

COURSE OUTCOMES- DEPARTMENT OF BOTANY

On completion of undergraduate program the students are expected to achieve the following course outcomes

THEORY				
Semester	Course code	Course titles	CO	Course outcomes
1	BO1CRT01	Methodology of science and an introduction to botany	CO1	Understand the universal nature of science
			CO2	Demonstrate the use of scientific method
			CO3	To lay a strong foundation to the study in Botany
			CO4	Impart an insight into the different types of classifications in the living kingdom
			CO5	Appreciate the world of organisms and its course of evolution and diversity
			CO6	Develop basic skills to study Botany in detail
1	BO1CMT01	Cryptogams, gymnosperms and plant pathology	CO1	Acquire fundamental knowledge in plant science
			CO2	Understand that Botany is an integral part of human life and development
			CO3	Foster and encourage an attitude of curiosity, appreciation and enquiry of

				various life forms
			CO4	Understand the diversity of plants with respect to algae, fungi, lichen, bryophytes, pteridophytes and Gymnosperms
			CO5	Plant Disease Classification and Analysis
2	BO2CRT02	Microbiology, mycology and plant pathology	CO1	Understand the fundamental principles of microbiology and its significance in various scientific and industrial applications
			CO2	Understand the world of microbes, fungi and lichens
			CO3	Appreciate the adaptive strategies of the microbes, fungi and lichens
			CO4	Develop basic research skills to explore recent advancements in microflora
			CO5	To study the economic and pathological importance of microorganisms
			CO6	Demonstrate proficiency in classifying plant diseases based on causative organisms and symptoms.
2	BO2CMT02	Plant physiology	CO1	Get an awareness about how plant physiology related to the basic activities of plants
			CO2	Understanding Water Absorption
			CO3	Differentiate between active and passive water absorption by roots

			CO4	Analyze and compare the Sap Ascent Theories
			CO5	Categorize and understand the types of transpiration
			CO6	Identify Growth and Development in Plants
3	BO3CRT03	Phycology and bryology	CO1	Develop a foundational understanding of algae
			CO2	Demonstrate mastery in classifying algae based on Fritsch's (1945) system
			CO3	Understand the economic importance of algae, including their roles as food, SCP, fodder, green manure, and in N ₂ fixation
			CO4	Develop a foundational understanding of bryophytes, including their general characters and introduction to classification
			CO5	Acquire a comprehensive understanding of the distribution, morphology, anatomy, reproduction, and life cycle of bryophytes
			CO6	Understand the evolution of gametophyte and sporophyte among bryophytes
			CO7	Realize the application of Phycology in different fields
3	BO3CMT03	Angiosperm taxonomy and economic botany	CO1	Identify and describe the morphological features of leaves, flowers, and fruits
			CO2	Appreciate the importance of plant classification
			CO3	Identify major characters and understand the economic importance of Angiosperm

				Families
			CO4	Classify economically important plants
			CO5	Study the morphology of useful parts and uses of various medicinal plants
4	BO4CRT04	Pteridology, gymnosperms and paleobotany	CO1	Understand the diversity in habits, habitats and organization of various groups of plants
			CO2	Gain proficiency in classifying Pteridophytes up to classes by Smith (
			CO3	Acquire a comprehensive understanding of the distribution, morphology, anatomy, reproduction, life cycle, and affinities of selected types
			CO4	Recognize the importance of Pteridophytes in various contexts, including medicinal uses, ornamental applications, and their role as biofertilizers
			CO5	Develop a foundational understanding of Gymnosperms, encompassing general characters and classification by Sporne
			CO6	Understand the affinities of Gymnosperms with Pteridophytes and Angiosperms
			CO7	Brief study of the fossil deposits in India. Important Indian Paleobotanical Institutes, contributions of Indian Paleobotanists
4	BO4CMT04	Anatomy and applied botany	CO1	Identify and describe the Cells and Tissues

			CO2	Analyze the Anatomy of Plant Organs
			CO3	Study and understand the Ecological Anatomy
			CO4	Understand the Plant breeding methods
			CO5	Apply various artificial vegetative propagation methods
			CO6	Understand the principles of plant tissue culture and micropropagation
5	BO5CRT05	Anatomy, reproductive botany and microtechnique	CO1	Imparting an insight into the internal structure and reproduction of the most evolved group of plants, the Angiosperm.
			CO2	Gain a deep understanding of the structure and composition of the cell
			CO3	To understand the organization of different types of tissues
			CO4	Understand the structural adaptations in plants growing in different environment
			CO5	To reveal the morphology and development of reproductive parts
			CO6	Familiarize preparation and use of stains, fixatives and mounting media

