

DEPARTMENT OF BOTANY
TWO YEARS PG PROGRAMME M.Sc. BOTANY

PROGRAMME OUTCOMES (POs)

PO 1: In-depth knowledge about plants, and related practices and techniques, necessary for teaching and research

PO 2: Understanding of environmental issues needed to become naturalists or conservationists

PO 3: Critical and reflective thinking, enabling them to make an honest assessment of their strengths and weaknesses

PO 4: Communication skills through effective presentations and interactive sessions in the class

PO 5: Problem-solving skills to help generate confidence for a more substantive life

PROGRAMME SPECIFIC OUTCOMES (PSOs)

After completing the two years (Four Semesters) PG Programme (M.Sc.) in Botany, the student would have:

PSO1: Developed a robust comprehension of the diversity of plants and microorganisms, including plant viruses, and understood the vital interactions amongst the plants, environment, microbes, and human beings

PSO2: Gained an insight into the functioning of a cell and understood the techniques and methods pertaining to plant physiology, cell and molecular biology, cytogenetics and plant breeding

PSO3: Acquired necessary training and skill for writing thesis/preparing a project report based on the information collected through review of literature.

COURSE STRUCTURE

Semester –I

CourseCode	Marks	CourseTitle	Credits
BOT510	100	Phycologyand Limnology	3
BOT511	100	Mycologyand PlantPathology	3
BOT512	100	Bryologyand Pteridology	3
BOT513	100	Gymnosperm and Palaeobotany	3
BOT540	100	LabWorkI (basedonCourseBOT510andBOT511) (Excursion/fieldwork/Project)	4
BOT541	100	LabWorkII (basedonCourseBOT512andBOT513) (Excursion/fieldwork/Project)	4
Total credits			20

Semester –II

CourseCode	Marks	CourseTitle	Credits
BOT514	100	PlantMorphologyandAnatomy	3
BOT515	100	ReproductiveBiology,MorphogenesisandTissueculture	3
BOT516	100	TaxonomyofAngiospermandEconomicBotany	3
BOT517	100	EcologyandPhytogeography	3
BOT542	100	LabWorkIII(basedonCourseBOT514andBOT515) (Fieldwork/Project)	4
BOT543	100	LabWorkIV(basedonCourseBOT516andBOT517) (Fieldwork/Project)	4
Totalcredits			20

Semester –III

CourseCode	Marks	CourseTitle	Credits
BOT665	100	PlantPhysiology	3
BOT666	100	PlantBiochemistryandBiochemicalTechniques	3
BOT667	100	Cytogenetics,PlantBreedingandBiostatistics	3
BOT668	100	Microbiology	3
BOT684	100	LabWorkV(basedonCourseBOT665andBOT666)	4
BOT685	100	LabWorkVI(basedonCourseBOT667andBOT668)	4
Totalcredits			20

Semester – IV

CourseCode	Marks	CourseTitle	Credits
BOT670	100	PlantMolecularBiologyandMolecularTechniques	3
BOT671	100	PlantBiotechnology,BioinformaticsandIPR	3
BOT672-683	100	ElectivePaper	3
BOT686	100	Dissertation/Thesis	3
BOT687	100	LabWorkVII(basedonCourseBOT605andBOT606)	4
BOT688-699	100	LabWorkVIII(basedonCourseElectivePaperBOT672-683)	4
Totalcredits			20

M.Sc. Botany Semester I

Paper I: Phycology and Limnology

CO 1: Recognize the Algal diversity, morphological and reproductive features of various genera, and classification of algae and lichens

CO 2: Understand the economic importance of algae.

CO 3: Understand the elementary knowledge of marine biology and micro and macrophytes growing in sea water

CO 4: Understand the knowledge of abiotic and biotic factors influencing growth of fresh water and marine water flora

Paper II: Mycology and Plant Pathology

CO 1: Learn about the general aspects of fungi, fungal systematics and phylogeny

CO 2: Understand the comparative knowledge of structure and life cycle patterns of selected fungi and allied organisms

CO 3: Understand the principles of plant pathology, host-pathogen interaction and disease management

CO 4: Understanding of the epidemiology, symptoms, etiology, prevention and control of diseases caused by fungi and nematodes, and abiotic factors

Paper III: Bryology and Pteridology

CO 1: Knowledge of the classification, general features, ecology, physiology, reproductive biology of Bryophytes and information on spore diversity, and structure of the peristome and moss protonema.

CO 2: Understand the diversity in gametophytic and sporophytic organization in Mosses, Liverworts and Hornworts.

CO 3: Understand the general concept of Pteridophytes with respect to their classification, phylogenetic associations and ecological distribution

CO 4: Understand the major evolutionary trends in Pteridophytes through cytological studies, stellar organization and Telome theory.

Paper IV: Gymnosperm and Palaeobotany

CO 1: Have a general concept of Gymnosperms regarding their classification, phylogenetic associations and economic importance

CO 2: Acquire knowledge about the morphology, anatomy and reproductive biology of Cycadopsida, Coniferopsida and Gnetopsida

CO 3: Understand the geographical distribution, evolutionary trends, affinities and inter-relationships among Cycadopsida, Coniferopsida and Gnetopsida

CO 4: Understand about fossils, their formation and role in stratigraphy

M.Sc. Botany Semester – II

Paper I: Plant Morphology and Anatomy

CO 1: Describe the structure of root, shoot and nodal types of dicot plants.

CO 2: Clear concept of meristems, tissues, their growth and differentiation, and development of organs.

CO 3: Understand the structural adaptations of plants with respect to diverse environmental conditions. It also helps them to distinguish between monocots, dicots and gymnosperms. Such a study is linked to plant physiology. Hence, it helps in the improvement of food crops.

