M.Sc. Botany Programme

Programme outcome (PO)

The programme envisages developing understanding and knowledge for applying into sectors like agriculture, horticulture, floriculture, biotechnology, genomics, forest and environment.

The Board of studies designed the programme envisioning the following Programme Outcomes (PO's):

PO1 - To encourage a clear, comprehensive and advanced mastery in the field of Botany.

PO2 - To provide basic principles of biological sciences with special reference to Botany and its applied branches.

PO3 -Enabling the students to explore the intricacies of life forms at cellular, molecular and nano level.

PO4 -To sustain students' motivation and enthusiasm and to help them not only to appreciate the beauty of different life forms but also to inspire them in the dissemination of the concept of biodiversity conservation.

PO5 -To develop problem solving skills in students and encourage them to carry out innovative research projects thereby enkindling in them the spirit of knowledge creation.

PO6 -To maintain a high level of scientific excellence in botanical research with added emphasis on the role of plants in the structure and functioning of terrestrial and aquatic communities and ecosystem

PO7 -To equip students to perform functions that demand higher competence in National/International fields.

Programme Specific Outcomes (PSO's)

Upon completion of the M.Sc. Botany Programme, the graduates will be able to:

PSO1- Keep in pace with the concepts, tools and techniques that have a multidisciplinary dimension

PSO-2 Understand the current developments in the different areas of botany and allied branches

PSO-3 Analyze and apply the methodologies and techniques learnt during the course of study.

PSO-4 Integrate the knowledge acquired to have innovative technologies for the development of society, while working in the area of plant sciences.

PSO-5 Share social, environmental and ethical concerns with fellow citizens

Course Outcomes

The courses for 4 semesters will envisage the Graduates for understanding and knowledge for applying into sectors like agriculture, horticulture, floriculture, biotechnology, genomics, forest and environment and allied areas as follows:-

SEMESTER I: COURSES AND CREDITS

BY010101: MICROBIOLOGY AND PHYCOLOGY
(Theory 27 + 45 = 72 Hrs; Practical 9 + 36 = 45 Hrs; Credits: 4)

MICROBIOLOGY

CO1 - The Student will be able to know the Introduction to microbiology, specifically Bacteria, Bacterial systematics, Culturing of microorganisms
CO2 - To know about Plant–microbe interactions
CO3 - Study details of Viruses

PHYCOLOGY
CO1 –To study the Introduction and General features of Algae
CO2 – Knowing the Ecological and Economic importance of Algae
CO3 - Study Algal biotechnology and its applications

BY010102: MYCOLOGY AND CROP PATHOLOGY
(Theory 36 + 36 = 72 Hrs; Practical 36 + 18 = 56 Hrs; Credits: 4)

MYCOLOGY
CO1 – To study the General introduction and classification of Fungi, Thallus structure and reproduction in Fungi
CO2 – To know the Fungal associations and Physiology of Fungi

CROP PATHOLOGY
CO1 - Understand the Introduction to crop pathology
CO2 - Understand the Process of infection and pathogenesis, Defense mechanism in plants
CO3 – To know about the Transmission of plant disease, Plant disease management
CO4 – To know about Major diseases in plants and its control.

BY010103: BRYOLOGY AND PTERIDOLOGY
(Theory 36 + 36 = 72 Hrs; Practical 18 + 36 = 54 Hrs; Credits: 4)

BRYOLOGY
CO1 – Highlights the Introduction of Bryophytes,
CO2 - Ecological significance and economic importance of bryophytes
CO3 - General characters and thallus organization

PTERIDOLOGY
CO1: Study the General introduction, Classification and evolution of Pteridophytes
CO2: Will be able to study Structure of the plant body, developmental studies in Pteridophytes
CO3: Understand the Ecological and economic importance of Pteridophytes

BY010104: GYMNOSPERMS, PALAEOBOTANY AND EVOLUTION
(Theory: 27 + 09 + 18 = 54 Hrs; Practical: 27 Hrs; Credits: 4)

