

MASTER OF PLANT BIOLOGY AND PLANT BIOTECHNOLOGY

COURSE OUTCOMES (COs)

On completion of the course students will be able to

COURSE COMPONENT	COURSE	COURSE OUTCOME
CORE THEORY I	ALGAE, FUNGI, MICROBIOLOGY	<p>CO1 :To impart knowledge on classification of algae, Pigments, Flagella, Reserve food materials, Life cycle and contribution of Algologists.</p> <p>CO2: To elucidate and enlighten general characteristics and Life cycle of selected algae.</p> <p>CO3 :To learn and understand classification of Fungi, the concept of heterothallism, sexuality, mushroom cultivation and importance of Fungi.</p> <p>CO4 :To explain and study the structure, reproduction and Life cycle of selected Fungi.</p> <p>CO5: To classify, identify, isolate and purify the bacterial cultures for their economic importance and to learn the classification, morphology of plant viruses.</p>
CORE THEORY II	BRYOPHYTES, PTERIDOPHYTES, GYMNOSPERMS AND PALEOBOTANY	<p>CO1: To explain the General characters and recent trends in Classification of Bryophytes, Pteridophytes and Gymnosperms</p> <p>CO2: To discuss the Structural organization and evolution of Gametophytes and Sporophytes in lower forms like Bryophytes, Pteridophytes and Gymnosperms</p> <p>CO3 :To learn the Stelar evolution, Concepts of Evolution and Fossilization</p> <p>CO4: To acquire knowledge on Morphology, reproduction, Life cycle and uses of some forms of Bryophytes, Pteridophytes and Gymnosperms</p> <p>CO5 :To create awareness about the contributions of Paleobotanists and some fossil forms.</p>

ELECTIVE I	PLANT PATHOLOGY	<p>CO1 :Understand the scope and significance of plant pathology.</p> <p>CO2: Explain the concept of diseases of crop plants, causal agents of plant diseases, disease cycle, and management of crop diseases.</p> <p>CO3: Analyze the sign and symptoms of common plant diseases and devise control measures in plant disease management.</p> <p>CO4: Explain the process of host- parasite interaction.</p> <p>CO5 :Use various molecular methods to analyze the diseased plant samples in the laboratory for detection of plant pathogens.</p>
ELECTIVE II	APPLICATIONS OF ALGAE	<p>CO1: understand the historical perspective of use of algae for human needs for Nutraceuticals, biofertilizers and or aquaculture.</p> <p>CO2 :now the Chemical constituent of Single Cell Protein (SCP) viz., Spirulina and Chlorella and other forms for biodiesel production.</p> <p>CO3 :evaluate the significance and utilize them for industrial purposes for extraction and uses of agar-agar, carrageenan and alginic acid.</p> <p>CO4: synthesis Liquid seaweed Fertilizers (LSF).</p> <p>CO5: apply them in Nanotechnological field. Identify aquatic pollution and apply them for phycoremediation.</p>
MAJOR PRACTICAL I	ALGAE, FUNGI, MICROBIOLOGY, BRYOPHYTES, PTERIDOPHYTES, GYMNOSPERMS AND PALEOBOTANY	<p>CO1: Apply the knowledge in identifying Bacteria and Virus.</p> <p>CO2 :Understand the identification of Algae and Fungi</p> <p>CO3: Learn the Life cycle of Bryophytes, Pteridohytes and Gymnosperms.</p> <p>CO4: Know the evolutionary trends and affinities of living gymnosperms with respect to external and internal features</p> <p>CO5: Understand the various fossil genera representing different fossil groups.</p>