CO 4: Understand the plant tissues and cells they will learn how the plants constructed and how they work. These studies are very important because they lead to be a better understanding of how to take care for plants and fight plant diseases.

Paper II: Reproductive Biology, Morphogenesis and Tissue culture

CO 1: Have knowledge of differentiation, development and functions of different tissues

CO 2: Have an understanding of the morphological nature of the flower along with its development and evolutionary history

CO 3: Understand the fertilization and post fertilization changes leading to fruit and seed formation

CO 4: Have an understanding of the phenomenon of morphogenesis

CO 5: Understand the knowledge and practical skills needed to work effectively with plant tissue culture techniques, whether in research, biotechnology, agriculture, or horticulture.

Paper III: Taxonomy of Angiosperm and Economic Botany

CO 1: Understand the principles and relevance of different classification systems and their phylogenetic significance

CO 2: Understand the ethnobotany, geographical distribution of plant species, and importance of Herbaria, biodiversity hotspots, etc.

CO 3: Understand the modern tools of taxonomy viz. morphological, anatomical, reproductive, cytological and chemical parameters

CO 4: Understand the distinguishing taxonomic features and interrelationships of selected Dicot and Monocot families

CO 5: Understand the special features of Insectivorous/Parasitic and Saprophytic families of plants

CO 6: Understand the economic utility of plants

Paper IV: Ecology and Phytogeography

CO 1: Understanding the nature of ecosystem, food chain, food web, biosphere, biogeochemical cycles.

CO 2: Understand the detail knowledge about concept of community, concept of climax, ecological succession.

CO 4: Understanding the cause, effects of environmental pollution.

CO 5: Understand the plant diversity, loss of diversity, indigenous medicinal system. Biosphere reserve, protected areas of India.

CO 6: Understand the conservation of plant diversity, seed bank, activities of BSI, sustainable development

M.Sc. Botany Semester – III

Paper I: Plant Physiology

CO 1: Understand the significance of plant water relations, essentiality of mineral nutrients for plants growth and development

CO 2: Have complete insight into various perspectives of photosynthesis and the function of plants as primary producers of food

CO 3: Knowledge of how plants undergo respiration (respiratory pathways) and provide energy (oxidative phosphorylation) for food synthesis

CO 4: Gain an understanding of physiology of flowering in response to light and temperature, and understand the mechanisms developed by plants to overcome abiotic stress

CO 5: Be able to demonstrate proficiency in the experimental techniques and methods of analysis for various physiological processes

Paper II: Plant Biochemistry and Biochemical Techniques

CO 1: Know about the structure and functions of carbohydrates, lipids, amino acids and proteins

CO 2: Have an understanding of assimilation of nitrogen and sulfur in plants

CO 3: Gain an insight into the functions of enzymes and growth hormones in plants

CO 4: Learn about the secondary metabolites found in plants, their structure, function and pathways of synthesis

Paper III: Cytogenetics, Plant Breeding and Biostatistics

CO 1: Have a comprehensive understanding of the structure and chemical basis of chromosome, and the physical basis of inheritance and heredity

CO 2: Have an understanding of linkage and crossing over and methods of mapping genes, and comprehend different mechanisms of inheritance, including Mendelian and non-Mendelian systems.

CO 3: Be able to analyze the historical evolution of plant breeding and the key scientific and technical advances that have influenced its development

CO 4: Gain knowledge of the different plant reproductive systems and their effect on genetic variability, and understand the strategies and processes of selection and breeding based on the reproductive mechanisms.

CO 5: Be able to use statistical methods to analyze results

Paper IV: Microbiology

CO 1: Understand the microbiology, including the history, scope, and significance of the field.

CO 2: Understand the microbial metabolism, including energy production, nutrient uptake, and metabolic pathways.

CO 3: Understand the growth and reproduction mechanisms of microorganisms, including binary fission and viral replication.

CO 4: Understand the role of microorganisms in natural environments, including their contributions to biogeochemical cycles.

M.Sc. Botany Semester - IV

Paper I: Plant Molecular Biology and Molecular Techniques

CO 1: Molecular biology is the basic science that has as its goal an explanation of life processes at the sub-cellular and molecular level.

CO 2: Molecular biology deals with nucleic acids and proteins and how these molecules interact within the cell to promote proper growth, division, and development.

CO 3: This course will emphasize on the molecular mechanisms of DNA replication, repair, protein synthesis, mutation etc.

CO 4: Developments in molecular biology have opened new areas of study and provided powerful techniques that are revolutionizing the pharmaceutical, health, and agricultural industries.

Paper II: Plant Biotechnology, Bioinformatics and IPR

CO 1: Utilize the biotechnological methods to develop plants using in vitro propagation.

CO 2: Develop the employability skills by understanding the utilization of plants as food, medicine and cosmetics

CO 3: Explain and Utilize the, economic products and uses of various plants, biotechnological methods to develop plants using in vitro propagation

CO 4: The knowledge of bioinformatics involves in analysis of plant and human genome, identification of targets for drug discovery, the study of structural and functional relationships and molecular evolution.

Paper III: Elective Paper (Choice based)

CO 1: In elective paper students have a opportunity to explore a paper studied previously in semesters (Choice based) in deep, and use the appropriate research tools. Seminars, study

tours, collection of specimen, laboratory analysis, data interpretation, learning research methodology etc.

Paper IV: Dissertation / Thesis

CO 1: Students capacity as a researcher and preparing them for further research work is being supervised identifying his or her own area of interest.

CO 2: All the dissertation works are supervised by subject experts and examined by subject experts from other universities of the region.

CO 3: This course prepare the students for choosing research as next option after master degree and further strengthen them to apply for industrial and other sector jobs as well.