



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

**P.G. DEPARTMENT OF BOTANY**

**16 Week-wise Course Schedule-2019-20**

**February-May**

Week	Semester II Topic/syllabus	Week	Semester IV Topic/syllabus
1	<p><b>1. Physical and chemical properties of water,</b> nucleotides, nucleic acids structure of nucleotides and poly nucleotides . Chemical and physical properties of nucleic acids.</p> <p>Amino acids general properties; peptide bonds, classification and characteristics of amino acids.</p> <p><b>Atoms, bonds and molecules.</b> Basic principles of diffusion, osmosis and viscosity, and their application in biology. Electromagnetic radiation-electromagnetic spectrum and light scattering absorption and emission of electromagnetic radiations by biomolecules. Fluorescence and phosphorescence.</p> <p><b>Differentiation and cell polarity</b> in acellular (Dictyostelium) unicellular (Acetabularia, ficus egg, equisetum spore) and multicellular (root hair and stomata formation) systems shoot apical meristems (SAM) origin structure and function organogenesis formation of auxiliary buds. Cytohistological zonation and biochemical activity in the shoot apex and ultra structure of meristems, shoot apical meristem organization, SAM mutants the mechanism of leaf primordium initiation, Phyllotaxis positioning, transition to</p>	1	<p><b>Biological features of fungi</b> – structure, mobility life cycle pattern in fungi, vegetative, ultra structure and growth ultra structure of fungal and reproductive structures. Growth forms, hyphal growth, mycelia habit and modification, colony formation, fungal dimorphism , hyphal fusions, growth dynamics, non mycelial forms.</p> <p>Introduction and history of plant pathology – Plant diseases caused by fungi, bacteria, virus and nematodes, The concept of disease in plants, Classifications of plant diseases. Genetic engineering and plant pathology, Significance of plant diseases, Plant diseases and world crop production, Effects of changes in agricultural methods and in human society on the development and spread of plant diseases, Diagnosis of plant disease.</p> <p><b>History and scope of ecology and environmental biology:</b> ecosystem – concept, structure , types, components, functions and dynamics. Energy flow in the</p>
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	<p>reproductive phase, vernalization – changes in the biochemical activity.</p> <p><b>Transmission Genetics:</b> An over view of Mendelian Genetics, extension of Mendelian's principles: Quantitative inheritance, multiple alleles, lethal allele. Extra nuclear inheritance:</p> <p>Inheritance of mitochondrial and chloroplast genes, male sterility in plant.</p> <p>Sex determination: Role of chromosomes and hormones in sex determination, molecular basis of sex determination and dosage compensation in man and Drosophila, Genetic disorders in man and their managements, Genetic testing and counselling, sex determination in plants.</p> <p><b>Unit 1:</b> 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.</p>		<p>ecosystem, tropic levels food chains food web ecological pyramid.</p> <p>Biogeochemical cycle; hydrological cycle, gases nutrient cycle, and sedimentary nutrient cycle. Major terrestrial ecosystem of the world- deserts, grasslands, savanna, tundra forest.</p> <p>Introduction: Definition Old and New Biotechnology. An interdisciplinary activity, Scoped and importance, commercial potential, Biotechnology centers in India.</p> <p>Biofertilizers: Introduction, Types, Blue green algae, Sea weeds, Azolla, Vesicular arbuscular mycorrhizal fungi and Rhizobium.</p>
5	<p><b>Proteins</b>-primary structure, solubility of protein, protein sequencing, protein conformation, protein folding alpha-helix and beta sheets, Rammachandra Plot, Hydropathic index, solid phase synthesis of polypeptides, protein denaturation.</p> <p><b>Theory of fluorescence</b>-instrumentation, polarization and anisotropy of fluorescence. Fluorescence spectroscopy applied to protein, nucleic acids and membranes.</p> <p><b>Developmental pattern at the flowering apex</b>, ABC model, specification floral organs, molecular aspects of MADS box genes during flower development. Cellular differences in between floral organs . senescence a general account; structure and function of root apical meristem(RAM) quiescent centre, origin of lateral roots, genetics of root development.</p> <p>Population Genetics: Population and gene pools , Hardy-Weinberg's Law, Factors effecting</p>	5	<p>Reproduction : Asexual and sexual, mating systems, physiological control of sexual reproduction, fruit body forms, morphogenesis and significance.</p> <p>Dispersal mechanisms and quantification of spores after their release.</p> <p>Parasitism and disease development – Attack of pathogens: Mechanical force exerted by pathogens in host tissues, Chemical weapons to pathogens, enzymes, Microbial toxins on plant diseases, Growth regulators in plant diseases.</p> <p><b>Population ecology</b>- growth and charecteristics of population antality, mortality, life table , age structure, concept of carrying capacity, concept of density dependent and density independent action in population control,. Biotic</p>
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	<p>allelic frequencies in population- Mutation, Migration, Nonrandom mating, selection, genetic drift, genetic equilibrium. Linkage and crossing over, Cytological and molecular basis of crossing over, recombination and gene mapping. and Hooker classification, Herbarium techniques and deposition of specimen in herbaria, Ethnic communities of India. Ethnobotany and folk medicine, Applications of ethnobotany.</p> <p><b>Internal assessment test- I</b></p>	<p>community- concept, structure , dominant, fluctuation and succession, ecological niche- intraspecific and inter specific interactions allelopathy predation.- prey relationship. system ecology and ecological models.</p> <p><b>Industrial Biotechnology:</b> Introduction, Industrial microbial products: Alcohol production (Beer), Antibiotics production (penicillin), production of Vitamins (Vitamin B12), production of Single Cell Protein, Algal protein: (Spirulina) Fungal protein: (Mushroom) and economic aspects. Plant Tissue Culture: Introduction. Importance of plant tissue culture, Basic requirements for tissue culture laboratory, composition of tissue culture medium. Culture of plant tissues, Regeneration of plants, Root culture, meristem culture, Anther culture, Pollen culture. Role of tissue culture technology in crop improvements.</p> <p><b>Internal assessment test- I</b></p>
9	<p><b>Carbohydrates</b>-A brief account of monosaccharide's and disaccharides, structure of starch</p>	<p><b>9 Fungal physiology :</b> Nutrition of carbon, nitrogen, mineral, vitamin and growth</p>
10	<p>cellulose, pectin and chitin.</p>	<p><b>10</b> regulators, metabolism and biosynthesis of carbohydrates</p>
11	<p>.lipids-lipid classification and chemical structure and physical properties of saturated and</p>	<p><b>11</b> (Including chitin) non carbohydrate (organic acids and lipids) and nitrogen (including lysine, amino acids,</p>
12	<p>unsaturated fatty acids. <b>Nuclear Magnetic Resonance:</b> The phenomenon of energy absorption and relaxation, chemical shifts. Instrumental; techniques –Proton NMR,C-13 NMR,P-31 NMR, two dimensional NMR-FINMR, solid state NMR, Magnetic resonance imaging. Application of NMR in the study of proteins. Nucleic acids ,membranes and metabolism.</p>	<p>nucleic acids and proteins) secondary metabolites and their role. Fungal genetics : <b>12</b> Fungi as organism for genetic study, genetic markers, isolation and selection of mutants, tetrad analysis. Industrial application of fungal genetics and strain</p>

