

**HKE Society's**  
A.V.Patil Degree college of Arts, Science & Commerce, Aland.

Department of Botany


**LESSON PLAN 2021-22**

Semester : Ist Semester (NEP)


Course: Microbial Diversity and Technology

<u>Month</u>	<u>Teaching learning plan:</u>	<u>Lecture hour</u>	<u>Teaching method</u>
November	<b>Unit –1 Microbial diversity</b> -Introduction to microbial diversity; Methods of estimation; Hierarchical organization and positions of microbes in the living world . Whittaker's five-kingdom system and Carl Richard Woese's three-domain system.	2	Lect. method
November	. Distribution of microbes in soil, air, food and water. Significance of microbial diversity in nature	1	Group discussion
November	<b>History and developments of microbiology</b> -Microbiologists and their contributions (Leeuwenhoek, Louis Pasteur, )	2	seminar
November	. Robert Koch, Joseph Lister, Dmitri Iwanowski, Sergius Winogradsky and M W Beijerinck and Paul Ehrlich).	1	Practical method
November	Microscopy-Working principle and applications of light, dark field, phase contrast and electron microscopes (SEM and TEM).	2	Practical method
December	Microbiological stains (acidic, basic and special) and Principles of staining. Simple, Gram's and differential staining.	2	Practical method
December	<b>Unit – 2 Culture media for Microbes</b> -Natural and synthetic media, Routine media -basal media, enriched media, selective media, indicator media, transport media, and storage media.	1	Group discussion
December	enriched media, selective media, indicator media, transport media, and storage media.	2	seminar
December	Sterilization methods -Principle of disinfection, antiseptic, tyndallisation and Pasteurization, Sterilization-Sterilization by dry heat, moist heat, UV light, ionization radiation, filtration. Sterilization-Sterilization by dry heat, moist heat, UV light, ionization radiation, filtration.	2	ICT
January	<b>Microbial Growth</b> -Microbial growth and measurement. Nutritional types of Microbes- autotrophs and heterotrophs, phototrophs and chemotrophs; lithotrophs and organotrophs	3	Group discussion
January	<b>Unit – 3 Microbial cultures and preservation</b> -Microbial cultures. Pure culture and axenic cultures, subculturing, Preservation methods-overlaying cultures with mineral oils, lyophilisation.	3	ICT


January	Microbial culture collections and their importance. A brief account on ITCC, MTCC and ATCC.	2	ICT
January	<b>Viruses</b> - General structure and classification of Viruses; ICTV system of classification	2	Lect. method
January	Structure and multiplication of TMV, SARS-COV-2, and Bacteriophage (T2).	2	Lect. method
January	Cultivation of viruses. Vaccines and types.	1	Group discussion
February	<b>Viroids</b> - general characteristics and structure of Potato Spindle	2	Practical method
February	Tuber Viroid (PSTVd); Prions - general characters and Prion diseases. Economic importance of viruses	2	Practical method
February	<b>Bacteria</b> - General characteristics and classification. Archaeobacteria and Eubacteria. Ultrastructure of Bacteria; Bacterial growth and nutrition.	2	ICT
February	Reproduction in bacteria- asexual and sexual methods. Study of Rhizobium and its applications.	2	Lect. method
February	A brief account of Actinomycetes and Cyanobacteria. Mycoplasmas and Phytoplasmas- General characteristics and diseases. Economic importance of Bacteria.	2	Lect. method
February	<b>Fungi</b> -General characteristics and classification. Thallus organization and nutrition in fung. Type study of <i>Phytophthora, Rhizopus, Neurospora, Puccinia, Penicillium and Trichoderma</i>	1	Group discussion
February	Reproduction in fungi (asexual and sexual). Heterothallism and parasexuality.	2	Practical method
February	Type study of <i>Phytophthora, Rhizopus, Neurospora, Puccinia, Penicillium and Trichoderma</i>	2	Practical method
February	<b>Lichens</b> - Structure and reproduction. <b>VAM Fungi</b> and their significance.	2	ICT
February	<b>Fungal diseases</b> -Late Blight of Potato, Black stem rust of wheat;	2	Lect. method
February	Downy Mildew of Bajra, Grain smut of Sorghum, Sandal Spike, Citrus Canker,	2	Lect. method
February	Root Knot Disease of Mulberry. Economic importance of Fungi.	1	Group discussion

  
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**LESSON PLAN 2021-22**

Semester : 1st Semester (NEP OE)

