

Course Outcomes

I. Semester I Honours

Core Course-1

Paper: Phycology and Microbiology

Paper Code: BOTACOR01T & BOTACOR01P

CO1: Develop understanding on the concept of microbial nutrition and examine the general characteristics of bacteria and their cell reproduction/ recombination.

CO2: Classify viruses based on their characteristics and structures.

CO3: Develop critical understanding of plant diseases and their remediation.

CO4: Increase the awareness and appreciation of human friendly viruses, bacteria, algae and their economic importance.

CO5: Conduct experiments using skills appropriate to subdivisions.

Core Course-2

Paper: Biomolecules and Cell Biology

Paper Code: BOTACOR02T & BOTACOR02P

CO1: Develop understanding of chemical bonding among molecules.

CO2: Identify the concept that explains chemical composition and structure of cell wall and membrane.

CO3: Classify the enzymes and explain mechanism of action and structure.

CO4: Compare the structure and function of cells & explain the development of cells.

CO5: Describe the relationship between the structure and function of biomolecules.

II. Semester I General

General Elective and Discipline Specific Course 1 (GE-1/DSC-1)

Paper: Microbes, Algae, Fungi and Archegoniates.

**Paper Code: BOTHGEC01T/ BOTHGEC01P & BOTGCOR01T/
BOTGCOR01P**

CO1: Develop understanding on the concept of microbial nutrition and examine the general characteristics of bacteria and their cell reproduction/ recombination; and classify viruses based on their characteristics and structures.

CO2: Understand the diversity among Algae, know the systematic, morphology and structure of Algae, understand the life cycle pattern of Algae, and understand the useful and harmful activities of Algae.

CO3: Understand the Biodiversity of Fungi, and know the Economic Importance of Fungi

CO4: Understand the morphological diversity of Bryophytes and Pteridophytes and Gymnosperms and know the evolution of Bryophytes and Pteridophytes and Gymnosperms.

CO5: Gain knowledge on the economic importance of the Bryophytes and Pteridophytes and Gymnosperms.

III. Semester II Honours

Core Course-3

Paper: Mycology and Phytopathology

Paper Code: BOTACOR02T & BOTACOR02P

CO1: Understand the biodiversity of Fungi as well as its role in maintaining ecological balance and know the Economic importance of Fungi leading to Industrial application and human welfare.

CO2: Their use in humans as a source of tinder, traditional medicines, food, and enzymes as well as their dangers, such as toxicity or infection.

CO3: Know about the fungal diseases of humans and their treatments.

CO4: Understand the scope and importance of Plant Pathology.

CO5: Know the prevention and control measures of plant diseases and their effect on the economy of crops.

Core Course-4

Paper: Archegoniate

Paper Code: BOTACOR04T & BOTACOR04P

CO1: Understand the morphological diversity of Bryophytes and Pteridophytes and Gymnosperms.

CO2: Understand the economic importance of the Bryophytes and Pteridophytes and Gymnosperms

CO3: Understand the Biodiversity of Bryophytes and Pteridophytes and Gymnosperms.

CO4: Know the evolution of Bryophytes and Pteridophytes and Gymnosperms

CO5: Gain a detailed knowledge about the affinities of Bryophytes, Pteridophytes and Gymnosperms.

IV. Semester II General

General Elective and Discipline Specific Course 2 (GE-2/DSC-2)

Paper: Plant Ecology and Taxonomy

**Paper Code: BOTHGEC02T/ BOTHGEC02P & BOTGCOR02T/
BOTGCOR02P**

CO1: To understand ecological relationships between organisms and their environment and to identify diversity of life forms in an ecosystem and to know the conceptual development of 'taxonomy' and 'systematics'.

CO2: To understand the Phylogeny of angiosperms -A general account of the origin of Angiosperms and to understand the general range of variations in the group of angiosperms.

CO3: To trace the history of development of systems of classification emphasizing angiosperm taxa and to learn the wide activities in angiosperm and trends in classification.

CO4: To learn about the characters of biologically important families of angiosperms and to know the floral variations in angiosperm families, their phylogeny and evolution.

CO5: To understand various rules, principles and recommendations of plant nomenclature in plant identification and to understand major evolutionary trends in various parts of angiosperm plants.

V. Semester III Honours

Core Course-5

Paper: Morphology and Anatomy of Angiosperms

Paper Code: BOTACOR05T & BOTACOR05P

CO1: Understand the habit of the angiosperm plant body and know the vegetative characteristics of the plant.

CO2: Understand the scope & importance of Anatomy.

CO3: Know various tissue systems.

CO4: Understand the normal and anomalous secondary growth in plants and their causes.

CO5: A parallel practical course will also help to gather a brief knowledge on various techniques used in anatomical study.

Core Course-6

Paper: Economic Botany

Paper Code: BOTACOR06T & BOTACOR06P

CO1: Understand the role plants in human welfare.

CO2: Gain knowledge about various plants of economic use.

CO3: Know importance of plants & plant products.

CO4: Understand the chemical contents of the plant products.

CO5: Know about the utility of plant resources.

