



**KLE SOCIETY'S
BASAVAPRABHU KORE ART'S, SCIENCE AND COMMERCE
COLLEGE, CHIKODI**

P.G. DEPARTMENT OF BOTANY

16 Week-wise Course Schedule-2020-21

Week	Semester I Topic/syllabus	Week	Semester III Topic/syllabus
1	<p>1.1 Microbial Diversity 1. Diversity in structure and organization of Eubacteria, Spirochetes, Rickettsias, Chlamydias, Actinomycetes, Archaeobacteria, mycoplasmas and Cyanobacteria, metabolic diversity in relation to phototrophic, chemolithotrophic, symbiotic, saprophytic and parasitic mode of life. Diversity in relation to photosynthetic pigments and energy biogeochemical cycling, Present picture of phylogeny and systematics of bacteria. conversion. phylloplane and rhizosphere microbiology-role of bacteria</p> <p>Unit I Biodiversity: Definition, levels of diversity - genetic, species and ecosystem diversity. Endemism - concept, types, endemism in Western Ghats, Biodiversity hotspots - general and with special reference to India; Mega-diversity regions</p> <p>Unit I Brief history and development of plant classification, sexual system of Linnaeus, Artificial system, Natural system and phylogenetic systems. Detailed study of Benthan & Hooker's system. Outlines of Hutchinson, Cronquist and APG systems.</p> <p>Evolutionary Biology: I. Origin of Life – A biogenesis, Hypothesis of panspermia. Theory of</p>	1	<p>3.1 PLANT PHYSIOLOGY UNIT-I. Bioenergetics - First and second law of thermodynamics. Relation between free energy change and equilibrium constant. Reduction potential. Relation between reduction potential and free energy change. Hexose catabolism – Study of Glycolysis and citric acid cycle.</p> <p>UNIT-I Microscopy: Concepts and applications of Light, Phase contrast, Fluorescent and Electron microscopy. Autoradiography, Cell fractionation and Centrifugation technology Chromosome: Organization of chromatin – Euchromatin and heterochromatin, constitutive and facultative heterochromatin, rearrangement, repetitive and nonrepetitive DNA, C-value paradox, nucleosome model, structure and organization of telomere, centromere and kinetochore. Structural and numerical abnormalities. Central dogma of molecular biology, Fine structure of gene, Concept of split gene, introns. Gene families,</p>
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	<p>Chemical of evolution, origin of life at molecular level process- structure of <i>Cosmos</i> primitive earth, prebiotic synthesis, origin and evolution of RNA world, Ribonucleoprotein, adaptive radiation in progenote, Evolution of Eukaryotes – Endosymbiotic hypothesis, theories of evolution- Lamarckism Neolamarckism, Darwinism, Neo-Darwinism, Germplasm theory, Mutatiuon theory and Synthetic theory.</p>		<p>Overlapping gene, Pseudo gene and cryptic gene. UNIT-I. History, scope and importance of medicinal plants. A brief account of Indigenous medicinal sciences- Ayurveda, Siddha and Unani. Brief account of herbal formulations and preparations Unit-I History, scope and importance of plant propagation, propagation structures, green house equipment and media, seed propagation, structure of seeds, techniques of seed production types of seeds – recalcitrant, orthodox, post-harvest handling of seeds.</p>
5	Methods of studying microbial biodiversity various culture methods	5	UNIT-II. Oxidative phosphorylation and photophosphorylation. Electron transfer
6	biodiversity of culturable bacteria. Isolation strategies	6	reaction in mitochondria.
7	recovering microbial biodiversity using environmental DNA, environmental genomics, screening environmental libraries	7	Light absorption by chloroplast pigments. Light harvesting complexes.
8	<p>preservation of microbial biodiversity, polyphasic taxonomy of microorganisms. Unit II Threats to biodiversity, IUCN threatened plant categories, methods of conservation: <i>In-situ</i> methods - National parks, Biosphere reserves, sacred grooves. <i>Ex-situ</i> methods: Botanical gardens, Germplasm collection seed bank, pollen bank Unit II Botanical Nomenclature: Need for scientific names, history of botanical nomenclature. Principles of ICBN, typification, rule of priority, ranks of taxa and nomenclature of taxa, effective and valid publication, citation, retention, choice and rejection of names</p>	8	<p>Macromolecular organization of chloroplast membranes. Carbohydrate biosynthesis and inter conversions. Photosynthetic carbon reduction cycle and its regulation. C4 pathways and photorespiration. Biosynthesis of sucrose, starch and cellulose. Unit – II Cell cycle- Regulation of CDK-cyclin activities, cellular check points, DNA damage and repair-Excision repair, Post replication repair, SOS response and mutagenesis, transcription repair coupling and mechanism that prevent DNA Damage. Mutation: Chemical and</p>

