

## Sri Adichunchanagiri First Grade College

Channarayapatna-573116

### DEPARTMENT OF BOTANY

LESSON PLAN FOR THE ACADEMIC YEAR 2022-23

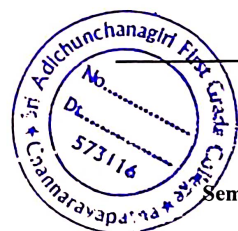
Programme: B.Sc (NEP)

Course/Paper Name: BOTANY (Plant Anatomy & Developmental Biology)

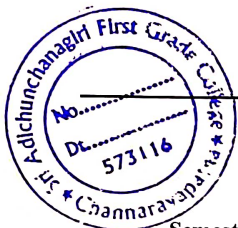
Total Hours:56

Semester:3<sup>rd</sup>

| Sl. No | Month & Year        | K L Ramaswamy   | Sowmya CV  | Practicals  |
|--------|---------------------|---|--|---|
| 1      | Oct –Nov<br>2022-23 | <p><b>Unit –I - ANGIOSPERM ANATOMY, PLANT CELL STRUCTURE AND TISSUES</b><br/>Introduction, objective and scope of Plant Anatomy, Plant cell structure – nature of plant cell wall. Tissue and tissue systems - meristematic tissue - Classification of meristem: (apical, intercalary and lateral), primary and secondary meristem. Apical meristem: Theories on organization of meristem (apical cell theory, Tunica-Corpus theory, Histogen theory and Korper - Kappe theory). Permanent tissues and Secretary cells. Types of vascular bundles and Vascular cambium. Origin, development, arrangement and diversity in size and shape of leaves.</p> | <p><b>Unit –II - ANGIOSPERM ANATOMY</b><br/>Structure of Dicot root: primary structure and secondary growth (Sunflower), Structure of monocot root (Maize). Structure of Dicot stem: Primary structure and secondary growth (Sunflower), Structure of Monocot stem (Maize). Structure of Dicot leaf: Primary structure (Sunflower), primary structure of Monocot leaf (Maize), Stomatal types. Anomalous secondary growth: Boerhaavia (dicot stem) Dracaena (monocot stem) Applications in Systematics, Forensics and Pharmacognosy.</p> | <p><b>Practical No.1</b><br/>i) Study of meristems (Permanent slides/ Photographs). ii) Study of Simple Tissues (Parenchyma, Collenchyma and Sclerenchyma) and Complex Tissues (xylem and phloem).<br/><b>Practical No.2, 3 &amp; 4</b><br/>Maceration technique to study elements of xylem and phloem, Study of primary structure of dicot root (Cicer), stem (Tridax) and leaf (Datura/Zinnia) and monocot root (Maize), stem (Grass) and leaf (Grass)<br/><b>Practical No.5</b> Anomalous secondary growth: Boerhaavia (dicot stem) Dracaena (monocot stem)<br/><b>Practical No. 6</b> Study of trichomes (any three types) and stomata (any three types) with the help of locally available plant materials<br/><b>Practical No. 7</b> Permanent slides</p> |
| 2      | Dec-Jan<br>2022-23  | <p><b>Unit-IV- REPRODUCTIVE BIOLOGY</b><br/>Introduction, Scope and contributions of Indian embryologists: P. Maheswari, B G L Swamy, B.M Johri, M.S. Swaminathan and K.C. Mehta. Microsporangium: Development and structure of mature anther, Anther wall layers, Tapetum -types, structure and functions and sporogenous tissue. Microsporogenesis- Microspore</p>  | <p><b>Unit III - MORPHOGENESIS AND DIFFERENTIATION</b><br/>Morphogenesis in plants - Differentiation and cell polarity in acellular (Dictyostelium), Unicellular (Acetabularia) and multicellular system (root hair and stomata formation) Organogenesis: Differentiation of root, stem, leaf and axillary bud. Mechanism of leaf primordium initiation, development and</p>   |   |



