

G. D. College, Begusarai

Department of Botany

M. Sc. Botany., Programme Specific Outcome

PSO1:

Develop and increase interest, engagement, and commitment to the subject of botany via conceptual knowledge of botany principles. The course will allow learners to be able to identify plants that are growing naturally as well as lab specimens. Various courses in the programme are meticulously planned to prepare students for competitive exams such as CSIR NET, ICAR, ICMR, GATE, and others. The courses taught and the hands-on experience obtained by students during course practicals can prepare students to write proposals for grants.

PSO2:

After finishing the course, students will be able to grasp and relate many key disciplines of Botany such as systematics, taxonomy of diverse life forms, biodiversity, ecology, embryology, physiology, biochemistry, plant interactions with microorganisms, and insects. Students will learn about the anatomy, reproduction, genetics, plant tissue culture, and molecular biology of plants. Students will be able to systematically classify and relate prominent aspects of different plant groupings and microorganisms with the information and understanding they have received.

PSO3:

Students can benefit from their understanding of cytogenetics, recombinant DNA technology, biostatistics application, analytical procedures, plant tissue culture, phytochemistry, karyotyping and chromosomal mapping, microscopy and chromatography. Students will also learn to speculate and draw conclusions from biological facts.

PSO4:

Learn about the applications of botany in sectors such as agriculture by studying plant pathology and genetic engineering. Understand plants molecular and physiological adaptations in response to biotic and abiotic stresses. Abiotic stress and the genes responsible for stress tolerance in plants. Students will also learn about the function of botany in environmental cleaning, forestry, floriculture, and the pharmaceutical business.

PSO5:

Perform operations in the domains of Biochemistry, Anatomy, Breeding techniques for hybridization, Biofertilizer Technology, Taxonomy, Economic Botany, Cell Biology, Reproduction, and Ecology in accordance with laboratory standards. This would aid them in their creative endeavours. Choose and use relevant methodologies, resources, and current technology in a multidisciplinary manner, as well as develop experiments, analyse, and interpret data to obtain an effective conclusion.

PSO6:

Understand environmental settings and sustainable development concerns. Students will gain an understanding of natural resources and the necessity of environmental conservation and sustainable development.

PSO7:

Carry out innovative research projects using the best problem-solving abilities, forcing them to employ in-depth information.

PSO8:

Projects, seminars, and dissertations would help students develop their research skills. The goal is to teach and persuade students in the fundamentals of research, including literature review, analysis and interpretation of the research issue, and articulation of their understanding of the topic in their own words. This would help them build entrepreneurial abilities.

M. Sc. Course Outcome

Semester-I

Paper MBOTCC1

Phycology, Mycology and Bryology

CO1: Understand the distinguishing characteristics, diversity, and phylogeny of algae, fungi, and bryophytes.

CO2: Explain the place of algae, fungi, and bryophytes in the most recent classification system.

CO3: Learn about their economic and environmental implications.

CO4: Explore the life cycles of selected genera.

CO5: Learn about the evolutionary tendencies of algae, fungi, and bryophytes.

Paper MBOTCC2

Microbiology and Plant Pathology

CO1: Understand general microbiological procedures and understand the scope and significance of Microbiology and Plant Pathology.

CO2: Understand the biodiversity, and differentiating characteristics of microorganisms, and plant pathogens.

CO3: Know about agricultural and industrial microbiology.

CO4: Understand the economic significance of microorganisms and plant pathogens and understand the etiology and control measures for plant diseases.

Paper MBOTCC3

Pteridophyta, Gymnosperm and Paleobotany

CO1: Explain the position of Pteridophytes and Gymnosperms in the most recent classification system.

CO2: Classify the specimens and connect them with their respective orders, salient features, distribution, morphology, anatomy, and reproductive structures.

CO3: Examine the specimens morphological and anatomical characteristics and demonstrate the life cycle strategies and the evolution of pteridophytes.

CO4: Explain the geological time scale, the fossilisation process, the classification and nomenclature of fossil plants, and methods for examining fossils.

MBOTCC4 (Practical)

CO1: To explain and demonstrate the practical concepts and techniques covered in the course curriculum of MBOTCC1, 2 & 3.