<p>CORE THEORY III</p>	<p>PLANT ANATOMY, EMBRYOLOGY, PALYNOLOGY</p>	<p>CO1:To identify plant materials, woods, etc., and perform the techniques in plant anatomy. CO2: To explain the evolutionary concept of organization of shoot and root apex. CO3 :To discuss self-incompatibility in pollination and fertilization. CO4 :To relate between embryo, endosperm and seed. CO5 :To analyse and identify pollens in environment.</p>
<p>CORE THEORY IV</p>	<p>TAXONOMY OF ANGIOSPERMS AND ECONOMIC BOTANY</p>	<p>CO1: Acquire knowledge on different systems of classification CO2: Understand the modern trends in taxonomy and apply in solving taxonomic problems. CO3 :Obtain knowledge of Binomial nomenclature and key preparation CO4 :To impart knowledge on Morphology and floral parts of some angiosperm families CO5 :To discuss the economic uses of pulses, legumes, spices and NTFP.</p>
<p>CORE THEORY V</p>	<p>CELL BIOLOGY</p>	<p>CO1: understand the structure and purposes of plasma membrane, membrane pumps and electrical properties of membranes. CO2: Discuss the Structure and function of intracellular organelles. CO3 :distinguish about the ultrastructure and function of Mitochondrial and chloroplast DNA, isolation and quantification techniques of nucleic acid. CO4: Evaluate and identify different stages of mitotic cell division, meiotic cell division and cell cycle. CO5 :Analyze the morphology and fine structure of chromosomes, types banding techniques, chromosome aberrations, gene structure and transposons.</p>

ELECTIVE III	MOLECULAR BIOLOGY AND GENETIC ENGINEERING	<p>CO1: Learn and understand the scope of molecular biology by knowing the structure, types and functions of Nucleic Acids.</p> <p>CO2 :Discuss the Gene concept, structure and its function.</p> <p>CO3: Acquire knowledge on the concept of a vector and its types.</p> <p>CO4: Understand the Cloning strategies, IPR, Patents and Biosafety of GMO and GMPs.</p> <p>CO5 :Develop in-depth knowledge about Blotting techniques, Principles and applications of PCR, its types, Sequencing methods.</p>
MAJOR PRACTICAL II	PLANT ANATOMY, EMBRYOLOGY, PALYNOLOGY, TAXONOMY OF ANGIOSPERMS, ECONOMIC BOTANY, AND CELL BIOLOGY	<p>CO1 :To understand and acquire knowledge of the internal structure of stem, leaf and root (monocot and dicot), anomalous secondary thickening (dicot and monocot), anther, nodes and isolation of embryo.</p> <p>CO2 :Able to differentiate the stages of mitosis and meiosis.</p> <p>CO3: Analyze and identify pollens in the environment.</p> <p>CO4:Recognize members of the angiosperm families by identifying their diagnostic features and economic importance</p> <p>CO5 :Acquire lab based training in writing short species descriptions , illustration and key preparations for identification of species</p>
CORE THEORY VI	GENETICS, PLANT BREEDING AND EVOLUTION	<p>CO1 :Understanding of Mendel's principle, its extension and chromosomal basis, and determination of gene action from genotype to phenotype.</p> <p>CO2: Capability to perform gene mapping using 3- point test cross in Drosophila, gene mapping in humans by linkage analysis in pedigrees</p> <p>CO3: Understand gene mutation, types of gene mutations, and methods for detection of induced mutations.</p> <p>CO4 :Apply principles involved in Plant Breeding in crop improvement and use plant breeding techniques for production of new superior crop varieties.</p> <p>CO5 :Understand and describe fundamental</p>

		processes of evolutionary changes, including natural selection, variation, recombination, adaptation and mutation.
CORE THEORY VII	ECOLOGY AND PHYTOGEOGRAPHY	<p>CO1 :Understand the basic concepts of ecology and various ecosystem</p> <p>CO2 :Obtain knowledge and Organize the ecosystem and mechanism of biogeochemical cycle and energy levels.</p> <p>CO3 :To discuss the causes, effect and protective measures against Green house effects and global warming.</p> <p>CO4 :To acquire indepth knowledge about Community Ecology and sampling of plant community by quadrat method.</p> <p>CO5: To know the Phytogeographical regions of world and Floristic regions of India</p>
CORE THEORY VII	PLANT TISSUE CULTURE	<p>CO1 :To impart knowledge on the history of plant tissue culture, learn and discuss various sterilization procedures and design R&D Lab for plant tissue culture.</p> <p>CO2: To enlist, elucidate and evaluate the media content for plant tissue culture.</p> <p>CO3: To learn, understand and demonstrate various explants for plant tissue culture.</p> <p>CO4: To explain and study the suspension and protoplast culture techniques and immobilization of cells and use of bioreactors in industries.</p> <p>CO5: To discuss, compare and evaluate crop improvement in tissue culture.</p>
ELECTIVE IV	BIOINSTRUMENTATION AND BIOINFORMATICS	<p>CO1: analyze the separation of biomolecules using chromatographic, electrophoretic and centrifugal techniques.</p> <p>CO2 :describe the principle, operation and use of various instruments to determine the concentration of molecules in biological samples.</p> <p>CO3 :to utilize the application of instruments used for the microscopic, physical and Analytical studies of biological samples.</p> <p>CO4 :compare different kinds of biological databases and their formats.</p> <p>CO5: understand the various techniques used for phylogenetic tree construction and drug designing.</p>

