SUBJECT: **BOTANY (PG)**	
PROGRAMME OUTCOMES **BOTANY (PG)**	The M.Sc. Botany programme is designed to equip students with essential knowledge and technical skills to study plants in a holistic manner. Upon completing M.Sc. in Botany, graduates will possess advanced knowledge of plant biology, including anatomy, physiology, taxonomy, and ecology. They will be adept in designing and conducting research, utilizing modern techniques and methodologies. Graduates will master plant identification, data analysis, and apply their expertise to address agricultural, conservation, and environmental challenges. They will communicate effectively through scientific writing and presentations, and address ethical issues in botanical research. Prepared for careers in research, education, agriculture, and conservation, or for further doctoral studies, they will integrate their knowledge to contribute to the field of botany and environmental management. PO1: Develop an aptitude towards science and nature. PO2:Equip the students with the basic skills in identifying and labeling different plants. PO3:To sensitize the students towards the need for keeping the environment clean and conserve our natural resources. PO4:Students would also become aware about the social and environmental significance of plants and their relevance to the national • PO5:To develop an aptitude towards science and nature. PO6:To equip the students with the basic skills in identifying and labeling different plants. PO7:To impart quality education in the field of Botany enabling our students to confidently face the job market. PO8:Environment and Sustainability: Understand the issues of environmental contexts and sustainable development.
PROGRAMME SPECIFIC OUTCOM	After completing the programme the learner will able to: PSO1:- Describe different specializations of Botany such as systematics, evolution, ecology, developmental biology, physiology, biochemistry, plant interactions with microbes and insects, morphology, anatomy,

	reproduction, genetics and molecular biology of various life-forms. PSO2: Apply various analytical techniques of plant and transgenic technologies basic and applied research in plants. PSO3: Identify various life forms of plants, design and execute experiments related to basic studies on evolution, ecology, developmental biology, physiology, biochemistry, plant interactions with microbes and insects, morphology, anatomy, reproduction, genetics, microbiology, molecular biology, recombinant DNA technology, proteomics and transgenic technology. Students are also familiarized with the use of bioinformatics tools and databases and in the application of statistics to biological data. PSO4: Execute short research projects incorporating various tools and techniques plant Sciences.
COURSE OUTCOME	
SEMESTER I	
BOT-411 Microbial Diversity	After completion of the course the learner will be able to CO1:Describe the vast diversity of microorganisms, including bacteria, archaea, fungi, viruses, and protists along with classification and phylogenetic relationships among microorganisms. CO2:State ecological roles and interactions of microbes in various environments CO3:Apply modern techniques in microbial isolation, cultivation, and identification CO4:Apply knowledge of microbial processes to biotechnology, medicine, agriculture, and environmental science.
BOT-412 Diversity of Cryptogams and Gymnosperm	CO1:Classify cryptogams (algae, fungi, bryophytes, and pteridophytes) and gymnosperms. CO2: Explain structural features, adaptations ecological roles, life cycles, and environmental adaptation of cryptogams and gymnosperms. CO3:Explain importance of conserving cryptogam and gymnosperm diversity. CO4: Applycryptogam and gymnosperm diversity. in various industries, including agriculture, medicine, and biotechnology.
BOT-413 Biochemistı	CO1:Explain the structure, function, and interactions of biological

	macromolecules such as proteins, nucleic acids, lipids, and carbohydrates. CO2: Describe pathways and regulation of cellular metabolism, including anabolic and catabolic processes. CO3: Solve complex biochemical problems.
BOT-414 Analytical Techniques	CO1:Describe a wide range of analytical techniques, including spectroscopy, chromatography, mass spectrometry, electro analytical methods, and thermal analysis. CO2:Describe underlying principles and theoretical foundations of instrumental analysis. Use analytical instruments in professional life. CO3: Make quantitative and qualitative analysis of samples accurately.
BOT-414 PRACTICAL	CO: Develop different project work in different natural diversity.
SEMESTER-II	
BOT-421 Systematics of Angiosperm	CO1: Explain the diversity and classification of angiosperms. CO2:State characteristics of major families, genera, and species of flowering plants. CO3:Explain principles and methods used in plant systematics and taxonomy. CO4:Use historical and modern approaches to classifying plants. CO5: Explain the key morphological and anatomical features used in angiosperm classification.
BOT-422 Plant Physiology and Metabolism	CO1: Explain fundamental physiological processes in plants, including photosynthesis, respiration, transpiration, nutrient uptake, and hormone regulation. CO2:Describe primary and secondary metabolic pathways in plants, including carbon, nitrogen, and sulphur metabolism. CO3:Explain biosynthesis, signalling, and functions of plant hormones such as auxins, gibberellins, cytokinins, ethylene, and abscisic acid. CO4:Describe the physiological and molecular responses of plants to various biotic (pathogen and insect) and abiotic stresses such as drought, salinity, temperature extremes, and nutrient deficiencies.
BOT-423	CO1:Explain cell structure, function, and molecular mechanisms, including