Course: **Plants and Human Welfare**

<u>Month</u>	<u>Teaching learning plan</u>	<u>Lecture hour</u>	<u>Teaching method</u>
November	<b>Unit I</b> Origin of Cultivated Plants. Concept of Centres of Origin, their importance with reference to Vavilov's work	2	Lect. method
November	Examples of major plant introductions. Crop domestication and loss of genetic diversity (Only conventional plant breeding methods)	2	Group discussion
November	Importance of plant bio- diversity and conservation	1	seminar
November	<b>Unit II Cereals:</b> Wheat and Rice (origin, evolution, morphology, post-harvest processing & uses)	2	Practical method
November	Green revolution. Brief account of millets and their nutritional importance.	2	Practical method
December	<b>Unit III Legumes:</b> General account (including chief pulses grown in Karnataka- red gram	2	Practical method
December	green gram, chick pea, soybean). Importance to man and ecosystem	2	Group discussion
December	<b>Unit IV Fruits:</b> Mango, grapes and Citrus (Origin, morphology, cultivation, processing and uses	1	seminar
December	<b>Unit V Cash crops:</b> Morphology, new varieties and processing of sugarcane, products and by-products of sugarcane industry.	2	ICT
December	Natural Rubber –cultivation, tapping and processing.	2	Group discussion
December	<b>Unit VI Spices:</b> Listing of important spices, their family and parts used, economic importance with special reference to Karnataka	2	ICT
December	Study of fennel, clove, black pepper and cardamom.	2	ICT
January	<b>Unit VII Beverages:</b> Tea, Coffee (morphology, processing & uses)	1	Lect. method
January	<b>Unit VIII Oils and fats:</b> General description, classification, extraction, their uses and health implications;	2	
January	groundnut, coconut, sunflower and mustard (Botanical name, family & uses). applications	2	Group discussion
January	<b>Unit IX Essential Oils:</b> General account. Extraction methods of sandal wood oil, rose oil and eucalyptus oil.	2	Practical method
January	Economic importance as medicine, perfumes and insect repellents.	2	Practical method
January	<b>Unit X Drug-yielding plants:</b> Therapeutic and habit-forming drugs with special reference to Cinchona, Digitalis, Aloe	1	

	vera and Cannabis.		
February	<b>Unit XI Fibers:</b> Classification based on the origin of fibers; Cotton and jute (origin morphology, processing and uses).	2	
February	<b>Unit XII Forests:</b> Forest and forest products. Community forestry. Concepts of reserve forests, sanctuaries and national parks with reference to India	2	
February	Endangered species and red data book.	2	
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**LESSON PLAN 2021-22**

Semester : III<sup>rd</sup> Semester (CBCS)

Course: Plant Anatomy and Embryology.

<u>Month</u>	<u>Teaching learning plan:</u>	<u>Lecture hour</u>	<u>Teaching method</u>
November	Unit:1 <b>Meristematic and permanent tissue</b> Root and shoot apical meristems; Simple and complex tissues. Secretory tissues. <b>Organs</b>	2	Lect. method
November	Structure of dicot and Monocot root, stem, and leaf	3	Group discussion
November	<b>Unit 2: Secondary Growth</b> Vascular cambium - structure and function, seasonal activity.	3	seminar
November	. Anomalous secondary growth ( <i>Amaranthus</i> &, <i>Dracaena</i> ) Adaptive and protective systems Epidermis, cuticle, stomata;	3	Practical method
November	Unit 3: Structural organization of flower Structure of anther and pollen. Pollination and fertilization	2	Practical method
December	Types of embryo sacs, organization and ultrastructure of mature embryo sac.	3	Practical method
December	Pollination mechanisms and adaptations; Double fertilization;	1	Group discussion
December	Seed - Structure (Dicot & Monocot) appendages and dispersal mechanism. Structure and types of ovules	2	seminar
December	<b>Unit 4:</b> Embryo and endosperm Embryo endosperm relationship	2	ICT
January	Apomixis and <b>polyembryony</b> Definition, types and practical applications.	2	Group discussion
January	General account of adaptations in xerophytes and hydrophytes.	3	ICT
January	Secondary growth in root and stem, Wood (heartwood and sapwood).	3	ICT
January	Dicot and monocot embryo	2	Lect. method
January	Secondary growth in root and stem, Wood (heartwood	2	

	Wood (heartwood and sapwood).		
January	Simple and complex tissues. Secretory tissues. <b>Organs</b>	2	Group discussion
February	Endosperm types, structure and functions	3	Practical method
February	Secretory tissues. <b>Organs</b>	2	Practical method

