

M.Sc. BOTANY PROGRAMME OUTCOMES

Critical Thinking: Ability to engage in independent and reflective thinking in order to understand logic connections between ideas.

Effective Communication: Development of communication skills for effectively transmitting and receiving information that focuses on acquiring knowledge, problem solving, improving on arguments and theories thereby paving the way for better employability and entrepreneurship.

Social Consciousness: Acquire awareness towards gender, environment, sustainability, human values and professional ethics and understand the difference between acting, responding and reacting to various social issues.

Ethics: Recognize different value systems including your own, understand the moral dimensions of your decisions, and accept responsibility for them.

Environment and Sustainability: Understand the issues of environmental contexts and sustainable development.

Multidisciplinary Approach: Combining various academic disciplines and professional specializations to cross borders and redefine problems in order to explore solutions based on the new understanding of complex situations.

Subject Knowledge: Acquiring knowledge at a higher level that would help develop the necessary skills, fuel the desire to learn and contribute to the field of expertise thereby providing valuable insights into learning and professional networking with the aim of catering to the local, national and global developmental needs.

Lifelong Learning: Understanding the necessity of being a lifelong learner for personal enrichment, professional advancement and effective participation in social and political life in a rapidly changing world.

PROGRAMME SPECIFIC OUTCOMES

1. Understanding the classification of plants from cryptogams to Spermatophyte.
2. Analyse the relationships among animals, plants and microbes
3. Prepare and view specimens for examination using light microscopy

4. Use pure culture and selective techniques to isolate fungi, plant pathogens, algae and identify them growing on media.
5. Qualitative and quantitative estimate the number of floral components by using enumeration and suitable sampling and techniques.
6. Use appropriate plant molecular techniques and use of instrumentation related to it.
7. Understand the current developments in the different areas of botany
8. Practice safe laboratory procedures, using appropriate protective, biosafety and emergency procedures.
9. Integrate the knowledge acquired in botany to solve problem, take real time decisions and innovate, while working with plants
10. Documentation and report writing on experimental protocols, results and conclusions, study tours and filed visits etc
11. Share social, environmental and ethical concerns with fellow citizens

COURSE OUTCOMES

BOT1 C01. PHYCOLOGY, BRYOLOGY, PTERIDOLOGY AND GYMNOSPERMS

- To impart knowledge about general characters, classification, reproduction methods, life cycles, cytology, pigments and economic importance of Algae.
- To get knowledge of thallus structure, reproduction and evolutionary trends of groups mentioned in syllabus.
- Students receive knowledge about general characters, structure and economic importance of bryophytes.
- To understand the phylogeny of Bryophytes. To know the evolution of sporophytes and gametophyte of bryophytes.
- To study and impart knowledge about the fossil bryophytes
- Students gain adequate knowledge on general characters, classification, cytology, evolution of stele, and economic importance of Pteridophytes.
- To understand the origin and evolution of sporangium, evolutionary trends in the gametophytes of pteridophytes.
- Develop a knowledge in apogamy, apospory and parthenogenesis.
- Students will able to differentiate the morphology, ecology and phylogeny of orders mentioned in the syllabus.

- Students have a good overview of general characters, morphology, reproductive organs, classification, phylogenetic relationship and economic importance of Gymnosperms.
- Enlighten the knowledge in the geological time scale and correlated predominant gymnosperm flora.

BOT1C02. MYCOLOGY & LICHENOLOGY, MICROBIOLOGY AND PLANT PATHOLOGY

- Understand basics of microbial life- cell structure, classification, reproduction and their economic importance of fungi.
- General characters of groups mentioned in the syllabus. Give awareness about mycorrhiza
- Develop general awareness on the diversity, thallus, reproductive bodies of lichens.
- Analyze the ecological role and economic significance played by lichens
- Understand the main groups of microorganisms and classification of microorganisms.
- Understand the ultrastructure, economic importance and dynamism of cyanobacteria.
- Interpret the different structure of viruses, bacteriophage and its multiplications, purification, infection, TMV and T4phage.
- Detection of microbes in air and water, Economic importance of bacteria
- Inculcate the importance of plant disease. Host- parasite interaction
- Identify the causative organism, symptoms and control measure of plant disease
- Realize the significance of plant diseases as far as crop production is concerned.

BOT1C03. ANGIOSPERM ANATONY, ANGIOSPERM EMBRYOLOGY, PALYNOLOGY & LAB TECHNIQUES

- The students can understand basic aspects of Cell wall and its development, Chemistry of cell wall, Node - nodal patterns, cambium etc.
- Students will be understanding the Anomalous secondary growth

- Students will be able to utilize embryological studies in various aspects like analysis of evolutionary trends, circumscription and delimitation of taxa and making a decision on systematic positions.
- Students will be aware of recent advances in palynological studies- forensic-pollen allergy-oil exploration-paleopalynology and knowledge to differentiate plants on the basis of Palynology in relation to taxonomy.
- Develop the skill for micro slide preparation and understand the internal structure.
- Expertise in various instruments.