Core Course-7

Paper: Genetics

Paper Code: BOTACOR07T & BOTACOR07P

CO1: Know about fundamentals of genetics like, concept of gene, Mendelian and non-Mendelian principle of inheritance, extra-chromosomal inheritance, linkage, crossing over, gene mutation, population genetics etc.

CO2: Know the phenomenon of dominance, laws of segregation, independent assortment of genes.

CO3: Understand the different types of genetic interaction, incomplete dominance, codominance, inter allelic genetic interactions, multiple alleles, and quantitative inheritance etc.

CO4: Acquire a clear-cut knowledge about different genetical analysis like, deciphering different genetical disease, variation of gene pool among different organism's population, applying genetical understanding to analyze and manipulate traits of living organisms etc.

CO5: A parallel practical course will also help to gather a brief knowledge on techniques of chromosome morphological study, statistical analysis of different types of inheritance and different normal and abnormal stages of cytological behavior and human genetic disorders.

VI. Semester III General

General Elective Course and Discipline Specific Course 3 (GE-3/DSC-3)

Paper: Plant Anatomy and Embryology

**Paper Code: BOTHGEC03T/ BOTHGEC03P & BOTGCOR03T/
BOTGCOR03P**

CO1: Understand the habit of the angiosperm plant body and know the vegetative characteristics of the plant.

CO2: Understand the scope & importance of Anatomy and know various tissue systems.

CO3: Understand the normal and anomalous secondary growth in plants and their causes.

CO4: Understand the development of reproductive organs of plants.

CO5: Know about the mechanisms of functions of reproductive organs of plants.

Semester III Skill Enhancement Course-1

Paper: Plant Diversity and Human Welfare

Paper Code: BOTSSEC01M

CO1: Know the causes of diversity loss.

CO2: Know about the organization who have been continuously working for biodiversity management and sustainable development.

CO3: Grow students' awareness about conservation of nature and natural resources.

CO4: Understand how plant diversity and sustainable development help in human welfare.

VII. Semester IV Honours

Core Course-8

Paper: Molecular Biology

Paper Code: BOTACOR08T & BOTACOR08P

CO1: Understand the biochemical nature of nucleic acids, their role in living systems, experimental evidence to prove DNA as a genetic material.

CO2: Understand the process of synthesis of proteins and role of genetic code in polypeptide formation.

CO3: Know the details of Microscopy- Principles of light microscopy, electron microscopy (TEM and SEM).

CO4: Know about the genomic organization of living organisms, study of genes genome, chromosome etc.

CO5: Gain knowledge about the mechanism and essential component required for prokaryotic DNA replication.

Core Course-9

Paper: Plant Ecology and Phytogeography

Paper Code: BOTACOR09T & BOTACOR09P

CO1: Know the scope and importance of the subject.

CO2: Understand plant communities and ecological adaptations in plants.

CO3: Discover botanical regions of India and vegetation types of India.

CO4: Learn about conservation of biodiversity, Non-conventional Energy and Pollution.

CO5: Understand Bioremediation, Global warming, and climate change.

Core Course-10

Paper: Plant Systematics

Paper Code: BOTACOR10T & BOTACOR10P

CO1: Know the conceptual development of “taxonomy” and “systematic” and understand the Phylogeny of angiosperms - the origin of Angiosperms.

CO2: Understand the general range of variations in the group of angiosperms and trace the history of development of systems of classification emphasizing angiosperm taxa.

CO3: Learn the wide activities in angiosperm and trends in classification and learn about the characters of biologically important families of angiosperms.

CO4: Know the floral variations in angiosperm families, their phylogeny and evolution and understand various rules, principles and recommendations of plant nomenclature produces in plant identification.

CO5: Understand major evolutionary trends in various parts of angiosperm plants.

VIII. Semester IV General

General Elective Course and Discipline Specific Course 4 (GE-4/DSC-4)

Paper: Plant Physiology and Metabolism

**Paper Code: BOTHGEC04T/ BOTHGEC04P & BOTGCOR04T/
BOTGCOR04P**

CO1: To understand plant physiological processes and metabolism and to understand the plants and plant cells in relation to water.

CO2: To explain the role of micronutrients in plant growth and development.

CO3: To understand the process of photosynthesis in higher plants with particular emphasis on light and dark reactions, C3 and C4 pathways and to understand the respiration in higher plants with particular emphasis on aerobic and anaerobic respiration.

CO4: To clarify the mechanism and breaking of dormancy and to understand the plant movements.

CO5: To understand structure and general features of enzymes and to have concept of enzyme activity and enzyme inhibition.

Semester IV Skill Enhancement Course-2

Paper: Ethnobotany

Paper Code: BOTSSEC02M

CO1: Understand the role of plants in human welfare and gain knowledge about various plants of economic use.

CO2: Know importance of plants & plant products.

CO3: Understand the chemical contents of the plant products.

CO4: Know about the utility of plant resources.

CO5: Know the interrelations of all the several traits and of the whole material and intellectual culture of a people in its entirety.