	<p><b>Androgenesis-</b> Histochemical , ultra structural, genetical and fictional aspects concept and significance of male germ unit.</p> <p><b>Gynogenesis-</b> Histochemical, ultra structural, genetical and fictional aspects concept and significance of female germ unit.</p> <p>Pollination and fertilization-structural and functional aspects of pollen, stigma and styles in the current aspects of fertilization. Male sterility concept, causes and mechanism and present status.</p> <p>DNA as genetic material, Gene concept, Mechanism of DNA replication in prokaryotes and eukaryotes, Enzymes in DNA replication. Types and role RNA, Genetic code- Contribution of Nirenberg and Khorana. Transposable genetic elements: AC-DS elements in Maize, mechanism of transpositions. Human genome project.</p> <p><b>3:</b> 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 vasica</i>, <i>Azadirachta indica</i>, <i>Gloriosa superba</i>, <i>Eclipta alba</i>, <i>Aristolochia indica</i>, <i>Phyllanthus amarus</i>, <i>Boerhaavia 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 speciosus</i>.</p>		<p>improvements.</p> <p><b>Plant defense mechanism</b> against pathogens – structural metabolic preexisting biochemical. Environmental effects on infections: Effect of temperature, soil, pH moisture, wind, light, Host – plant nutrition. Herbicides and pesticides. Plant disease epidemiology, The elements of an endemics, Measurement of plant disease, pattern, Comparison, Development, modeling computer simulation, forecasting of plant disease endemics.</p> <p>Major aquatic ecosystems of the world- fresh water ecosystem, marine ecosystem, environmental pollution-sources, major and impact of air, water and soil pollution radioactive pollution disposal and management oil pollution and management. Plant indicators in pollution. Solid and liquid waste management in tannery, fertilizer , pulp and paper and sugar industries. Noise pollution-assessment , control and management. Global environment problem, ozone depletion, global warming and climatic change.</p> <p><b>Biofuels:</b> Introduction, Production of biogas, Structure of biogas plant, Biochemistry of methane production, Biogas research in India, Uses of biogas. Plant Biotechnology Introduction, Somatic hybrids and cybrids, cytoplasmic gene transfer, gene transfer, Advantage and Limitations.</p>
<b>13</b>	<p><b>Enzymes-</b> nature and classification of enzymes, enzyme specificity, reaction rates and activation energy, enzyme kinetics. Micheaelis-Menten equation, Line weavers Burk</p>	<b>13</b>	<p><b>Somatic incompatibility</b> – Systems in Ascomycetes and Basidiomycetes in culture and in nature, parasexuality</p> <p><b>Management and control of plant</b></p>
<b>14</b>		<b>14</b>	
<b>15</b>		<b>15</b>	

