

Course Outcome (CBCS) B.Sc. Botany Honours



Department of Botany Nalbari College, Nalbari, Assam - 781335

Core Papers

BOT-HC-1016: Phycology and Microbiology

- CO1. Detailed knowledge on microbes, viruses and bacteria, and their importance in agriculture and medicine
- CO2. Knowledge on Algal classification, Economic and ecological importance of Algae
- CO3. Practical knowledge on structure of T-Phage and TMV, lytic and lysogenic life cycle
- CO4. Practical knowledge on microscopy of bacteria and algae

BOT-HC-1026: Biomolecules and Cell Biology

- CO1. Knowledge on structure, classification and physicochemical properties of biomolecules and enzymes
- CO2. Detailed knowledge on structure, properties and functions of cell and its components
- CO3. Practical knowledge on properties of cell and cell membrane, DNA staining techniques and microscopy of plant cell
- CO4. Knowledge on qualitative tests of biomolecules

BOT-HC-2016: Mycology and Phytopathology

- CO1. Detailed knowledge on different classes of fungi, their structure, classification, life cycle and reproduction
- CO2. Knowledge on diseases in plants caused by viruses, bacteria and fungi and biotechnological applications of fungi
- CO3. Structural analysis of different classes of fungi and their reproductive stages
- CO4. Knowledge on structures of symbiotic associations (Lichens, Mycorrhiza)

BOT-HC-2026: Archegoniate

- C01. Detailed knowledge on morphology, anatomy, classification and properties of bryophytes, pteridophytes and gymnosperms
- C02. Knowledge on reproduction and economic importance and ecological significance of bryophytes, pteridophytes and gymnosperms
- C03. Practical knowledge on morphology and reproductive structures of archegoniates
- C04. Spore morphology analysis and detailed knowledge on male and female reproductive structures in gymnosperms

BOT-HC-3016: Morphology and Anatomy of Angiosperms

- C01. Knowledge on morphology of angiosperms and developmental biology of plant body
- C02. Knowledge on structural and anatomical organization of tissue system in plants and their classification
- C03. Practical knowledge on inflorescences and fruits of angiosperms
- C04. Practical knowledge on anatomical features of plant body parts

BOT-HC-3026: Economic Botany

- C01. Knowledge on morphology, uses and economic importance of crop plants
- C02. Knowledge on uses of industrially important plants
- C03. Practical knowledge on economically important plant parts and their products

BOT-HC-3036: Genetics

- C01. Knowledge on Mendelian concepts in genetics; structure, functions and properties of chromosome; chromosomal aberration
- C02. Knowledge on gene structures and gene mutations, population genetics
- C03. Practical knowledge on chromosomal mapping and gene interaction studies
- C04. Practical visualization of chromosomal anomalies

BOT-HC-4016: Molecular Biology

- C01. Detailed knowledge on architecture of nucleic acids, organization of DNA in organisms, models of replication and the factors associated with it
- C02. Detailed knowledge on transcriptional and post transcriptional events in a cell, translation of proteins
- C03. Practical acquaintance of isolation and quantification of DNA from plants
- C04. Knowledge on photographic study of RNA polymerases and RNA modification machinery

BOT-HC-4026: Plant Ecology and Phytogeography

- C01. Knowledge on origin, formation and properties of abiotic components of the ecosystem, interactions and adaptation of plants with biotic and abiotic factors
- C02. Knowledge on properties of communities in a population and tropical and habitat organization in an ecosystem
- C03. Practical knowledge on property analysis of abiotic components of the ecosystem
- C04. Practical knowledge on vegetation study and different ecological sites

BOT-HC-4036: Plant Systematics

- C01. Knowledge on plant identification and classification systems, plant nomenclature
- C02. Knowledge on phylogenetic and evolutionary relationships of angiosperms
- C03. Practical knowledge on foliar morphology and taxonomical study of angiosperms

BOT-HC-5016: Reproductive Biology of Angiosperms

- C01. Knowledge on detailed morphological and anatomical study of reproductive structures of angiospermic plants
- C02. Knowledge on embryology and embryological abnormalities in angiosperms
- C03. Structural documentation of reproductive structures of angiosperms
- C04. Practical knowledge on developmental biology of embryo and endosperms

BOT-HC-5026: Plant Physiology

- C01. Knowledge on mechanisms of water, minerals and nutrient absorption of plants
- C02. Knowledge on roles of plant hormones and mechanism of flowering in plants
- C03. Practical knowledge on effects of growth regulators on plant parts
- C04. Practical knowledge on determination of osmotic and water potential

BOT-HC-6016: Plant Metabolism

- C01. Detailed knowledge of metabolic events of photosynthesis and nutrient metabolism
- C02. Knowledge of signalling molecules and pathways in the plant cell
- C03. Practical knowledge on different types of chromatographic techniques
- C04. Estimation of TAN, sugar and protein contents in plant sample