	<p>and epithets, conservation of names, names of hybrids, names of cultivated plants.</p> <p>II. Population genetic and Evolution – Madeline population, gene pool, gene frequency, genetic drift, founder effect, genetic polymorphism, Hardy Weinberg’s Law, Genetics equilibrium and mechanism of speciation. Patterns of evolution in plants- Evolution of vegetative, reproductive structure in Algae, Fungi, Bryophytes, Pteridophytes and spermatophytes (Evolution of sporophytes in Bryophytes). Steelar evolution in Pteridophytes, Heterospory and seed habit. Fossil forms- <i>Lepidodendron</i>, <i>Lepidocarpon</i>, <i>Stigmaraia</i>.</p> <p>Internal assessment test- I</p>	<p>radiation mutagenes, molecular basis of mutations and their role in evolution and cancer development. Oncogenes, Proto-oncogenes, P53 gene, Tumor suppressor genes, RB gene, E2F gene, RAS genes.</p> <p>UNIT-II Plant identification- authentication and deposition in recognised herbaria, Ethnic communities of India. Ethnobotany and folk medicine, Applications of ethnobotany. Study of some important medicinal plants with reference to their systematic position, diagnostic features, methods of propagation and medicinal uses of <i>Solanum trilobatum</i>, <i>Cardiospermum halicacabum</i>, <i>Vitex negundo</i>, <i>Adathoda</i> <i>vasica</i>, <i>Azadirachta indica</i>, <i>Gloriosa superba</i>, <i>Eclipta alba</i>, <i>Aristolochia indica</i>, <i>Phyllanthus amarus</i>, <i>Boerhaavia</i> <i>diffusa</i>, <i>Curcuma longa</i>, <i>Ocimum sanctum</i>, <i>Centella asiatica</i>, <i>Aloe vera</i>, <i>Coleus forskohlii</i> and <i>Costus</i> <i>speciosus</i></p> <p>Unit-II Vegetative propagation: techniques of propagation by cutting, stem cuttings- hard wood, semi hard wood, soft wood and herbaceous, leaf cuttings, leaf bud cuttings , root cuttings. Biology and techniques of grafting: Whip and tongue, wedge and cleft, bark, side grafting approach</p> <p>Internal assessment test- I</p>
9	<p>UNIT-III Plant Virology: Origin of viruses,</p>	<p>9</p> <p>UNIT-III. Lipid metabolism – fatty acid biosynthesis and</p>

10	classification and nomenclature of Viruses with special stress on plant viruses, introduction to molecular virology, Virology on Internet - viral databases and their use for understanding viral phylogeny, Viral genomics and proteomics Transmission of viruses; Mechanism of replication of DNA and RNA viruses, modern techniques to study the viruses- Morphology, chemical composition, ultrastructure, replication. The virus cryptogram, Transmission of Plant Viruses, Virus-Vector relationship, Control of Plant Viruses. Present knowledge of Viroid's and prions. Virus pandemics in recent years -SARS Family viruses, Covid-19 virus- origin, Causes and Response measures.	10	oxidation. Biosynthesis and catabolism of storage lipids. Biosynthesis and functions of membrane lipids.
11		11	Membrane transport – organization of transport at plasma membrane and Tonoplast
12	<p> pumps, carriers and ion channels, P-type and V- type, ATPases, ABC transporters. Regulation of membrane transport in guard cells.</p> <p>Unit – III Transposable elements: Retro-elements. Transposable elements in man, Prokaryotic transposons: Insertion and composite sequences, Applications of transposons in research and health care system</p> <p>UNIT-III. Database of medicinal plants, Methods of preparation of herbal extracts and phytochemical analysis. Antibacterial and antifungal activity assay of herbal extracts, Medicinal plants and plant products used in the treatment of Jaundice, cardiac problems, infertility, cancer and diabetes. Conservation of medicinal plants- In situ and Ex situ. IPR and Patenting, threatened medicinal plants.</p> <p>Unit-III Techniques of budding: T-budding, patch budding chip budding ring budding. Layering and its natural modifications: simple layering tip layering, mound and stool layering air layering, compound and serpentine layering and trench layering. Propagation by specialized stem and roots</p>	12	