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**LESSON PLAN 2021-22**


Semester : VIth Sem (CBCS)

Course: Plant pathology Biotechnology & Plant Breeding

<u>Month</u>	<u>Teaching learning plan</u>	<u>Lecture hour</u>	<u>Teaching method</u>
March	<b>Unit 1:</b> Introduction, disease triangle (Host, pathogen and environment), Terminologies, Koch's postulates.	2	Lect. method
March	. Brief account on integrated pest management: Causal organism, symptoms, etiology and control measures of Leaf curl of papaya, Bunchy top of banana, Citrus canker, Angular leaf spot of cotton	3	Group discussion
March	<b>Unit 2:</b> Causal organism, symptoms, etiology and control measures of the following diseases.	3	seminar
April	<b>Unit 3:</b> Sandal spike disease of mycoplasma Introduction and scope of biotechnology, Application of Biotechnology,	3	Practical method
April	Transgenic plant- Bt cotton and Golden rice, Genetic engineering	2	Practical method
April	Introduction, tools used in genetic engineering Recombinant DNA technology (Steps of rDNA technology): DNA Fingerprinting	3	Practical method
April	PCR technique, Hybridoma technique, ELISA test, gene Therapy.	1	Group discussion
April	Plant tissue culture: Media preparation, Steps involved in tissue culture	2	seminar
May	<b>Unit 4: Plant Breeding:</b> Methods of crop improvement, Hybridization	2	ICT
May	Mutation and polyploidy Centres of origin and domestication of crop plants, crop genetic resources	2	Lect. method

  
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LESSON PLAN 2021-22

Semester : V Sem (CBCS)

Course: SEC: Herbal Technology

<u>Month</u>	<u>Teaching learning plan</u>	<u>Lecture hour</u>	<u>Teaching method</u>
January	<b>Unit 1:</b> Herbal medicines: history and scope - role of medicinal plants in Ayurveda and Siddha systems of medicine;	2	Lect. method
January	cultivation - harvesting - processing - storage -marketing and utilization of medicinal - plants	3	Group discussion
January	<b>Phytochemistry</b> - active principles Phytochemical screening tests for secondary metabolites (alkaloids, flavonoids, steroids, triterpenoids, phenolic compounds).	3	seminar
February	<b>Unit 2:</b> Pharmacology: Medicinal uses of <i>Ocimum sanctum</i> , <i>Zingiber officinale</i> ,	3	Practical method
February	<i>asoca</i> , <i>Catharanthus roseus</i> , <i>Withania somnifera</i> , <i>Terminalia arjuna</i> ,	2	Practical method
February	<i>Aloe vera</i> and <i>Centella asiatica</i> . Methods of screening plant crude drugs against microbial pathogens.	3	Practical method
February	Drug adulteration, methods of drug storage and microbial drug contaminations.	1	Group discussion



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Semester : II<sup>nd</sup> Semester (NEP)


Course: Diversity of Non- Flowering Plants

<u>Month</u>	<u>Teaching learning plan:</u>	<u>Lecture hour</u>	<u>Teaching method</u>
March	<b>Unit –1</b> 1 Algae –Introduction and historical development in algology. Distribution of Algae.	1	Lect. method
March	General characteristics and classification of algae,	1	Group discussion
March	. Diversity- habitat, thallus organization, pigments, reserve food, flagella types, life-cycle and alternation of generation in Algae.	3	seminar
April	. Morphology and reproduction and life-cycles of <i>Nostoc</i> , <i>Oedogonium</i> ,	1	Practical method
April	<i>Chara</i> , <i>Sargassum</i> and <i>Batrachospermum</i> . <i>Chara</i> , <i>Sargassum</i> and <i>Batrachospermum</i> .	2	Practical method
April	Blue-green algae-A general account. Algal blooms and toxins	3	Practical method
April	Algal cultivation- Cultivation of microalgae- <i>Spirulina</i> and <i>Dunaliella</i> ; Algal cultivation methods in India..	1	Group discussion
April	Algal products- Food and Nutraceuticals, Feed stocks, food colorants; fertilizers, aquaculture feed; therapeutics and cosmetics; medicines; dietary fibres from algae and uses	2	seminar
May	Unit – 2 Bryophytes – General characteristics and classification of Bryophytes, Diversity-habitat, thallus structure, Gametophytes and sporophytes.	2	ICT
May	Diversity-habitat, thallus structure	1	Group discussion
May	Gametophytes and sporophytes.	1	Group discussion
May	Distribution, morphology, anatomy, reproduction and life-cycles of <i>Riccia</i> , <i>Anthoceros</i>	3	ICT
May	<i>Riccia</i> , <i>Anthoceros</i> , and <i>Funaria</i> . Ecological and economic importance of Bryophytes. Fossil Bryophytes	3	ICT
May	. <b>Pteridophytes</b> - General characteristics and classification; Structure of sporophytes and life-cycles.	2	Lect. method