BOT-HC-6026: Plant Biotechnology

- C01. Knowledge on applications of tissue culture techniques, construction of recombinant DNA and transformation into hosts, construction of DNA libraries
- C02. Knowledge on development of transgenic plants for agricultural or industrial use
- C03. Practical utility on isolation of plasmid DNA, its digestion and separation of fragments through gel electrophoresis
- C04. Preparation of media for tissue culture techniques and photographic study of plant tissue culture
- C05. Photographic study of generating transgenic plants for agriculture

Discipline Specific Elective (DSE) Papers

BOT-HE-5016: Natural Resource Management

- C01. Comprehensive knowledge on different types of natural resources and their ecological, economical and socio-cultural values
- C02. Basic understandings of land, water and forest resources
- C03. Overall knowledge on resource degradation, their judicious use and management for sustainability
- C04. Knowledge on biodiversity - its importance, management and Bioprospecting
- C05. Knowledge on IPR, and global arena on resource management, conservation and benefit sharing
- C06. Hands on experience on the domestic solid waste estimation and determining its impact on land degradation
- C07. Hands on experience on forest study using tools like GPS/GIS, and understanding of ecological importance of forest resources

BOT-HE-5026: Horticultural Practices and Post-Harvest Technology

- C01. Basic understandings on Horticultural science and its importance in employment generation and socio-economic development

- C02. Classification of horticultural crops, identification of potential horticultural crops – their cultivation, production, management and commercialization
- C03. Knowledge on horticultural techniques, landscaping and gardening
- C04. Overall knowledge on post-harvest technology, disease management, and germplasm management for horticulture
- C05. Field knowledge of gardening, nurseries, standing crops of horticultural importance

BOT-HE-6016: Industrial and Environmental Microbiology

- C01. Understanding the roles of microbes in industries and environment
- C02. Basic knowledge of different kinds of bioreactors and fermentation processes
- C03. Knowledge on production processes of some microbial products in industries through site visits
- C04. Knowledge on application of enzymes in industries
- C05. Diversity and distribution of microbes in air, water and soil
- C06. Basic understandings on water microbiology and water analysis methods
- C07. Usefulness of microbes in agriculture and bioremediation of contaminated soils
- C08. Practical experiences on basic microbiological techniques and handlings

BOT-HE-6026: Analytical Techniques in Plant Sciences

- C01. Knowledge on microscopy and imaging in plant science
- C02. Principles and application of centrifuge, spectroscopy and chromatography in biology
- C03. Basic knowledge on biostatistics including measures of central tendency and dispersions, statistical data analysis and representations
- C04. Practical knowledge on microscopy, chromatography, centrifugation and spectroscopy

BOT-HE-6036: Project Work/Dissertation

- C01. Practical knowledge on addressing relevant scientific questions through experimentation

Generic Elective Courses

BOT-HG-1016: Biodiversity (Microbes, Algae, Fungi and Archegoniate)

- C01. Knowledge on structure and reproduction of viruses and bacteria, and their economic importance
- C02. Describe general characteristics, morphological diversity, thallus organization, life cycles, ecological and economic importance of algae
- C03. Describe general characteristics, morphological diversity, thallus organization, life cycles, ecological and economic importance of fungi
- C04. General characteristics, classification, morphological diversity and evolutionary significance of bryophytes
- C05. General characteristics and classification of pteridophytes; evolution of stele, heterospory and seed habit in pteridophytes
- C06. Classify gymnosperms, and describe their general characteristics and economic importance
- C07. Practical knowledge on staining and slide preparation to study bacteria, algae and fungi under the microscope

C08. Practical knowledge on vegetative and reproductive structures of some representative bryophytes, pteridophytes and gymnosperms

BOT-HG-2016: Plant Ecology and Taxonomy

C01. Understanding soil, water, light and temperature as ecological factors

C02. Knowledge on adaptive characters of hydrophytes and xerophytes

C03. Knowledge on plant community types and their succession

C04. Knowledge on ecosystem, trophic levels and energy flow in ecosystems

C05. Knowledge on biogeochemical cycling with an emphasis on carbon, nitrogen and phosphorus cycles

C06. General idea on phytogeography and endemism

C07. Knowledge on plant taxonomy, principles, ICN rules, ranks and hierarchy

C08. Knowledge on different systems of plant classification and cluster analysis

C09. Practical knowledge on soil temperature measurement, humidity measurement, rainfall estimation and light intensity measurement

C010. Adaptive morphological characterization of hydrophytes and xerophytes

C011. Quadrature size determination for herbaceous plant studies in ecology

C012. Estimation of frequency distribution of herbaceous plants using quadrature method

C013. Practical knowledge on plant identification upto the family level that belongs to Brassicaceae, Solanaceae and Lamiaceae; Preparation of herbarium specimens

BOT-HG-3016: Plant Physiology and Metabolism

C01. Understanding the roles of water in plant physiology, transpiration, and guttation

C02. Knowing of macro- and micro-nutrients and mineral uptakes in plants

C03. Understanding the transportations of minerals and foods in plants

C04. Knowledge on photosynthetic pigments, photosynthetic reactions and photorespiration