5	BO5CRT06	Research methodology, biophysics and biostatistics	CO1	To equip the students to conduct independent research and prepare research reports.
			CO2	Enable students to prepare comprehensive research reports, emphasizing clarity, structure, and effective communication of research findings
			CO3	To make the students acquaint with different tools and techniques used in research work.
			CO4	Provide students with sufficient numerical skills necessary for carrying out research, including data interpretation & statistical analysis,
			CO5	To equip the students with basic computer skills necessary for conducting research
5	BO5CRT07	Plant physiology and biochemistry	CO1	Understand the mechanisms of diffusion, imbibition, osmosis, osmotic potential, and water potential in plants
			CO2	Differentiate between active and passive absorption of water, and recognize the apoplastic and symplastic pathways of water movement
			CO3	Comprehend the cohesion-tension theory for the ascent of sap and understand the types, mechanisms,

				and significance of transpiration
			CO4	Understand the role of major and minor elements in plant nutrition, and identify deficiency symptoms of essential nutrients
			CO5	Apply the principles of Blackmann's law of limiting factors and comprehend the factors affecting photosynthesis
			CO6	Understand both anaerobic and aerobic respiration, including glycolysis, Kreb's cycle, and mitochondrial electron transport system
			CO7	Understand the physiological effects and practical applications of plant hormones, including auxins, gibberellins, cytokinins, ABA, and ethylene
			CO8	Understand the physiology of flowering, including phytochrome, photoperiodism, and vernalization
			CO9	Understand the features and roles of lipids, types of fatty acids, and gain knowledge of enzymes, their classification, and factors affecting

				their action
5	BO5CRT08	Environmental science and human rights	CO1	Understand the fundamental concepts of ecology, including its definition, scope, and relevance
			CO2	Understand the community concept, biotic community, species diversity, trophic structure, ecotone, habitat, ecological niche
			CO3	Grasp the concepts of energy flow, food chains, food webs, trophic levels, and ecological pyramids
			CO4	Define biodiversity and identify its types
			CO5	Recognize threats to biodiversity, IUCN threat categories, and the importance of wetlands
			CO6	Recognize conservation strategies and efforts at both global and national levels

5	BO5OPT02	Horticulture and nursery management	CO1	Understand the definition and historical development of horticulture
			CO2	Evaluate the propagation of horticultural plants
			CO3	Describe various types of gardens, including ornamental, indoor, and kitchen gardens
			CO4	Describe the commercial aspects of floriculture, including the cultivation of jasmine, orchid, anthurium, rose, and gladiolus
			CO5	Define different types of nurseries and understand their management strategies
6	BO6CRT09	Genetics, plant breeding and horticulture	CO1	Imparting an insight into the principles of heredity
			CO2	Understand the patterns of inheritance in different organisms
			CO3	Understand the inheritance pattern of nuclear and extra nuclear genes
			CO4	Understand the methods of crop improvement

			CO5	Develop skill in gardening technique among students
6	BO6CRT10	Cell and molecular biology	CO1	Understand the ultra structure and functioning of cell in the sub-microscopic and molecular level.
			CO2	Get an idea of origin, concept of continuity and complexity of life activities.
			CO3	Understand the basic and scientific aspect of diversity.
			CO4	Understand the cytological aspects of growth and development.
			CO5	Understand DNA as the basis of heredity and variation.
6	BO6CRT11	Angiosperm morphology, taxonomy and economic botany	CO1	Acquaint with the aims, objectives and significance of taxonomy
			CO2	Identify the common species of plants growing in Kerala and their systematic position
			CO3	Acquaint with the basic technique in the preparation of herbarium
			CO4	Familiarizing with the plants having immense economic importance.
6	BO6CRT12	BIOTECHNOLOGY AND BIOINFORMATICS	CO1	Understand the fundamental concepts of biotechnology and its applications in plant tissue culture
			CO2	Describe the components of tissue culture media and the role of plant growth regulators

			CO3	Differentiate methods of micropropagation
			CO4	Understand the steps involved in recombinant DNA technology and the characteristics of cloning vectors
			CO5	Explain the objectives and applications of bioinformatics
6	BO6PET02	Plant genetic resources management	CO1	Understand the historical developments in crop botany, identifying key events and their impact on the field
			CO2	Recognize primary and secondary centers of origin using the Vavilovian concept and comprehend their significance in crop improvement
			CO3	Identify and analyze major threats to genetic resources, including human interference, deforestation, and overexploitation. Understand the consequences of these threats
			CO4	Demonstrate proficiency in documenting endangered and threatened plants, utilizing principles from red data books.
			CO5	Appreciate the importance of underutilized plants for future food

