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

P.G. DEPARTMENT OF BOTANY

16 Week-wise Course Schedule-2019-20

August-November

Week	Semester I Topic/syllabus	Week	Semester III Topic/syllabus
1	**1.1 Microbial Diversity** 1. Diversity in structure and organization of Eubacteria, Spirochetes, Rickettsias,	1	**3.1 PLANT PHYSIOLOGY** **UNIT-I**. Bioenergetics - First and second law of thermodynamics. Relation between
2		2	free energy change and equilibrium constant. Reduction potential. Relation between
3	Chlamydias, Actinomycetes, Archaebacteria, mycoplasmas and Cyanobacteria, metabolic	3	reduction potential and free energy change. Hexose catabolism – Study of Glycolysis and citric acid cycle.
4	diversity in relation to phototrophic, chemolithotrophic, symbiotic, saprophytic and parasitic mode of life. Diversity in relation to photosynthetic pigments and energy conversion. Diversity in carbon utilization by microorganisms, microbial diversity in the degradation of natural substances such as cellulose, xylene starch and other glucans, fructose, pectans, chitin, lignin, methane, aromatic hydrocarbons etc and its ecological significance. **Unit I** **Biodiversity**: Definition, levels of diversity - genetic, species and ecosystem diversity. Endemism - concept, types, endemism in	4	**UNIT-I** **Microscopy**: Concepts and applications of Light, Phase contrast, Fluorescent and Electron microscopy. Autoradiography, Cell fractination 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, 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**

	Western Ghats, Biodiversity hotspots - general and with special reference to India; Mega-diversity regions **Unit I** Brief history and development of plant classification, sexual system of Linnaeus, Artificial system, Natural system and phytogenetic systems. Detailed study of Benthan & Hooker's system. Outlines of Hutchinson, Cronquist and APG systems. **Evolutionary Biology:** I. **Origin of Life** – A biogenesis, Hypothesis of panspermia. Theory of Chemical of evolution, origin of life at molecular level process- structure of *Cosmos* primitive earth, prebiotic synthesis, origin and evolution of RNA world, Ribonucleoprotein, adaptive radiation in progenote, Evolution of Eukaryotes – Endosymbiotic hypothesis, theories of evolution- Lamarckism Neolamarkism, Darwinism, Neo-Darwinism, Germplasm theory, Mutatiuon theory and Synthetic theory.		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.
5	Methods of studying microbial biodiversity various culture methods biodiversity of culturable bacteria. Isolation strategies recovering microbial biodiversity using environmental DNA, environmental genomics, screening environmental libraries preservation of microbial	**5**	**UNIT-II**. Oxidative phosphorylation and photophosphorylation. Electron transfer reaction in mitochondria. Light absorption by chloroplast pigments. Light harvesting complexes. Macromolecular organization of chloroplast membranes. Carbohydrate biosynthesis and inter conversions. Photosynthetic carbon reduction cycle and its regulation. C4
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	biodiversity, polyphasic taxonomy of microorganisms. **Unit II** Threats to biodiversity, IUCN threatened plant categories, methods of conservation: *In-situ* methods - National parks, Biosphere reserves, sacred grooves. *Ex-situ* 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 and epithets, conservation of names, names of hybrids, names of cultivated plants. 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-*Lepidodendron,*		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 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. **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 Solanum trilobatum, Cardiospermum halicacabum, Vitex negundo, Adathoda vasica, Azadirachta indica, Gloriosa superba, Eclipta alba, Aristolochia indica, Phyllanthus amarus, Boerhaavia diffusa, Curcuma longa, Ocimum sanctum, Centella asiatica, Aloe vera, Coleus forskohlii and Costus speciosus **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 **Internal assessment test- I**

	Lepidocarpon, Stigmaria. **Internal assessment test- I**		
9	Toxin producing microorganisms and cyanobacterial blooms-their ecological significance. Viruses, Viroids and Prions bacterial animal and plant viruses their diversity in structure and organization. Genetic diversity, vertical and horizontal gene transfer in microbial diversification and speciation. **Unit III** Environmental movements: Global and regional. Environmental laws : Forest Conservation Act, Biodiversity bill (2002); Community Biodiversity Register (PBR); Convention on International Trade in Endangered Species (CITES), Ramsar Convention, Intellectual Property Rights (IPR) **Unit III** Botanical Survey of India - organization and contributions of BSI Herbarium methodology, significance of herbaria; floras Taxonomic evidence: Chemotaxonomy, Cytotaxonomy, Embryology as taxonomic evidence. Brief account of numerical taxonomy. **Plant Geography:** III **Principles of Plant Geography**- Origin of islands and Continents- Pangea, Panthalasa, Laurisia, Gondwana land, Plant tectonics and Continental drifts. Center of	**9**	**UNIT-III**. Lipid metabolism – fatty acid biosynthesis and oxidation. Biosynthesis and catabolism of storage lipids. Biosynthesis and functions of membrane lipids. Membrane transport – organization of transport at plasma membrane and Tonoplast pumps, carriers and ion channels, P-type and V- type, ATPases, ABC transporters. Regulation of membrane transport in guard cells. **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 **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. **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
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	origin of cultivated plants, Vavilo centers and Zhukosky centers with plants in each region.		
13 **14** **15** **16**	Structural diversity distribution and the ecological significance of lichens. Fungal biodiversity-taxonomic diversity, general structural features and the latest Classification **Unit IV** Biodiversity Management: Sustainable development, Environmental Impact Assessment (EIA) Ecological restoration, Afforestation, Green belt, Social forestry, Agroforestry. Remote sensing and biodiversity management. **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 IV **Plant distribution and Plant migration**- Floristic regions of the world.	**13** **14** **15** **16**	**UNIT-I**V. 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. **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**.** **UNIT-I**V Herbal drug technology: Identification and authentication of phytoconstituents, Alkaloids, Coumarins, , Lignans, phenols, terpenes, sterols, of isolation and estimation of the following drugs; Forskolina from *Coleus forskaoli* L-Dopa from *Mucuna pruriens* Alicin- *allium sativa* Piperine from *piper nigram* Catechines from *camellia sinensis (green tea)*

	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. **Internal assessment test- II**		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 **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. **Internal assessment test- II**