C05. Understanding of respiration processes – glycolysis, TCA and PPP pathways

C06. Knowledge on enzyme properties, actions and inhibitions

C07. Knowledge on biological nitrogen fixation

C08. Knowledge on plant hormones, and plant responses to light and temperature

C09. Determine osmotic potentials of plant cells and effect of light on transpiration

C010. Calculate stomatal index and frequency

C011. Demonstrate the effect of pH and concentrations in catalase activity

C012. Demonstrate the effect of bicarbonate concentration on O₂ evolution in photosynthesis

BOT-HG-3026: Environmental Biotechnology

C01. Knowledge on environment and the cause of environmental pollutions

C02. Knowledge on the methods of pollution measurement and bioremediation

C03. Knowledge on waste water treatment processes

C04. Knowledge on xenobiotics – their types and bioremediation

C05. Knowledge on application of immobilized cells/enzymes in industries

C06. Knowledge on national legislations and international treaties for environmental protection and pollution management

C07. Practical knowledge on determining basic properties of soil and water like DO, salinity, pH, total hardness, etc

C08. Practical knowledge on gravimetric analysis of effluents

C09. Practical knowledge on the assessment of microorganisms in air and water samples

BOT-HG-4016: Plant Anatomy and Embryology

- C01. Knowledge on different types of tissues and their organizations in plants
- C02. Knowledge on secondary growth and anomalous structures in plants
- C03. Knowledge on adaptive and protective characters of plants
- C04. Understanding the reproductive units of a flower; ovule types, ovary types, pollination and fertilization mechanisms; embryo and endosperm developments and functions
- C05. Hands on experiences on slide preparation for anatomical studies of leaf, stem and root
- C06. Flower dissection and study of flower reproductive parts and events

BOT-HG-4026: Economic Botany and Plant Biotechnology

- C01. Understanding the concept of 'centre of origin of crop plants' and their distribution with a special emphasis on wheat
- C02. Overall knowledge on economically important crops with their botanical characters and parts used
- C03. Knowledge on plant tissue culture and the basic molecular techniques used in biotechnology
- C04. Basic concept of bioinformatics and its application

Skill Enhancement Paper

BOT-SE-3014: Biofertilizers

- C01. Basic knowledge on the microbes used as biofertilizer and understand the process of their isolation, identification, mass multiplication, carrier based inoculants and knowledge on Actinorrhizal symbiosis
- C02. Concept on the general characteristics, isolation, mass multiplication carrier based inoculants of *Azospirillum* and *Azotobacter* also the knowledge on the crop response to *Azotobacter*
- C03. Basic knowledge on Cyanobacteria including factors affecting growth of Cyanobacteria, concept on the nitrogen fixation and use of blue green algae in rice cultivation
- C04. Brief knowledge on the Mycorrhizal association and understand the details of various types, taxonomy, occurrence, distribution and growth parameters of Mycorrhiza
- C05. Details about the organic farming, maintenance and recycling of biodegradable waste material and understand the methods of making biocompost and vermicompost with application

BOT-SE-3024: Herbal Technology

- C01. Concept on the plants used as traditional medicine, and understanding the process of cultivation, harvesting, processing, storage, marketing and utilization of medicinal plants

C02. Brief knowledge on medicinal drugs obtained from plants and comprehensive idea about systematic position, medicinal uses of Tulsi, Ginger, Fenu greek, Indian goose berry and Ashoka

C03. Concept on the phytochemistry of medicinal herbs and identification, utilization of medicinal plants

C04. Basic knowledge on quality control, owing the medicinal properties of herbal drugs including the secondary metabolites and concept of drug adulteration, types, methods of drug evaluation

C05. Understand the process of micro propagation of important medicinal plant species

BOT-SE-4014: Nursery and Gardening

C01. Brief idea about objectives, scope, infrastructure and maintenance of Nursery

C02. Concept on structure, types and dormancy of seeds and brief idea about seed storage including types and process and knowledge on seed production technology

C03. Knowledge on various modes of vegetative propagation and maintenance of plants in green house

C04. Brief idea about development and maintenance of gardening including scope and types and understand the various gardening operations including management of pests and diseases

C05. Detail knowledge on managements of seeds and seedlings and concept about cultivation, storage and marketing of important vegetables

BOT-SE-4024: Floriculture

C01. Basic knowledge including history, importance and scope of floriculture

C02. Brief idea about Nursery management and garden operations and knowledge on the terms related to gardening and concept about role of plant growth regulators

C03. Covers the knowledge of various ornamental plants and concept of cultivations of plants in pots and knowledge about Bonsai

C04. Idea about various garden designs and features of such gardens and knowledge about some famous gardens of India

C05. Knowledge about the process of making garden more attractive by altering the existing design in places of public importance, highways and educational institute

BOT-SE-4034: Intellectual Property Rights

C01. Knowledge on IPR, their types and infringement

C02. Understanding about traditional knowledge and their protection, bio-prospecting and bio-piracy.

C03. Knowledge on protection of plant varieties, farmer rights

C04. Knowledge on Information technology related IPR; data, database, chips and domain name protection

C05. Knowledge on novelty, bio-based patenting, and moral issues associated with biotechnological inventions