IX. Semester V Honours

Core Course-11

Paper: Reproductive Biology of Angiosperms

Paper Code: BOTACOR11T & BOTACOR11P

CO1: Recall the history of reproductive biology of angiosperms & recognize the importance of genetic and molecular aspects of flower development.

CO2: Understand structure and functions of anther wall and pollen wall.

CO3: Evaluate the special structures of Ovule.

CO4: Solve Self-incompatibility in Pollination and fertilization & relate between Embryo, Endosperm and Seed.

CO5: Comprehend the causes of Polyembryony and apomixes with its classification.

Core Course-12

Paper: Plant Physiology

Paper Code: BOTACOR12T & BOTACOR12P

CO1: Discuss plant water relations, i.e., how plants acquire, utilize, and regulate the flow of water between plants and environment.

CO2: Outline the mineral nutrients plants require, and how they are obtained, metabolized, transported and their role in plants.

CO3: Explain how plant growth regulators regulate the growth and development in plants.

CO4: Describe the physiology of flowering, light responses, and seed dormancy in plants.

CO5: To clarify the mechanism and breaking of dormancy and to understand the plant movements.

Discipline Specific Elective-01

Paper: Natural Resource Management

Paper Code: BOTADSE01T & BOTADSE01P

CO1: Demonstrate an advanced understanding of the application of fundamental principles of ecological studies to the conservation of biodiversity.

CO2: Discuss and cite theories and case studies as prerequisites for success in sustainable utilization and effective species conservation.

CO3: Translate theoretical aspects of contemporary practices to recommendations for environmental management.

CO4: Know about renewable and non-renewable energy resources.

CO5: Gain knowledge about all the regulatory bodies and organizations for the environment and their policies and functions.

Discipline Specific Elective-02

Paper: Industrial and Environmental Microbiology

Paper Code: BOTADSE03T & BOTADSE03P

CO1: Understand the concept and role of microbes in industry and environment.

CO2: Analyze the types of bioreactors and the fermentation process.

CO3: Evaluate the role of microorganisms in industry and microbes in agriculture.

CO4: Develop skills on the remediation process of contaminated soils.

CO5: Learn and practice applications of microbiology in terms of industries.

X. Semester V General

Discipline Centric Elective 1 (DSE-1)

Paper: Cell and Molecular Biology

Paper Code: BOTGDSE01T/ BOTGDSE01P

- CO1: Demonstrate the various microscopic techniques.
CO2: Explain the processes of cell division.
CO3: Identify, describe, and differentiate plant cells and cell organelles and their functions.
CO4: Describe DNA replication and protein synthesis.

XI. Semester VI Honours

Core Course-13

Paper: Plant Metabolism

Paper Code: BOTACOR13T & BOTACOR13P

- CO1: Differentiate anabolic and catabolic pathways of metabolism.
CO2: Explain the significance of Photosynthesis and Respiration and recognize the importance of Carbon assimilation in Photorespiration.
CO3: Classify aerobic and anaerobic respiration.
CO4: Explain the ATP-Synthesis
CO5: Interpret the Biological nitrogen fixation in metabolism.

Core Course-14

Paper: Plant Biotechnology

Paper Code: BOTACOR14T & BOTACOR14P

- CO1: Understand the core concepts and fundamentals of Plant Biotechnology and Genetic Engineering.
CO2: Develop their competency on different types of plant tissue culture.
CO3: Analyze the enzymes and vectors for genetic manipulations.
CO4: Examine gene cloning and evaluate different methods of gene transfer.
CO5: Critically analyze the major concerns and applications of transgenic technology.

Discipline Specific Elective-03

Paper: Analytical Techniques in Plant Sciences

Paper Code: BOTADSE04T & BOTADSE04P

- CO1: Develop conceptual understanding of cell wall degradation enzymes and cell fractionation.
- CO2: Classify different types of chromatography techniques.
- CO3: Explain the principles of Light microscopy, compound microscopy, Fluorescence microscopy and confocal microscopy.
- CO4: Understand the applications of various instruments and techniques in biological research.
- CO5: Apply suitable strategies in data collections and disseminating research findings.

Discipline Specific Elective-04

Paper: Biostatistics

Paper Code: BOTADSE06T & BOTADSE06P

- CO1: Comprehend the fundamental concepts related to descriptive and inferential biostatistics.
- CO2: Develop skills in data tabulation, its treatment, analysis, interpretation, and graphical representation of data.
- CO3: Analyze the implications of inferential statistics in biology.
- CO4: Understand the applications of biometrical tests in biological research.
- CO5: Develop their competence in hypothesis testing and interpretation.

XII. Semester VI General

Discipline Specific Elective 2 (DSE-2)

Paper: Analytical Techniques in Plant Sciences

Paper Code: BOTGDSE04T/ BOTGDSE04P

- CO1: Develop conceptual understanding of cell wall degradation enzymes and cell fractionation.

CO2: Classify different types of chromatography techniques.

CO3: Explain the principles of Light microscopy, compound microscopy, Fluorescence microscopy and confocal microscopy.

CO4: Understand the applications of various instruments and techniques in biological research.

CO5: Apply suitable strategies in data collections and disseminating research findings.