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|  | <p>mother cells, microspore tetrads, Pollinia. Microgametogenesis- Formation of vegetative and generative cells, structure of male gametophyte. Pollen embryosac (Nemec phenomenon). Megasporangium - Structure of typical Angiosperm ovule. Types of ovule: (Anatropous, Orthotropous, Amphitropous, Hemianatropous, Campylotropous, Circinotropous). Megagametogenesis- Types and development of Female gametophyte/embryosac- monosporic- Polygonum type, bisporic - Allium type, tetrasporic - Fritillaria type. Structure of mature embryosac. Pollination and Fertilization: Structural and functional aspects of pollen, stigma and style. Post pollination events; Current aspects of fertilization and Significance of double fertilization, Post fertilization changes. Endosperm - Types and its biological importance. Free nuclear (Cocos nucifera) cellular (Cucumis), helobial types. Ruminant endosperm. Embryogenesis - Structure and development of Dicot (Capsella bursa-pastoris) and Monocot (Najas), embryo. Polyembryony, Apomixis and Parthenocarpy.</p> | <p>Phyllotaxis (Diversity in size and shape of leaves) Root cap, quiescent centre and origin of lateral roots. Transition from vegetative apex into reproductive apex Developmental patterns at flowering apex: ABC model specification of floral organs. Modification of gene action by growth hormones and cellular differences between floral organs. Senescence - a general account.</p> | <p>of Microsporogenesis and male gametophyte, Mounting of Pollen grains of Grass and Hibiscus and Pollinia of Calotropis<br/> <b>Practical No. 8</b> Pollen germination by hanging drop method<br/> <b>Practical No. 9</b> Permanent slides : T.S of Tricarpellary and pentacarpellary ovary, Matured ovule, Placentation types : Axile, Marginal and Parietal types.<br/> <b>Practical No. 10</b> Mounting of embryo: Tridax /Cyamopsis/Crotolaria, Mounting of endosperm: Cucumis<br/> <b>Practical No. 11 &amp; 12</b> Mini project work in groups of 3-5 students, from the following list<br/> a) Study of pollen morphology of different flowers with respect to shape, colour, aperture etc.<br/> b) Pollen germination of different pollen grains and calculate percentage of germination.<br/> c) Calculate the percentage of germination of one particular type of pollen grain collected from different localities/ under different conditions.<br/> d) Study of placentation of different flowers.<br/> e) Any other relevant study related to Anatomy / Embryology.</p> |
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**DEPARTMENT OF BOTANY**

LESSON PLAN FOR THE ACADEMIC YEAR 2022-23

Programme: B.Sc (CBCS)( BOTANY - FIFTH SEMESTER - DSEB- 1.1)

Course/Paper Name: BOTANY (TAXONOMY OF FLOWERING PLANTS)

Semester:5<sup>th</sup>

Total Hours:64

| Sl.No | Month & Year        | K L Ramaswamy  | Sowmya CV  | Practicals   |
|-------|---------------------|--|--|--|
| 1     | Oct –Nov<br>2022-23 | <b>Unit-1: Principles of Taxonomy:</b> A brief account of classical and modern Taxonomy; Systems of classification; Broad outline of Engler and Prantl's, Hutchinson's and Cronquist System of classifications with merits and demerits. A brief account of APG system of classification; Plant Nomenclature-Binomial system, ICBN /ICN – Principles, rules, Typification, Ranks, categories and taxonomic hierarchy; author citation, valid publication, rejection of names, principle of priority and its limitations. | <b>Unit-2: Important Botanical gardens of India and World;</b> Botanical Survey of India- Aims and objectives; Taxonomy in relation to palynology, cytology, embryology, phytochemistry, anatomy; Numerical taxonomy; Field and herbarium; Techniques - important herbaria; Hortus Malabaricus.  | 1 -12) Study of vegetative and floral characters of the Annonaceae, Magnoliaceae, Brassicaceae, Rutaceae, Rosaceae, Myrtaceae, Cucurbitaceae, Apiaceae, Rubiaceae, and Convolvulaceae, Acanthaceae, Verbenaceae, Scropulariaceae, Lamiaceae, Amaranthaceae, Nyctaginaceae, Loranthaceae, Moraceae, Orchidaceae, Musaceae, Cannaceae, Zingiberaceae, Arecaceae. 13). Mounting of a properly dried and pressed specimen of any wild plant on herbarium sheet. (The herbarium sheet shall be submitted with record book at the time of examination). Note: Field trip of 2-3 days to a floristically rich area is compulsory. |
| 2     | Dec-Jan<br>2022-23  | <b>Unit-3:</b> Study of general characters, morphological peculiarities, systematic position (Bentham and Hooker) and economic importance of the following plant families - Annonaceae, Magnoliaceae, Nymphaeaceae Brassicaceae, Rutaceae, Meliaceae, Rosaceae, Myrtaceae, Cucurbitaceae, Apiaceae, Rubiaceae, Apocynaceae, Solanaceae Convolvulaceae, Bignoniaceae.   | <b>Unit-4:</b> Study of general characters, morphological peculiarities, systematic position and economic importance of the following plant families - Acanthaceae, Verbenaceae, Scropulariaceae, Lamiaceae, Amaranthaceae, Cuscutaceae, Nyctaginaceae, Euphorbiaceae, Moraceae, Orchidaceae, Musaceae, Cannaceae, Zingiberaceae and Arecaceae,. |  |