GYMNOSPERMS
CO1- To study the Introduction, Vegetative and reproductive structures of Gymnosperms
CO2 - Gametophyte development of Gymnosperms
CO3 - Economic importance of Gymnosperms

PALEOBOTANY
CO1: Familiarize Introduction to Fossils
CO2: Expertise with the Techniques and preservation of fossils
CO3 – Understand the Nomenclature and applied aspects

EVOLUTION
CO1:Will study the Introduction and Evidences for evolution
CO2: To understand the Natural selection, Mutation as an evolutionary force, Speciation and Co-evolution

SEMESTER II - COURSES AND CREDITS

BY010201: PLANT ANATOMY, DEVELOPMENTAL BIOLOGY AND HORTICULTURE
(Theory: 36 + 18+ 18 = 72 Hrs; Practical: 27 + 09 + 09 = 45 Hrs; Credits: 4)

PLANT ANATOMY
CO1: To provide the Introduction of Anatomy, In detail the Meristem, secondary structure
CO2: Details of Leaf and Node, Reproductive anatomy and Applied anatomy

DEVELOPMENTAL BIOLOGY
CO1 – To understand the History and basic concepts of development
CO2 – To familiarize the Overview of plant development, Morphogenesis and organogenesis in plants

HORTICULTURE (18 hrs)
CO1:To study the Introduction, and Principles of Horticulture
CO2: Understand the Horticulture applications, Floriculture Industry
CO3:TO know the Modern trends in horticulture

BY010202: CELL BIOLOGY, GENETICS AND PLANT BREEDING
(Theory: 27 + 27 + 18 = 72Hrs; Practical: 18 + 18 + 9 = 45 Hrs; Credits: 4)

CELL BIOLOGY
CO1: TO study Introduction to plant cells, Cell signaling, Cell interaction
CO2: Understand the Cytoskeleton, Cell cycle and its regulation

GENETICS

CO 1: Study Genetics - From “Factors” to “Genes” and gene interactions
CO 2: Understand Human genetics and Cancer
CO 3: To know about the details of Mutations and Population Genetics

PLANT BREEDING

CO 1: Introduction to Plant Breeding
CO 2: Study the Hybridization techniques, Idiotype breeding,Breeding for resistance
CO 3: Study the Mutation breeding procedures and Modern breeding methods

BY010203: PLANT PHYSIOLOGY AND BIOCHEMISTRY
(Theory 45 + 27 = 72 Hrs; Practical 36 + 27 = 63 Hrs; Credits: 4)

PLANT PHYSIOLOGY (45 Hrs)

CO 1: Transport and Translocation of water and solutes
CO 2: Photosynthesis & Respiration
CO 3: Nitrogen metabolism, Stress physiology, Sensory photobiology, Plant growth regulators

BIOCHEMISTRY (27 Hrs)

CO 1: Introduction
CO 2: Carbohydrates, Lipids, Amino acids and proteins and Enzymes
CO 3: Secondary metabolites

BY010204: MOLECULAR BIOLOGY
(Theory 54 Hrs; Practical 18 Hrs; Credits: 3)

CO 1: Nucleic acids, Organization andReplication of the Genome
CO 2: Gene Expression and Control of Gene Expression
CO 3: Recombination Epigenetic inheritance and Mutation repair

SEMESTER III COURSES AND CREDITS

BY010301: RESEARCH METHODOLOGY, MICROTECHNIQUE, BIOSTATISTICS AND BIOPHYSICAL INSTRUMENTATION
(Theory: 18 + 18 + 18 + 18 = 72 Hrs; Practical: 09 + 27 + 09 + 18 = 63 Hrs; Credits: 4)

RESEARCH METHODOLOGY (18 hrs)
CO 1: Introduction, Review of literature
CO 2: Preparation of project report and Dissertation/Thesis, presentation and publication of research outcome

