples for each family and make suitable diagrams, describe them in technical terms (Description, V.S. flower, section of ovary, floral diagram/s, floral formula/e and systematic position according to Bentham & Hooker's system of classification) and identify up to species using the</p>

2	Nov-Dec 2023-24	<p>Unit 2: Taxonomic Hierarchy: Concept of taxa (family, genus, species); Categories and taxonomic hierarchy; Species concepts (biological, morphological, evolutionary). Modes of speciation. Problems with species concepts. Botanical Nomenclature: Principles and Rules (ICBN/ ICN); Latest code. Brief account of Ranks of taxa, Typification, Author citation, valid publication, rejection of names, principle of priority and its limitations. Plant Taxonomic Evidences: from Palynology, Embryology, Cytology, Phytochemistry and molecular data. Field inventory.</p>	<p>Unit 3: Biometrics, Numerical Taxonomy; Phenetics and Cladistics: Characters; Variations; OTUs, character weighting and coding; Cluster analysis; Phenograms, cladograms (definitions and differences). Phylogenetic Systematics: Terms and concepts (primitive and advanced, homology and analogy, parallelism and convergence, monophyly, Paraphyly, polyphyly, clades, synapomorphy, symplesiomorphy, apomorphy, lineage sorting, serial homology etc). Origin and evolution of angiosperms; Co-evolution of angiosperms and animals; Methods of illustrating evolutionary relationship (phylogenetic tree, cladogram). sMolecular taxonomy: DNA sequences of chloroplast genes (atpB, rbcL, ITS, trnL etc) and nuclear gene (nuclear ribosomal 18s DNA).</p>	<p>flora*** 11. Construction of plant phylogenetic trees using various loci (atpB, rbcL, ITS, trnL etc) with various phylogenetic methods (Neighbour Joining, Maximum Likelihood etc). 12-13. Identify plants/plant products of economic importance: Binomial name, Family and part used and uses. Cotton, Mango, Red gram, Green gram, Horse gram, Black gram, Bengal gram, Indigo, Brinjal, Tomato, Chilly, Tamarind, Bitter gourd, Luffa, Asafoetida, Cumin, Coriander, Coffee, Rubber, Tapioca, Ricinus, Ginger, Turmeric, Coir, Arecanut, Rice, Wheat, Ragi, Sugarcane, Annona muricata, Catharanthus roseus, Rauwolfia serpentina, Justicia adhatoda, Vitex negundo and Leucas aspera. 14. Field visit***: Local or outside area/ Botanical garden/ tribal settlements minimum 3 to 5 days. Submission: Record book, Tour report and Herbarium</p>
---	--------------------	---	--	--

				(Preparation of 05 properly identified herbarium specimens; mounting of a properly dried and pressed specimen of any common plants from your locality with herbarium label).
--	--	--	--	--

|| Jai Sri Gurudev ||

Sri Adichunchanagiri First Grade College

Channarayapatna-573116

DEPARTMENT OF BOTANY

LESSON PLAN FOR THE ACADEMIC YEAR 2023-24

Programme: B.Sc (NEP)

Course/Paper Name: BOTANY (Plant Morphology and Taxonomy) – Paper II

Semester:5th

Total Hours:60

Sl.No	Month & Year	Sowmya C.V	Sowmya C. V	Practicals
1	Sep-Oct 2023-24	<p>Unit 1: Genetics: Mendelism-History; Principles of inheritance; Mendelian genetics and its extension; Chromosome theory of inheritance; Autosomes and sex chromosomes. Incomplete dominance and codominance. Multiple alleles, Lethal alleles, Epistasis, Polygenic inheritance; Pleiotropy. Penetrance and Expressivity. Extrachromosomal Inheritance- Chloroplast mutation: Variegation in Four O'clock plant; Mitochondrial mutations in yeast.</p>	<p>Unit 3: Cell Biology: Microscopy- Light microscopy, Phase contrast microscopy, Electron microscopy (SEM and TEM) and Fluorescence Microscopy. Structure and functions of cell wall, cell membrane and cell organelles (nucleus, mitochondria, chloroplast, Golgi apparatus, vacuole, endoplasmic reticulum, ribosome, spherosome and lysosome). Phases of eukaryotic cell cycle: mitosis and meiosis. Regulation of cell cycle and significance of mitosis and meiosis. Structure and function of Chromosome, DNA and RNAs</p>	<p>1. Hybridization: Emasculation, bagging, pollination and production of hybrids. 2. Pollen viability test- Hanging drop and tetrazolium test 3. Seed viability- TTC and Paper towel method 4-5. Origin, distribution and centre of diversity of crop plants: Wheat, sorghum, rice, chilli, sugarcane, cotton, potato, coffee, sunflower and groundnut. 6. Charts related to plant breeding. 7-8. Genetic problems: 2 each from monohybrid, dihybrid, incomplete dominance and interaction of genes. 9. Study of aneuploidy: Down's, Klinefelter's and</p>

				<p>Turner's syndrome.</p> <p>10. Photographs/ permanent slides showing translocation ring, laggards and inversion bridge.</p> <p>11. Study of Mitosis in onion root tips</p> <p>12. Study of Meiosis in onion/ Chlorophytum flower buds.</p> <p>13. Study of Micrometry</p> <p>14. Karyotype (onion)</p>
	Nov-Dec 2023-24	<p>Unit 2: Linkage, crossing over and chromosome mapping; Linkage and crossing over-Cytological basis of crossing over; Recombination frequency, two factor and three factor crosses; Interference and coincidence; Gene mapping; Sex Linkage. Variation in chromosome number and structure. Gene mutations- Types of mutations; Molecular basis of Mutations; Mutagens – physical and chemical (Base analogs, deaminating, alkylating and intercalating agents); Detection of mutations: CIB method. Fine structure of gene, Population and Evolutionary Genetics, Allele frequencies, Genotype frequencies, Hardy-Weinberg's Law, Role of natural selection, mutation, genetic drift. Genetic variation and Speciation.</p>	<p>Unit4: Plant Breeding: Introduction and objectives. Breeding systems: modes of reproduction in crop plants. Important achievements and undesirable consequences of plant breeding. Centers of origin and domestication of crop plants, plant genetic resources; Acclimatization, Selection methods- for self-pollination, cross pollination and vegetatively propagated plants. Hybridization: For self, cross and vegetative propagation in plants – Procedure, advantages and limitations. Inbreeding depression and Heterosis, genetic basis of inbreeding depression and heterosis; Applications. Crop improvement and breeding Role of mutations; Polyploidy; Distant hybridization and role of biotechnology in crop improvement.</p>	