May	Distribution, morphology, anatomy, reproduction and life-cycles in <i>Selaginella</i> , <i>Equisetum</i> , <i>Pteris</i> and <i>Salvinia</i> .	2	Group discussion
May	A brief account of heterospory and seed habit. Stellar evolution in Pteridophytes.	2	Group discussion
June	Affinities and evolutionary significance of Pteridophytes. Ecological and economic importance.	3	Practical method
June	<b>Gymnosperms</b> - General characteristics. Distribution and classification of Gymnosperms. Study of the habitat, distribution, habit, anatomy, reproduction and life-cycles in <i>Cycas</i> , <i>Pinus</i> and <i>Gnetum</i> .	2	Practical method
June	Affinities and evolutionary significance of Gymnosperms. Economic importance of Gymnosperms - food, timber, industrial uses and medicines.	2	Group discussion
June	Economic importance of Gymnosperms - food, timber, industrial uses and medicines.	2	Group discussion
July	<b>Unit – 4 Origin and evolution of Plants:</b> Origin and evolution of plants through Geological Time scale.	2	Group discussion
July	<b>Paleobotany</b> - Paleobotanical records, plant fossils, Preservation of plant fossils - impressions, compressions, petrification's,	3	Practical method
July	moulds and casts, pith casts. Radiocarbon dating.	2	Practical method
July	Fossil taxa- <i>Rhynia</i> , <i>Lepidodendron</i> , <i>Lepidocarpon</i> , <i>Lyginopteris</i> and <i>Cycadeoidea</i> .	2	Group discussion
July	Exploration of fossil fuels. Birbal Sahni Institute of Paleosciences.	2	Group discussion

  
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**LESSON PLAN 2021-22**


Semester : II<sup>nd</sup> Sem (OE)

Course: Plant propagation nursery management & Gardening

<u>Month</u>	<u>Teaching learning plan</u>	<u>Lecture hour</u>	<u>Teaching method</u>
March	Unit I Nursery: Definition, objectives and scope and general practices and building up of infrastructure for nursery, planning and seasonal activities	2	Lect. method
March	Planting - direct seeding and transplants, Soil free/soilless/ synthetic growth mediums for pots and nursery	2	Group discussion seminar
March	<b>Unit II Seed:</b> Structure and types - Seed dormancy; causes and methods of breaking dormancy.	1	
March	Seed storage: Seed banks, factors affecting seed viability	2	Practical method
March	genetic erosion Seed production technology. Seed testing and certification.	2	Practical method
April	<b>Unit III Vegetative propagation:</b> Air-layering, cutting, selection of cutting, collecting season,.	2	Practical method
April	treatment of cutting, rooting medium and planting of cuttings	2	Group discussion seminar
April	Hardening of plants .Green house ,mist chamber, shed root, shade house and glass house	1	
April	<b>Unit IV Gardening:</b> Definition, objectives and scope. Different types of gardening	2	ICT
May	- landscape and home/terrace gardening, parks and its components	2	Group discussion
May	Plant materials and design. Computer applications in landscaping, Gardening operations	2	ICT
June	soil laying, manuring, watering, management of pests and diseases and harvesting.	2	ICT
June	<b>Unit V Sowing/raising of seeds and seedlings -</b> Transplanting of seedlings - Study of cultivation of different vegetables and flowering plants:	1	Lect. method
July	cabbage, brinjal, lady's finger, tomatoes, carrots, bougainvillea, roses, geranium, ferns, petunia, orchids etc	2	Lect. method
July	Storage and marketing procedures. Developing and maintenance of different types of lawns. Bonsai technique.	2	Group discussion

  
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**LESSON PLAN 2021-22**

Semester : IVth Semester (CBCS)