MICROTECHNIQUE (18 hrs)
CO 1: Killing and Fixing, Dehydration, Clearing, Embedding and Sectioning
CO 2: Staining and Mounting techniques

BIOSTATISTICS (18 hrs)
CO 1: Introduction to Statistics , Probability, Correlation and Regression
CO 2: Design of experiments, Tests of Significance

BIOPHYSICAL INSTRUMENTATION (18 hrs)
CO 1: Introduction to Microscopy, Principles and applications of instruments
CO 2: Basic Principles and applications of chromatography
CO 4: Basic principles and applications of electrophoresis and spectroscopy

BY010302: BIOTECHNOLOGY, BIOINFORMATICS AND BIONANOTECHNOLOGY
(Theory 72 Hrs; Practical 36 Hrs; Credits: 4)

BIOTECHNOLOGY (54 hrs)
CO 1: Bioprocess Technology, Plant tissue culture, Genetic engineering
CO 2: Genome editing, Advanced tools and techniques in Biotechnology Genomics
CO 3: Societal concerns with biotechnology

BIOINFORMATICS (12 hrs)
CO 1: Methods, tools and applications of bioinformatics
CO 2: Molecular phylogeny Structural bioinformatics

BIONANOTECHNOLOGY (6 Hrs)
CO 1: Introduction to nanoparticles and nanotechnology
CO 2: Applications of bionanotechnology

BY010303: ANGIOSPERM TAXONOMY, ECONOMIC BOTANY AND ETHNOBOTANY
(Theory: 72 Hrs; Practical: 63 Hrs; Credits: 4)

CO 1: Introduction ,Units of classification and Phylogeny of Angiosperms
CO 2: Data sources of taxonomy, Methodology of Identification of plants , Tools of Taxonomy
CO 3: Botanical Nomenclature, Study of angiosperm diversity
CO 4: Economic Botany Ethnobotany

BY010304: ENVIRONMENTAL SCIENCE
(Theory 54 Hrs; Practical 27 Hrs; Credits 3)

CO 1: Introduction to Ecological Science
CO 2: Autecological concepts - Population Ecology, Synecological concepts - Community ecology
CO 3: Dynamic Ecology - Ecological succession, Biosphere and Ecosystem, Phytogeography
CO 4: Environmental pollution, Environmental biotechnology and solid waste management
CO 5: Global environmental problems and climate change, Biodiversity and its conservation

SEMESTER IV PROGRAMME ELECTIVES - COURSES AND CREDITS

PROGRAMME ELECTIVE – BIOTECHNOLOGY
BY800401. PLANT TISSUE CULTURE AND MICROBIAL BIOTECHNOLOGY
(Theory 90 Hrs; Practical 72 Hrs; Credits 4)

CO 1: Tissue culture regeneration of plants, Somaclonal variation, Embryo and meristem culture
CO 2: Protoplast culture , Production of ploidy variants, In vitro germplasm conservation
CO 3: Production of secondary metabolites, Cell and enzyme technology. Microbial technology
CO 4: Tissue engineering and Stem cell technology. Bioremediation

BY800402: GENETIC ENGINEERING, GENOME EDITING AND IMMUNOLOGY
(Theory 90 hrs; Practical 54 hrs; Credits 4)

CO 1: Important tools and techniques in gene cloning, Selection and screening of recombinants
CO 2: Gene library, Advanced transgenic technology, Applications of rDNA technology
CO 3: Genome editing, Gene therapy, Protein engineering
CO 4: Biosensors, Immunology

BY800403: GENOMICS, TRANSCRIPTOMICS, PROTEOMICS AND BIOINFORMATICS
(Theory 90 hrs; Practical 54 hrs; Credits 4)

CO 1: Familiarize with Genome mapping ,,Genome sequencing, Genome annotation
CO 4: Understand Comparative genomics, Transcriptomics, Proteomics
CO 5: Study about Bioinformatics
CO 6: Understand the Ethical, legal, and social impact of complete genome analysis