<p>MAJOR PRACTICAL III</p>	<p>GENETICS, PLANT BREEDING AND EVOLUTION, PLANT TISSUE CULTURE, ECOLOGY AND PHYTOGEOGRAPHY</p>	<p>CO1 :Able to solve genetic problems in Mendelian and non-Mendelian inheritance. CO2: Apply principles involved in Plant Breeding in crop improvement and use plant breeding techniques for production of new superior crop varieties. CO3 :Demonstrate the knowledge about the techniques of Plant Tissue Culture, organisation of tissue culture lab. CO4: Understand and describe fundamental processes of evolutionary changes, including natural selection, variation, recombination, adaptation and mutation. CO5: Apply different methods to find qualitative and quantitative characters of a plant community and to understand population Ecology</p>
<p>CORE THEORY IX</p>	<p>PLANT BIOTECHNOLOGY</p>	<p>CO1: To discuss the procedure of sterilization and working principles of different Fermentors. CO2 :Understand the Microbial metabolic products and their production process. CO3: To acquire knowledge about Enzyme technology, methods of immobilization and Biosensors. CO4: To learn the process of microbial production of organic solvents and acids, aminoacids and antibiotics. CO5: To obtain knowledge on Microbial production of fermented food and alcoholic beverages</p>
<p>CORE THEORY X</p>	<p>PLANT PHYSIOLOGY AND BIOCHEMISTRY</p>	<p>CO1: Understand bioassay, biosynthesis and physiological actions of plant hormones. CO2 :Analyze and appraise the role of carbohydrates, proteins, lipids and secondary metabolites. CO3 :Understand nomenclature, properties of enzymes and kinetics. CO4: Evaluate and appraise the role of photosynthesis and photoperiodism. CO5: analyze different pathways involved in respiration</p>

ELECTIVE V	PHARMACOGNOSY	<p>CO1:Acquire adequate knowledge and scientific information regarding basic principles of Pharmacognosy including herbal medicines.</p> <p>CO2: Able to perform preclinical and clinical evaluation of drugs of various categories.</p> <p>CO3:Able to do product detailing, marketing, distribution and selling of pharmaceutical products.</p> <p>CO4 :Associate medicinal compounds with their natural sources.</p> <p>CO5:Able to perform experimental procedures as per laboratory standards in the area of Pharmacognosy.</p>
MAJOR PRACTICAL IV	<p>PLANT BIOTECHNOLOGY, PLANT PHYSIOLOGY AND BIOCHEMISTRY</p>	<p>CO1: To impart practical knowledge on the theoretical subjects handled.</p> <p>CO2: To learn and understand the working principles of the laboratory tools and techniques, and utilize them practically.</p> <p>CO3 :To evaluate, interpret and analyze the acquired data.</p> <p>CO4 :To help the student with innovative thoughts and scientific thinking and research.</p> <p>CO5 :To help and facilitate students for taking up jobs in Botany, biotechnology, research and multidisciplinary fields.</p>
PROJECT	PROJECT	<p>CO1: To know, understand and able to do the literature survey for the selected topic.</p> <p>CO2: Acquire skills in practical work, experiments, laboratory techniques and field based studies with multidisciplinary work and tasks.</p> <p>CO3: Handle instruments for analysis and discuss their experimental results</p> <p>CO4: To discuss, compare, evaluate and interpret the results and to prepare reports/presentation and defend their work.</p> <p>CO5: To facilitate students for taking up and shaping a successful careers in Botany/biotechnology/multidisciplinary fields.</p>