Course: Plant Physiology and Metabolism

<u>Month</u>	<u>Teaching learning plan</u>	<u>Lecture hour</u>	<u>Teaching method</u>
March	<b>Unit 1: Plant-water relations</b> Importance of water water potential and its components Transpiration and its significance	2	Lect. method
March	Factors affecting transpiration; Root pressure and guttation Mineral nutrition	3	Group discussion
March	Essential elements, macro and micronutrients Criteria of essentiality of elements Role of essential elements;	3	seminar
April	active and passive transport, carriers, channels and pumps.	3	Practical method
April	<b>Unit 2: Photosynthesis</b> Photosynthetic Pigments (Chl a, b, xanthophylls, carotene) Photosystem I and II, reaction center, antenna molecules	2	Practical method
April	Electron transport and mechanism of ATP synthesis; C <sub>3</sub> , C <sub>4</sub> and CAM pathways of carbon fixation; Photorespiration	3	Practical method
April	<b>Enzymes</b> Structure and properties; Mechanism of enzyme catalysis and enzyme inhibition.	1	Group discussion
April	<b>Unit 3: Respiration</b> Glycolysis, anaerobic respiration, TCA cycle; Oxidative phosphorylation,	2	seminar
May	Glyoxylate, Oxidative Pentose Phosphate Pathway. <b>Translocation in phloem</b>	2	ICT
May	Composition of phloem sap, girdling experiment Pressure flow model; Phloem loading and unloading	2	Group discussion
May	Nitrogen metabolism Biological nitrogen fixation; Nitrate and ammonia assimilation.	3	ICT
May	<b>Unit 4:</b> Plant growth regulators Discovery and physiological role of auxins, gibberellins, cytokinins, ABA, ethylene. Plant response to light and temperature	3	ICT



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LESSON PLAN 2021-22

Semester : IVth Semester (CBCS)

Course: Plant Physiology and Metabolism

<u>Month</u>	<u>Teaching learning plan</u>	<u>Lecture hour</u>	<u>Teaching method</u>
March	<b>Unit 1:</b> Plant-water relations Importance of water water potential and its components Transpiration and its significance	2	Lect. method
March	Factors affecting transpiration; Root pressure and guttation Mineral nutrition	3	Group discussion
March	Essential elements, macro and micronutrients Criteria of essentiality of elements Role of essential elements;	3	seminar
April	active and passive transport, carriers, channels and pumps.	3	Practical method
April	<b>Unit 2:</b> Photosynthesis Photosynthetic Pigments (Chl a, b, xanthophylls, carotene) Photosystem I and II, reaction center, antenna molecules	2	Practical method
April	Electron transport and mechanism of ATP synthesis; C <sub>3</sub> , C <sub>4</sub> and CAM pathways of carbon fixation; Photorespiration	3	Practical method
April	<b>Enzymes</b> Structure and properties; Mechanism of enzyme catalysis and enzyme inhibition.	1	Group discussion
April	<b>Unit 3: Respiration</b> Glycolysis, anaerobic respiration, TCA cycle; Oxidative phosphorylation,	2	seminar
May	Glyoxylate, Oxidative Pentose Phosphate Pathway. Translocation in phloem Composition of phloem sap, girdling experiment	2	ICT
May	Pressure flow model; Phloem loading and unloading	2	Group discussion
May	Nitrogen metabolism Biological nitrogen fixation; Nitrate and ammonia assimilation.	3	ICT
May	<b>Unit 4:</b> Plant growth regulators Discovery and physiological role of auxins, gibberellins, cytokinins, ABA, ethylene. Plant response to light and temperature	3	ICT

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
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LESSON PLAN 2021-22**

Semester : Vth Semester (CBCS)

Course: SEC Nursery and Gardening

<u>Month</u>	<u>Teaching learning plan</u>	<u>Lecture hour</u>	<u>Teaching method</u>
April	Unit 1: Nursery: Introduction, infrastructure for nursery, planning and seasonal activities - Planting - direct seeding and transplants	2	Lect. method
April	Seed: Seed dormancy; causes and methods of breaking dormancy, Seed storage and seed testing	3	Group discussion
April	Sowing/raising of seeds and seedlings - Transplanting of seedlings.	3	seminar
April	Vegetative propagation: air-layering, cutting, selection of cutting, collecting season, treatment of cutting, rooting medium and planting of cuttings - Hardening of plants - green house - shade house and glass house.	3	Practical method
April	Unit 2: Gardening: definition, objectives and scope - different types of gardening	2	Practical method
May	landscape and home gardening - parks and its components - plant materials and design - computer applications in landscaping - Gardening operations	3	Practical method
May	Study of cultivation of different vegetables: cabbage, brinjal, lady's finger, onion, garlic, tomatoes, and carrots Storage and marketing.	1	Group discussion

  
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