Cell and Molecular Biology	gene expression and regulation. CO2:Applyvarious concepts from different biologicaldisciplines for a comprehensive understanding of cellular and molecular processes. CO3: Apply knowledge and understanding to innovate and solve complex biological problems, contributing to advancements in biotechnology and medicine.
BOT-424 Ecology and Biostatistics	CO1:Explain ecological principles, including ecosystem dynamics, species interactions, and biodiversity. CO2:Apply advanced bio statistical methods to analyze ecological data and interpret results. CO3: Address ethical issues in ecological research and data analysis. CO4:Apply knowledge of ecology and biostatistics to address complex environmental issues.
BOT-425	CO: Develop the practical field work in the field of natural science.
Semester III	
BOT-511 Plant Embryology and Anatomy	CO1: State embryonic development, including fertilization, embryo formation, and seed development. CO2: Identify and describe various plant structure and their developmental processes. CO3: Explain plant anatomical structures and functions, from cellular to organ levels. CO4:Design and conduct experiments to study plant embryology and anatomy.
BOT-512 Genetics, Plant Breeding and Evolution	CO1:Describe principles of genetics, including gene function, inheritance patterns, and genetic variation. CO2:Explain mechanisms of evolution and influence of evolution plant diversity and adaptation. CO3:Apply knowledge to agricultural and conservation challenges. CO4:Address ethical issues in genetic research and breeding.
BOT-513 Plant Pathology	CO1:Identify and understand plant diseases, including their causes (pathogens) and effects on plants. CO2: Apply strategies for managing and controlling plant diseases, including cultural, chemical, and biological methods.

	CO3: Explain the life cycles and epidemiology of plant pathogens.
BOT-514 Natural Resource, Conservation and Utilization	CO1:State types and importance of natural resources, including water, soil, minerals, and biodiversity. CO2:Explain principles and practices of conservation, including sustainable management and protection strategies. CO3:Make sustainable utilization of natural resources to balance ecological, economic, and social needs. CO4:Plan and implement natural resource management projects and policies successfully. CO5:Apply knowledge to real-world challenges in conservation, policy-making, and sustainable development
BOT-415	CO: Engage in different field of natural diversities activity.
SEMESTER-IV	
BOT-521 Advance Plant Biotechnology	CO1:Explain techniques required for plant related research CO2: Apply the techniques to evaluate research findings and problem solving CO3:Describe theories, models, laws, principles and concepts of biotechnology and plant sciences CO4: Think and act scientifically
BOT-522 Environmental Biotechnology	CO1:Explain principles of biotechnology and their application to environmental management and protection. CO2: Use biological organisms to clean up environmental pollutants and manage waste. CO3: Apply biotechnology to promote sustainable practices in agriculture, industry, and conservation. CO4:Conduct experiments to evaluate and develop biotechnological applications for environmental issues.
BOT-523 E-B Molecular Stress Biology	CO1:Understand the molecular mechanisms of cellular responses to various stressors, including heat, oxidative, and chemical stress. CO2:Identify and describe key signaling pathways and molecular players involved in stress responses. CO3: Learn about mechanisms of adaptation and resilience in cells and organisms under stress.

	CO4:Apply knowledge of stress mechanisms to engineer or select organisms with enhanced stress tolerance for agriculture or biotechnology
BOT-524 Environment and Waste Management	CO1:Describe principles and practices of waste management, including waste minimization, recycling, and disposal. CO2: Assess the environmental impacts of different types of waste and the effectiveness of various management strategies. CO3: Explain environmental regulations and policies related to waste management and hazardous materials. CO4: Address ethical issues related to waste management and environmental protection.
BOT- 525 Project	CO1: Write research papers, reports, and grant proposals. CO2:Develop oral communication skills through presentations and discussions of scientific topics. CO3: Enhance research skills through designing, conducting, and analyzing experiments. CO4:Formulate hypotheses, design experiments, and interpret data. CO5:Develop problem-solving abilities to address analytical challenges.