<p>16</p> <p>plot. Kinetics of bisubstrate reactions. Kinetic tests for determining inhibition mechanisms.</p> <p>Mass spectrometry- basic theory and instrumentation, general modes of fragmentation</p> <p>Gas Chromatography and Mass Spectroscopy (GCMS), FTIR spectroscopy and LASERS its applications in biology and medicine.</p> <p><b>Embryogenesis-</b> Cellular and biochemical aspects, composition and function of endosperm in relation to embryo development. Regulation of gene activity during zygotic embryogenesis, embryo suspensor- composition and function. <b>Seed development and germination-</b> Physiology and biochemistry expression of genes during seed germination. Seed dormancy and role of hormones</p> <p>Photo morphogenesis-photoreceptors, structure and function.</p> <p>Plant Breeding: Mode of reproduction, methods of hybridization in self and cross pollinated plants, Plant Introduction, Domestication and acclimatization, patterns of evolution in crop plants. Heterosis-genetic basis of heterosis. Breeding plants for resistance to abiotic and biotic stresses.</p> <p>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.</p> <p>Conservation of medicinal plants- <i>In situ</i> and <i>Ex situ</i>. IPR and Patenting.</p> <p><b>Internal assessment test- II</b></p>	<p>16</p> <p><b>diseases:</b> Control methods that exclude the pathogen from the host, Control methods that eradicate the pathogen inoculums. Cultural methods, Biological methods. Environmental factors that cause plant disease. General Chromatistics, Diagnosis, and control, Temperature effects, Moisture effects. Air pollution, nutritional deficiencies in plants. The often Confused. Etiology of stress disease.</p> <p><b>Biodiversity conservation-</b> definition , importance , biological hotspots , biodiversity loss , magnitude and distribution of biodiversity. biodiversity values- timber, ornamental, medicinal. Conservation insitu and exsitu methods. Environmental management- natural resources, principles of conservation , concept and strategies of sustainable development , environmental impact assessment, principles of remote sensing , application of RS and GIS in environmental management , environmental laws forest conservation act, biological diversity.</p> <p><b>Genetic Engineering:</b> Introduction, Genetic Engineering of microorganisms, Vectors of gene cloning direct transformations, Microinjection, Nuclear transplantation, Isolation and cloning plasmid and Mitochondrial genes. Transgenic plants with nif genes. Improvement of seed proteins, production of disease free and disease resistant plants.</p> <p><b>Internal assessment test- II</b></p>
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