				requirements
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PRACTICAL				
Semester	Course code	Course titles	CO	Course outcomes
1	BO2CRP01	Methodology of science and introduction to Botany, Microbiology, mycology & plant pathology	CO1	Design an experiment to verify a given hypothesis
			CO2	Identification of plants with vascular elements, plants which produce flowers, fruits, seeds, cone, sporophyll, embryos and study their salient features
			CO3	Prepare temporary, stained hand sections (TS, TLS, RLS) of plant specimens appropriate for light microscopic studies
			CO4	Gram staining - curd, root nodules
			CO5	Micropreparation and detailed microscopic study of Rhizopus, Albugo, Saccharomyces, Penicillium, Xylaria, Peziza, Puccinia, Fusarium and Parmelia.
			CO6	Identify the diseases mentioned in the syllabus with respect to causative organisms and symptoms
1	BO2CMP01	Cryptogams, Gymnosperms and Plant Pathology & Plant Physiology	CO1	Develop proficiency in micropreparation techniques and identify the vegetative structures of Algae
			CO2	Acquire skills in micropreparation and identification, being able to recognize the vegetative and reproductive structures of

				Fungi, Bryophytes, Pteridophytes and Gymnosperms
			CO3	Identification and Understanding Plant Diseases
			CO4	Understands the principles of Osmosis, Paper Chromatography, Photosynthesis
			CO5	Master the technique of measuring transpiration, stomatal indices, plant growth
			CO6	Perform Mohl's half leaf experiment, light screen experiment
2.	BO4CRP02	Phycology, Bryology & Pteridology, Gymnosperms and Paleobotany	CO1	Analyze the morphology, internal structure, and reproduction of different types of algae
			CO2	Examine the morphology, internal structure, and reproduction of different types of bryophytes
			CO3	Explain the morphology, anatomy, and reproduction of different types of pteridophytes
			CO4	Analyze the morphology, anatomy, and reproduction of different types of gymnosperms
2.	BO4CMP02	Angiosperm Taxonomy, Economic Botany & Anatomy and Applied Botany	CO1	Classify plants based on their morphology and identify them using the classification systems so that they can be used for different medicinal and research purposes
			CO2	Determine the relevance of different plants on an economic basis so that the student can conserve them
			CO3	Summarize the internal structure of different plant organs with reference to their functions and adaptations in different growing conditions.

			CO4	Explain the different methods of selection, hybridization, and plant propagation in plant breeding
3	BO6CRP03	Anatomy, Reproductive Botant, Microtechnique, genetics, Plant breeding and Horticulture	CO1	Examine the structure of plant cells and tissues and illustrate primary and secondary structures of plant organs
			CO2	Illustrate different floral parts and outline the features of microsporangium, megasporangium, and gametophyte
			CO3	Understand the significance and applications of micro technique
			CO4	Analyze the patterns of inheritance of characters in populations
			CO5	Determine appropriate crop improvement methods and predict the suitable horticulture method for different crops based on environmental conditions.
3	BO6CRP04	Physiology, Biochemistry, Cell biology and Molecular Biology	CO1	Outline the importance of plant water relation and its role in physiological processes in plants
			CO2	Relate the absorption and metabolism requirements of major and minor elements
			CO3	Describe the mechanism and significance of photosynthesis, and predict the behaviour of plants under different stress conditions.
			CO4	Outline the ultrastructure of cell organelles, structure of chromosomes and compare the different types of cell divisions
			CO5	Describe the types of numerical and structural chromosomal aberrations and mechanism of mutation
3	BO6CRP05	Environmental Science and Human Rights &	CO1	Explain various kinds of pollution in the environment,

		Biotechnology And Bioinformatics		their impacts on the ecosystem and their control measures.
			CO2	Equip the students to carry out plant tissue culture
			CO3	Outline the technique involved in rDNA technology and to discuss the applications in plant Biotechnology
			CO4	Introduce the vast repositories of biological data knowledge
			CO5	Equip to access and analyze the data available in the databases
3	BO6CRP06	Research Methodology, Biophysics, And Biostatistics & Angiosperm Morphology, Taxonomy And Economic Botany	CO1	Realize the significance of research and equip the students to conduct independent research and prepare research reports.
			CO2	To equip the students with basic computer skills necessary for conducting research.
			CO3	To enable the students to have statistical data analyzing skills necessary to substantiate their laboratory experiments and research.
			CO4	Identify common angiosperm species using the classification systems and design a new classification system for different plant groups using the method of taxonomic key construction.
			CO5	Determine the relevance of different plants on an economic basis so that the student can conserve them
3	BO6PRT01	PROJECT	CO1	Designing and execution of experiments
			CO2	Enable students to handle basic and advanced instruments
			CO3	Collection, analysis, and interpretation of data

			CO4	Equip students to prepare research reports and their presentation
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