AECC1

Environmental Sustainability & Swachchha Bharat Abhiyan Activities

CO1: Students will learn about the environment and its biotic and abiotic components. Students will also learn to take care of the environment and its sustainable development in general.

CO2: During the course, students will receive information about lots of general studies elements that can really help them in competitive exams and during daily activities.

Semester-II

MBOTCC5

Biofertilizer Technology

CO1: learn isolation, purification, and mass production of cyanobacteria, nitrogen-fixing bacteria, and other microorganisms for application as biofertilizer inoculants.

CO2: Understand different bio fertilizers inoculants used in agriculture and their quality control, shelf life and marketing of different biofertilizers.

CO3: Analyse the concepts of soil fertility, process, and organic matter decomposition. Understand the use, manufacturing, and concepts of Vermicomposting.

MBOTCC6

Taxonomy & Anatomy & Embryology

CO1: Understand the position of angiosperms in the plant kingdom and their genesis. Study different systems of classification and angiosperm families, emphasising their morphology, distinguishing characteristics, biology and also understanding of their economic significance.

CO2: Understand important areas of taxonomy such as chemotaxonomy, cytotaxonomy, numeric taxonomy, and so on. Understand the scope of anatomy and its role in taxonomy and phylogeny.

CO3: Understand all the different types of tissue systems. Study about normal and abnormal secondary growth in plants. Understand the structure and development of plant reproductive organs.

CO4: Learn about microsporogenesis and megasporogenesis, as well as the formation of male and female gametophytes. Understand the fertilisation, endosperm, and embryogenic processes.

MBOTCC7

Physiology and Biochemistry

CO1: Understanding the fundamental physiological relationships between plants, water, and soil, as well as the translocation of organic solutes. Understanding of stomatal transpiration mechanism.

CO2: Understand the physiology of flowering, senescence, and abscission in plants, as well as seed dormancy, Phytochrome, and Biological cycles/clock.

CO3: Understand the biochemistry and physiology of photosynthesis, respiration: Glycolysis, Krebs's cycle, electron transport chain, the generation of ATP, and photorespiration.

CO4: To understand nitrogen metabolism and the physiological significance of phytohormones in plant growth and development.

CO5: To acquire a biochemical understanding of carbohydrates, proteins, lipids, vitamins, and enzymes, as well as the functions of different vitamins as coenzymes.

MBOTCC8

Plant Tissue Culture, Ethnobotany, Biodiversity & Biometry

CO1: Learn about several tools and techniques for culturing plant tissues on an aseptic medium. Learn about various plant tissue cultures media.

CO2: Students may be familiar with the ethnobotanical applications of unknown plants used by the society's tribal and ethnic groups. To assess the origins and applications of the conventional medical system.

CO3: Learn about the concept of biodiversity, its applications, conservation categories, and the economic significance of biodiversity.

CO4: To comprehend the significance and scope of statistical approaches in research.

CO5: To understand different statistical approaches and formulae for analysing various hypotheses and experiments.

MBOTCC9 (Practical)

CO1: To explain and demonstrate the practical concepts and techniques covered in the course curriculum of MBOTCC5, 6, 7, and 8.

MBOTAEC1

Environmental Law & Policy

CO1: Students will study concerning environmental laws and regulations, which are important for pollution prevention, resource management, and conservation. The course will provide information on the extensive topic of environmental law and policy to students.

CO2: Students will understand forest, biodiversity, and wildlife-related laws. Additionally, they will learn about the legal framework for huge projects, environmental protection legislation, and pollution of the air, water, and soil.

CO3: Understand the role of the judicial system in infrastructure projects, and environmental protection.

CO4 The course aims to develop the understanding of students so they can take specialized courses in environmental law and policy and have a strong foundation in environmental protection.

Semester-III

MBOTCC10

Cell Biology & Cytogenetics

CO1: This course is about how cells are organized together with cellular ultrastructure and the chemical composition of cellular organelles. Discuss nuclear structure and cell division.

CO2: Learn about chromosome structure and organization.

CO3: This course deals with Mendelian inheritance, deviation from Mendel law, and sex determination.