BOT2C04. CELL BIOLOGY, MOLECULAR BIOLOGY AND BIOPHYSICS

- Understand the structure of intracellular compartments, cell communication and signalling, life cycle and cytoskeleton of the cell,
- Explain the structure of nucleic acids and chromosomes.
- Build the knowledge about DNA replication, repair and recombination.
- Recognize, compare and distinguish the processes and mechanisms involved in Transcription and Translation.
- Analyse and assess the regulation of gene expression in Viral, Prokaryotic and Eukaryotic systems.
- Introduction of research instruments.

BOT2C05. CYTOGENETICS, GENETICS, BIOSTATISTICS, PLANT BREEDING AND EVOLUTION

- Understand the basics of gene interactions and linkage
- Impart the knowledge of human genetics and cancer
- Comprehend the concepts involved in population genetics
- Summarize on the various concepts of evolution and speciation
- Discuss and interpret the various theories explaining evolution
- Understand principles and applications of instruments.
- Recognize, compare and explain the correlation and regression & application of different methods, analysis of data and also learn how to write dissertation, thesis and research paper.
- Familiarize the students with different aspects of plant breeding
- Developing and designing the various methods of crop improvement

- Develop basic skills and techniques for qualitative and quantitative analysis of physiological parameters.

BOT2C06. PLANT ECOLOGY, CONSERVATION BIOLOGY, PHYTOGEOGRAPHY AND FOREST BOTANY

- Understand the concept and principles of ecology
- Identify the different components and their interrelationships in the ecosystem
- Classify different types of ecosystems and discover those which need immediate attention.
- To identify and analyse the distribution of vegetation in different zones.
- Understand and analyse environmental problems and social issues
- Build awareness in controlling pollution and apply their knowledge in waste management
- Assess the biodiversity loss and understand the need to conserve it.

BOT3C07. PLANT PHYSIOLOGY, METABOLISM AND BIOCHEMISTRY

1. Equip students with skills and techniques related to plant physiology so that they can design their own experiments
2. Acquire basic knowledge about growth and development of plants
3. Understand mechanism of various metabolic processes such as photosynthesis, transpiration etc. taking place within the plants
4. Take students to higher levels of learning about the mineral nutrition in plants
5. Impart an insight into the various plant water relations

BOT3C08. ANGIOSPERM MORPHOLOGY, ANGIOSPERM TAXONOMY AND PLANT RESOURCES

1. Understand different plant morphology terminologies and identify morphological peculiarities
2. Understand the different systems of classification of angiosperms, rules of nomenclature, key preparation etc
3. Recognize members of the major angiosperm families by identifying their diagnostic features and economic importance.
4. Change their attitude towards over exploitation of rare/endemic plants.
5. Provide lab-based training to identify a plant up to species level

6. Provide training to write short description of a plant species and to draw illustration
7. Develop the skill of scientific imaging of plants.
8. Realize the importance of field study.

BOT3C09. BIOTECHNOLOGY AND BIOINFORMATICS

1. Understand the history and current developments in the field of biotechnology and bioinformatics
2. Explain the methods involved in Tissue Culture and Molecular techniques
3. Analyze the role of biotechnology in daily life
4. Understand the repositories of Biological Data Knowledge
5. Analyze the data available in databases
6. Understand applications of Bioinformatics in drug designing and Drug Discovery
7. To gain knowledge about various biological databases that provide information about nucleic acids and protein.

ELECTIVE I: BOT4E01-6: GENETICS AND CROP IMPROVEMENT

1. Understand the science of plant breeding, its conventional as well as modern approaches, for the survival of human being from starvation
2. Study the techniques of production of new superior crop varieties
3. Get a detailed knowledge about modern strategies applied in Genetics and Plant breeding for crop improvement
4. Understand the significance of germplasm, biodiversity conservation in relation to plant variety protection and Intellectual Property Right (IPR)
5. Developing and designing the various methods of crop improvement
6. Get a thorough understanding about the Genetically Modified crops in our country and the major achievements in that field

ELECTIVE II: BOT4E02-2: PATHOLOGY OF PLANTATION CROPS AND SPICES

1. Know the principles of plant pathology, concept of plant diseases, classification, causes and symptoms, remedies and epidemiology of plant diseases. The students will also learn about the various bacterial, fungal, viral and nematode diseases of plants
2. Learn the various stages of infections and effect of pathogens on plant physiology
3. Learn the importance of botanicals as plant protectants, and can focusing on improving health, enhance environment protection

4. Know the isolation and culture methods of bacteria, fungi and nematodes, the common disease-causing organisms of crops
5. Understand the major fungicides, bactericides and pesticides used in farming industry, their mode of action and both beneficial and harmful effects
6. Acquire knowledge about losses in crops due to pests, principles of Integrated Pest Management (IPM) and use of IPM to farmer's real-time situations and economic ecological effects of pesticide uses in India.

DISSERTATION

1. M. Sc dissertation is designed in such a way to teach and train the students with full practical knowledge in the different research areas of Botany in order to make them efficient researchers to start their carrier in research through Ph.D. and other R&D Programmes
2. The students develop understanding about the literature reading and dissertation writing required to carry out a good research
3. Find the resources and practical skills required to perform the research process
4. Statistical analysis, presentation and documentation of research findings
5. Helps the students to improve the presentation skills and teaching communication skills