## DEPARTMENT OF BOTANY

LESSON PLAN FOR THE ACADEMIC YEAR 2022-23

Programme: B.Sc (CBCS)( BOTANY - FIFTH SEMESTER - SECB- 1.1)

Course/Paper Name: BOTANY (MEDICINAL AND ORNAMENTAL PLANTS)

Semester:5<sup>th</sup>

Total Hours:16

| Sl.No | Month & Year | K L Ramaswamy  | Sowmya C V  |
|-------|--------------|--|---|
| 1     | Jan-2023     | <b>Unit 2: Ornamental Plants:</b> Flowering annuals; Herbaceous perennials; Shade and ornamental trees; Ornamental bulbous and foliage plants; Cacti and succulents; Palms and Cycads; Ferns and Selaginellas; Cultivation of plants in pots; Indoor gardening; Floriculture: Factors affecting flower production; Production and packaging of cut flowers; Flower arrangements; Methods to prolong vase life; Cultivation of Important cut flowers (Carnation, Aster, Chrysanthemum, Dahlia, Gerbera, Gladiolus, Marigold, Rose, Lilium, Orchids); Bonsai & Terrariums. | <b>Unit-1: Medicinal Plants:</b> Brief history, scope and importance of medicinal plants; Pharmacognosy and Pharmacology; Indigenous medicinal sciences- Definition and Scope; Ayurveda, Siddha and Unani; Classification of drugs based on the source; Common medicinal plants, parts used and their uses-Melia azadirachta (Azadirachta indica), Terminalia chebula, T. bellirica, Withania somnifera, Curcuma longa, Zingiber officinale, Cinnamomum zeylanicum, Saraca asoca, Aloe vera, Phyllanthus emblica, P. amarus, Piper longum, P. nigrum, Catharanthus roseus, Tinospora cardifolia. Asparagus racemosus, Boerhaavia diffusa, Centella asiatica, Ocimum sanctum, Plectranthus amboinicus. |

*Sowmya C.V*  
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*M. J. ...*  
Principal  
Sri Adichunchanagiri First Grade Collage  
Channarayana-573 116



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### DEPARTMENT OF BOTANY

LESSON PLAN FOR THE ACADEMIC YEAR 2022-23

Programme: B.Sc (CBCS)( BOTANY - SIXTH SEMESTER - DSEB- 1.4)

Course/Paper Name: BOTANY (ECONOMIC BOTANY AND MEDICINAL PLANTS)