CO4: This course explains extranuclear inheritance, chromosome aberration, types of polyploidy and its role in speciation.

CO5: Learn about the molecular mechanism of mutation involving inducing mutations with chemical and physical mutagens.

CO6: The course discusses the details of population genetics and also concepts of microscopy.

MBOTCC-11

Recombinant DNA Technology

CO1: Understand the organization of the genome.

CO2: Learn the fundamentals of structure, replication, repair, and synthesis of DNA and RNA.

CO3: Understanding of translation and transcription machinery in the prokaryotes and eukaryotes.

CO4: Students will develop concepts for gene regulation in prokaryotes and eukaryotes.

MBOTCC12

Molecular Biology

CO1: Describe how molecular tools and cloning DNA vectors are used in genetic engineering.

CO2: Describe the process and practices of genetic engineering.

CO3: Discuss the various blotting methods and describe the equipment and procedures used in DNA amplification.

CO4: Understand about various recombinant screening techniques.

CO5: Describe the processes and applications of gene therapy.

MBOTCC-13

Plant Ecology & Environmental Science

CO1: To introduce the students to certain fundamental and environmental concepts of conservation ecology, including its scientific tenets and ethical precepts. Additionally, the management of protected area networks, the Biodiversity Act, and the biodiversity action plan will all be explained to the students. Students will also study some real-world case studies of conservation and management strategies in India.

CO2: The course is intended to provide information on what constitutes a natural resource, different sorts of resources, natural resource degradation, and natural resource conservation. The students would also be familiar with shifting cultivation, coal mining, numerous environmental issues and their ecological effects, and sustainable development.

CO3: The course is developed to spread awareness of issues with the environment, including global warming, ozone depletion, pollution, acid rain, the greenhouse effect, various greenhouse gases, climate change, and its effects on the environment

CO4: The course focuses on comprehending India's phytogeographical areas and knowledge of endemism and biodiversity hotspots.

MBOTCC-14 (Practical)

CO1: To explain and demonstrate the practical concepts and techniques covered in the course curriculum of MBOTCC10, 11, 12 & 13.

AECC-2

Human Rights

CO1: Students will learn about the significance of humanity, gender equality, and human values.

CO2: Students will become familiar with moral concepts throughout the course, making it simpler for them to cooperate and produce results while collaborating as a group.

Semester-IV

MBOTEC-1*

Cytogenetics & Crop Improvement

CO1: Development of haploids and their contribution to cytogenetics and crop improvement. Learn about speciation, evolution, and chromosome banding techniques.

CO2: The role of mutation and mutagenesis in crop improvement.

CO3: Recognize transposition, terminator genes, and their applications to genetic diversity and crop development.

CO4: Learn the principles and applications of breeding, eugenics, and maternal inheritance.

CO5: The detailed teaching of the role of cytogenetics in crop development.

MBOTEC-1*

Applied Microbiology & Plant Pathology

CO1: Uncover the function of microorganisms in many industrial processes, such as fermentation technology and the brewing process etc.

CO2: Learn about the metabolites, enzymes, and other products created by microorganisms, and understand their uses.

CO3: Principle and the way microbes function in bioremediation.

CO4: Students are taught the fundamentals of IPM and plant pathology.

CO5: Learn to utilize modern developments in technology to learn the causes and to manage important plant diseases.

*** Students can opt for either Applied Microbiology and Plant Pathology or Cytogenetics and crop Improvement as per their choice.**

MBOEC-2

CO1: To explain and demonstrate the practical concepts and techniques covered in the course curriculum of MBOTEC-1*.

GE-1

Human Rights

CO1: Understanding and evaluating the historical, philosophical, political, and cultural trends that led to the establishment of human rights as a body of rules and regulations, accords, and rules on a global scale are topics covered throughout the course.

CO2: Examine the impact that various geographical, cultural, and theoretical contexts have and how society perceives and implements human rights laws.

CO3: Organize interdisciplinary perspectives and contributions on issues including gender, race, poverty, and violence within a human rights framework.

CO4: Evaluate human rights practices' impact on regional, governmental, and international humanitarian initiatives.