13	<p>UNIT-IV Structural diversity distribution and the ecological significance of lichens. Fungal biodiversity- taxonomic diversity, general structural features and the latest classification. Phocobionts & Mycobionts- Lichenized versus nonlichenized fungi.</p> <p>Unit IV Biodiversity Management: Sustainable development, Environmental Impact Assessment (EIA) Ecological restoration, Afforestation, Green belt, Social forestry, Agroforestry. Remote sensing and biodiversity management.</p> <p>Unit IV Study of the following families with economic important, systematics and phylogeny: Magnoliaceae, Menispermaceae, Capparidaceae, Polygalaceae, Caryophyllaceae, Meliaceae, Oxalidaceae, Balsaminaceae, Meliaceae, Droseraceae, Combretaceae, Melastomataceae, Cactaceae, Sopotaceae, Oleaceae, Loganiaceae, Gentianaceae, Lentibulariaceae, Podostemaceae, Piperaceae, Myristicaceae, Lauraceae, Loranthaceae, Moraceae, Orchidaceae, Zingiberaceae, Commelinaceae, Araceae, Cyperaceae, Poaceae</p> <p>IV Plant distribution and Plant migration- Floristic regions of the world. Phytogeographical regions of India, Hansen's classifications, distribution of plants based on altitude and latitude, contisin, tricontisin and endemic distribution. Age and area hypothesis- Wills theory. Plant migration and barriers for plant migration.</p> <p>Internal assessment test- II</p>	13	<p>UNIT-IV. Nitrogen metabolism – uptake of nitrate and its reduction; catalytic and genetic regulation of nitrate reductase. Symbiotic nitrogen fixation, mechanism of action of nitrogenase. Plant growth regulators, mechanism of action of auxins, gibberlins, cytokinins, ethylene, abscisic acid.</p> <p>Unit – IV Expression of Genome: Transcription - RNA polymerase-types, structure and function, mechanism of transcription-initiation, elongation and termination in prokaryotes and eukaryotes. Post transcriptional modifications-RNA processing, capping, polyadenylation, splicing, alternate splicing, exon, shuffling, structural organization of m-RNA, t-RNA and r-RNA, m-RNA transport; Translation: t-RNA identity, amino acylation of t-RNA, amino acyl synthetase, mechanism of translation-initiation, elongation and termination, proof reading, translational inhibitors, post translational modifications of proteins;. Gene regulation in prokaryotes: Concept -Lac operon-positive and negative control, tryp – operon ; A detailed study of Gene regulation in eukaryotes.</p> <p>UNIT-IV Herbal drug technology: Identification and authentication of phytoconstituents, Alkaloids, Coumarins, , Lignans, phenols, terpenes, sterols,</p>
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		<p>of isolation and estimation of the following drugs; Forskolina from <i>Coleus forskaoli</i> L-Dopa from <i>Mucuna pruriens</i> Alicin- <i>alliun sativa</i> Piperine from <i>piper nigrum</i> Catechines from <i>camellia sinensis (green tea)</i> Organization and institutes: national medicinal plant board (NMPB) foundation for revitalization of local health tradition (FRLHT) national botanical research institute (NBRI) central institute for medicinal[and aromatic plants (CIMAP) AYUSH</p> <p>Unit-IV Micro propagation techniques: cell and tissue culture techniques, media, growth regulators, micro and macro nutrients, sterilization techniques, MS media, root, bud. Advantage, limitations and applications of vegetative propagation, clones , genetic variation in asexually propagated plants, different methods. Propagation methods of some selected plants – citrus, grape, mango, mulberry, hibiscus, rose, croton, eucalyptus, banana, orchids, papaya, watermelon, potato, tomato, chilly, coconut, pepper, anthurium. Nursery techniques: composting, green house, planting mixture, vermicompost.</p> <p>Internal assessment test- II</p>
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