Semester:6<sup>th</sup>

Total Hours:64

| Sl.No | Month & Year         | K L Ramaswamy  | Sowmya CV  | Practicals   |
|-------|----------------------|--|--|--|
| 1     | April-May<br>2022-23 | <b>Unit-4:</b> Medicinal plants: Brief history, scope and importance of medicinal plants. Pharmacognosy and Pharmacology; Classification of drugs based on the source; Indigenous Medicinal Sciences- Definition and Scope-Ayurveda, Siddha and Unani, Common medicinal plants, parts used and their uses- Rauwolfia serpentina, Aconitum heterophyllum, Hemidesmus indicus, Cinchona officinalis, Atropa belladonna, Digitalis purpurea, Strychnos nuxvomica, Melia azadirachta(Azadirachta indica), Terminalia chebula, T. bellirica, T. arjuna, Withania somnifera, Curcuma longa, Zingiber officinale, Cinnamomum zeylanicum, Saraca asoca, Aloe vera, Tylophora asthamatica, Emblica officinalis, Piper longum, P. nigrum, Catharanthus roseus Tinospora cardifolia. Vetiveria zizanioides. | <b>Unit-1:</b> Economic Botany: Introduction, origin, distribution, cultivation, botanical name, family, part used and uses of the following group of plants; cereals and millets-rice, wheat, maize, barley, sorghum, finger millet, pearl millet, foxtail millet, kodo millet; Pulses- Pigeon pea, Bengal gram, Green gram, Black gram, Soya bean, Pea; Spices- Pepper, Cardamom, Clove, Nutmeg, Chilly, Cinnamon, Cumin, Turmeric, Ginger, Coriander, Saffron | 1) Study of Cereals and Millets – Rice, wheat, Maize, Barley, Sorghum, Finger Millet, pearl millet, foxtail millet, kodo millet.<br>2) Study of Pulses- Pigeon pea, Bengal gram, Green gram, Black gram, Soya bean, Pea. 17<br>3) Study of Spices- Pepper, Cardamom, Clove, Nutmeg, Chilly, Cinnamon, Cumin, Turmeric, Ginger, Coriander, Saffron.<br>4) Study of fibre yielding plants- cotton, Jute, Linen, Coir, Agave.<br>5) Study of Wood- Rosewood, Teak, Honne, Acacia. Rubber- Havea. Gums and resins- Gum Arabic, turpentine, Hing.<br>6) Study of Beverages yielding plants- Coffee, Tea-Types of tea, Cocoa. Sugars- Saccharum.<br>7) Study of Fumitories and Masticatories- Tobacco- Betel nut, betel leaf. Narcotics –Opium, Cannabis.<br>8) Study of Oils and fats- Ground nut, Coconut, Safflower, Sunflower, Mustard and Olive oil.<br>9) Study of Essential oils- |
| 2     | June-July<br>2022-23 | <b>Unit-2:</b> Economic Botany- Fibres- Classification, extraction and processing of fibres. Cotton, Jute,   | <b>Unit -3:</b> Economic Botany- Oils and fats- Classification, extraction methods; Ground nut, Coconut, Safflower,  |  |



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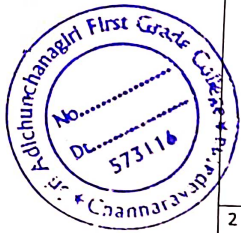
Programme: B.Sc (NEP)

Course/Paper Name: BOTANY (ECOLOGY AND CONSERVATION BIOLOGY)

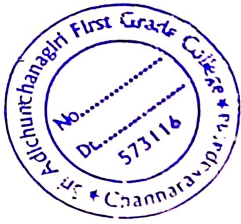
Semester:4th

Total Hours:56

| Sl. No | Month & Year         | K L Ramaswamy  | Sowmya C V  | Practicals   |
|--------|----------------------|--|---|--|
| 1      | April-may<br>2022-23 | <p><b>Unit-1 Introduction to Ecology and Conservation Biology:</b> Definitions, Principles of Ecology, Brief History, Major Indian Contributions, Scope and importance. Ecological levels of organization. Ecological factors: Climatic factors: light, temperature, precipitation and humidity. Edaphic factors: Soil and its types, soil texture, soil profile, soil formation; soil pH, soil aeration, soil water, soil humus and soil microorganisms. Topographic Factors: Altitude and Slope 15 Hrs 15. Pandey, B. P., 1997. Plant Anatomy, S.Chand and Co. New Delhi 16. Raghavan, V., 2000. Developmental Biology of Flowering plants, Springer, Netherlands. 17. Saxena M. R. – Palynology – A treatise - Oxford &amp; I. B .H., New Delhi. 18. Shivanna, K.R., 2003. Pollen Biology and Biotechnology. Oxford and IBH Publishing Co. Pvt.Ltd. Delhi. 19. Vashishta .P.C .,1984. Plant Anatomy – Pradeep Publications – Jalandhar 9. Johri, B.M. I., 1984. Embryology of Angiosperms, Springer-Verlag,</p> | <p><b>Unit-2 Ecosystem Ecology:</b> Introduction, types of ecosystems with examples -terrestrial and aquatic, natural and artificial. Structure of ecosystem: Biotic and Abiotic components, detailed structure of a pond ecosystem. Ecosystem functions and processes: Food chain, Food web and Ecological pyramids, energy flow in an ecosystem. Bio-geo chemical cycles: Gaseous cycles -carbon and nitrogen, Sedimentary cycle Phosphorus. Ecological succession: Definition, types- primary and secondary. General stages of succession. Hydrosere and xerosere. Community Ecology: Community and its characteristics – frequency, density, Abundance, cover and basal area, phenology, stratifications, life-forms. Concept of Ecotone and Ecotypes. Intra-specific and Inter-specific interactions with examples. Ecological methods and techniques: Methods of sampling plant communities – transects and quadrates. Remote sensing as a tool for vegetation analysis, land use – land cover mapping. Population Ecology: Population and its characteristics – Population density, natality, mortality, age distribution, population growth curves and dispersal.</p> | <p><b>Practical No. Experiments</b><br/>           1 Determination of pH of different types of Soils, Estimation of salinity of soil/water samples.<br/>           2 Study of Ecological instruments – Altimeter, Hygrometer, Soil thermometer, Rain Gauge, Barometer, etc<br/>           3 Hydrophytes: Morphological adaptations in Pistia, Eichhornia, Hydrilla, Nymphaea. Anatomical adaptations in Hydrilla (stem) and Nymphaea (petiole).<br/>           4 Xerophytes: Morphological adaptations in Asparagus, Casuarina, Acacia arabica, Aloe vera, Euphorbia tirucalli. Anatomical adaptations in phylloclade of Casuarina .<br/>           5 Epiphytes: Morphological adaptations in Acampe, Bulbophyllum, Drynaria. Anatomical adaptations in epiphytic root of Acampe/ Vanda. Halophytes: study of Vivipary in mangroves,</p> |



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|---|-------------------|---|--|--|
|   |                   | Netherlands. 10. Karp G., 1985. Cell Biology; Mc.Graw Hill Company 13. Nair P .K .K - Pollen Morphology of Angiosperms - Scholar Publishing House, Lucknow Biotic factors: A brief account Ecological groups of plants and their adaptations: Morphological and anatomical adaptations of hydrophytes, xerophytes, epiphytes and halophytes.  |  | Morphology and anatomy of Pneumatophores. Parasites- Morphological and Anatomical adaptations in Cuscuta and Viscum .<br>6 Study of a pond/forest ecosystem and recording the different biotic and abiotic components<br>7 Demonstration of different types of vegetation sampling methods – transects and quadrats. Determination of Density and frequency.<br>8 Application of remote sensing to vegetation analysis using satellite imageries<br>9 Field visits to study different types of local vegetations/ecosystems and the report to be written in practical record book.<br>10 Determination of water holding capacity of soil samples<br>11 Determination of Biological oxygen demand (BOD )<br>12 Determination of Chemical oxygen demand (COD)<br>13 Determination of soil texture of different soil samples. |
| 2 | June-July 2022-23 | <b>Unit-IV- BIODIVERSITY AND ITS CONSERVATION</b> Biodiversity: Definition, types of biodiversity - habitat diversity, species diversity and genetic diversity, Global and Indian species diversity. SDG's in biodiversity conservation. Values of Biodiversity – Economic and aesthetic value, Medicinal and timber yielding plants. NTFP. Threats to biodiversity. Concept of Biodiversity Hotspots, Biodiversity hot spots of India. Concept of endemism and endemic species. ICUN plant categories with special reference to Karnataka/ Western Ghats. Biodiversity Conservation- Indian forest conservation act, Biodiversity bill (2002). Conservation methods – In-situ and ex-situ methods In-situ methods –Biosphere reserves, National parks, Sanctuaries, Sacred grooves. Ex-situ methods- Botanical gardens, Seed bank, Gene banks, Pollen banks, Culture collections, Cryopreservation | <b>Unit III - PHYTOGEOGRAPHY AND ENVIRONMENTAL ISSUES</b> Theory of land bridge, theory of continental drift, polar oscillations and glaciations. Centre of origin of plant – Vavilov's concept, types. Phytogeographical regions – concept, phytogeographical regions of India. Vegetation types of Karnataka – Composition and distribution of evergreen, semi-evergreen,- deciduous, scrub, mangroves, shola forests and grasslands. An account of the vegetation of the Western Ghats. Pollution: Water pollution: Causes, effect, types; water quality indicators, water quality standards in India, control of water pollution (Waste water treatment). Water pollution disasters – National mission on clean Ganga, Minimata, Pacific gyre garbage patch, Exxon valdez oil spill. Air pollution: Causes, effect, air quality standards, acid rain, control. Soil pollution: Causes, effect, solid waste management, control measures of soil pollution. |  |



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|  |  | Linen, Coir, Agave; Wood- Features and properties of wood. Principal wood trees of India Rosewood, Teak, Sal, Honne, Acacia. Wood conversion products- Veneer, Plywood, Lamin board and Paper; Beverages- Coffee, Tea-Types of tea, processing of tea leaves, Coccoaprocessing; Fumitories and masticatories- Tobacco- curing of tobacco leaf. Betel nut, betel leaf; Narcotics – harvesting, chemical constitution; Opium, Cannabis- Bhang, Ganja and Hashish. | Sunflower, Mustard and Olive oil, Hydrogenation of oil, Vanaspathi Essential oils- Extraction methods; Important essential oil yielding plants - Eucalyptus, Jasmine, Geranium, Lavender, Lemongrass, Mint, Sandalwood, Patchouli and Rose; Rubber –processing of rubber; Havea- gums and resins; Gum Arabic, Copals, turpentine, Asafoetida; Sugars- Sugar cane, preparation of sugar; Stevia and beet sugar. | Eucalyptus, Jasmine, Geranium, Lavender, Lemongrass, Mint, Sandalwood, Patchouli, Rose. 10-12) Study of important medicinal plants and their uses. |
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**DEPARTMENT OF BOTANY**

LESSON PLAN FOR THE ACADEMIC YEAR 2022-23

Programme: B.Sc (CBCS)( BOTANY - SIXTH SEMESTER - SECB- 1.3)

Course/Paper Name: BOTANY (MEDICINAL AND ORNAMENTAL PLANTS)


Semester:6<sup>th</sup>

Total Hours:16

| Sl.No | Month & Year | K L Ramaswamy  | Sowmya C V   |
|-------|--------------|--|--|
| 1     | July-2023    | <b>Unit 2:</b> Gardening: definition, objectives and scope - different types of gardening – roof top, kitchen, vertical and herbal; Landscaping - parks and its components - plant materials and design, computer applications in landscaping - Gardening operations: soil laying, manuring, watering, management of pests and diseases and harvesting; Sowing/raising of seeds and seedlings - Transplanting of seedlings - Study of cultivation of different vegetables: cabbage, brinjal, lady's finger, onion, garlic, tomatoes, and carrots - Storage and marketing procedures. | <b>Unit 1:</b> Nursery: definition, objectives and scope and building up of infrastructure for nursery, planning and seasonal activities - Planting - direct seeding and transplants; Seed: Structure and types Seed dormancy; causes and methods of breaking dormancy - Seed storage: Seed banks, factors affecting seed viability, - Seed production technology - seed testing and certification; Vegetative propagation: air-layering, cutting, selection of cutting, collecting season, treatment of cutting, rooting medium and planting of cuttings - Hardening of plants - green house - mist chamber, shade house and glass house. |

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 Principal  
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