

B.Sc. Botany-Programme Specific Outcomes

- Nurture problem solving skills, thinking, and creativity through assignments.
- Empowering the students to pursue higher degrees at reputed academic institutions.
- Motivate the students to prepare for competitive examinations.
- The graduate will acquire proficiency in the acquisition of data using a variety of laboratory instruments an analysis and interpretation of such data.

B. Sc Botany Cources-wise learning objectives and outcomes are as follow

Year	Course Code	Paper Title	Course Outcome
B.Sc. 1st Year	DSC-1A (BOTA 101)	Biodiversity (Microbes, Algae, Fungi and Archegoniates)	<p>The knowledge of:</p> <ul style="list-style-type: none"> ● Classification of algae and fungi and their Economic & ecological importance Morphology and life cycle of algae like Nostoc, Oedogonium, Vaucheria, Diatoms, Ectocarpus and Polysiphonia and fungi like Rhizopus, Saccharomyces, Neurospora, Agaricus and Colletotrichum ● Symbiotic relationships between fungi and algae: Lichens: Classification, Morphology, anatomy, Special vegetative structures associated with lichen thallus; Reproduction; Ecological and Economic importance. ● Definitions, symptoms, classification and etiology of major plant diseases ● Able to perform laboratory techniques (Whole mounts, Maceration, Smearing, Section cutting, Squash, Light microscopy, Digital image projection and Micrometry) and also prepare temporary mounts of type specimen of algae and fungi Students understand the fossilization process and know the type of fossils and their importance ● They know the Geological Time Table (Up to period level with characteristic plant life) and Evolution of seed habit <p>Students know the:</p> <ul style="list-style-type: none"> ● General characters, Classification up to order and Economic importance of Gymnosperms. ● Morphology, anatomy, reproduction and life history of Cycas, Pinus, and Ephedra.

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	DSC-1B (BOTA 102)	Plant Ecology and Taxonomy	<p>Students are familiar with:</p> <ul style="list-style-type: none"> ● Binomial nomenclature, principles and rules; Principle of priority ● Type concept and keys to identification of plants; ● Herbarium – its functions, important herbaria and botanical gardens of world and India ● Botanical gardens and their role ● Taxonomic evidences from palynology, cytology, photochemistry and molecular data. ● To study about various phytogeographical zones <p>They understand the:</p> <ul style="list-style-type: none"> ● Artificial, Natural and Phylogenetic system of classification; Phylogenetic (Evolutionary) principles; ● Salient features of the systems of classification of Angiosperms proposed by Bentham & Hooker and Engler & Prantl. <p>The various biotic and abiotic factors of ecosystem:</p> <ul style="list-style-type: none"> ● Various plant communities ● Knowledge of food chain, food web, ecological pyramids and biochemical cycles ● Succession & its mechanism. ● Flow of energy in various trophic levels. ● What various components of ecosystem ● How energy flows from one trophic level to other ● Biogeochemical Cycles ● They are able to understand the complex interaction between abiotic and biotic components and know the importance of environmental conservation.
B.Sc. 2nd Year	DSC-1A (BOTA 201)	Plant Anatomy and Embryology	<p>Students learn the Meristematic and permanent tissues</p> <ul style="list-style-type: none"> ● They understand the Shoot System Shoot, leaf and root system of plants. ● They know the histological organization of the Shoot, leaf and root. ● They know the morphology and modifications of these structures
	DSC-1B (BOTA 202)	Plant Physiology and Metabolism	<p>Students were enabled to understand the following topics:</p> <ul style="list-style-type: none"> ● Plant water relations, transpiration,

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			<p>guttation and stomatal movement.</p> <ul style="list-style-type: none"> ● Photosynthesis: pigments, photosystems, photophosphorylation, photorespiration. ● Animal respiration: glucose breakdown pathways and energy synthesis. ● Enzyme: structure, function and properties. ● Plant hormones and their role ● Photomorphogenesis
	SEC-I (BOTA 203)	Biofertilizers	<p>Students understands the concept of biofertilizer</p> <ul style="list-style-type: none"> ● Sustainable agriculture ● Eco-Friendly environment ● How we can improve the soil quality and protecting the plants from the pathogens ● How we improve the yield of plants.
	SEC-II (BOTA 204)	Gardening and Floriculture	<p>Students understands the concept of biofertilizer</p> <ul style="list-style-type: none"> ● Identifying different plant varieties, families and morphologies ● How can floriculture provide income and empowerment for farmers, especially small areas. ● Known about local flowers common and botanicals names and their uses.
B.Sc. 3rd Year	DSE-IA (BOTA 301)	Economic Botany and Biotechnology	<p>They understand the concept of the centre of origin of major economic crops.</p> <ul style="list-style-type: none"> ● Name of research centres and institute of Rice, Wheat, Maize, Potato. ● Students know the Distribution, botanical description and brief idea of cultivation and uses of major Cereals, Vegetables, Fibres, Oils, Medicinal plants, Beverages, Spices and Timber yielding plants of India with emphasis on Himachal Pradesh
	DSE-IB (BOTA 302)	Analytical Techniques in Plant Sciences	<p>Students know about</p> <ul style="list-style-type: none"> ● Chromatography. ● Extraction and different methods used for extraction and its affect the yield and profile of plant sample ● Spectroscopy technique used for the detecting plant diseases . ● Quantitative analysis for understanding the potential effects of plants on human health. ● Phenotype's data analysis and modelling to understanding the relationships between

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			traits and how plants respond to their environment.
	DSE-IA (BOTA 303)	Cell and Molecular Biology	<ul style="list-style-type: none"> ● Chemistry of the Cell. ● Brief account of Basic Techniques used in Cell Biology. ● Eukaryotic Cell Structure ● Chromosomes and Cell Division
	DSE-IB (BOTA 304)	Bioinformatics	<p>Students know about</p> <ul style="list-style-type: none"> ● Several bioinformatic techniques. ● How to combines computer programming, big data and biology to help scientists understand and identify patterns in biological data. ● Students know about National Centre for Biotechnology Information ● Sequences Alignments and Molecular Phylogeny.
	DSE-IB (BOTA 305)	Genetics and Plant Breeding	<p>Students understand the Mendelian Genetics</p> <ul style="list-style-type: none"> ● They are able to understand the Laws of dominance, Segregation, and independent assortment; ● Extensions of Mendelian Genetics: Chromosomal basis of Mendelism; Concept of Linkage and Crossing over; Genetic recombination; Brief idea about chromosome mapping in eukaryotes; Karyotype; Allelic and non-allelic interactions; Multiple alleles; Brief account of Quantitative inheritance ● They know Chromosomal alterations and Mutations ● They know the Genetic Material: and Gene Expression. ● They have knowledge of Extra Nuclear Inheritance ● They know about plant breeding
	SEC-I (BOTA 306)	Medicinal Botany and Ethnobotany	<p>Students know the</p> <ul style="list-style-type: none"> ● Distribution, botanical description and brief idea of cultivation and uses of major Cereals, Vegetables, Fibres, Oils, Medicinal plants, Beverages, Spices and Timber yielding plants of India ● Students know the traditional system of Medicine

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			<ul style="list-style-type: none"> ● Major and minor ethnic groups of Tribals of India and their life Styles
	SEC-II (BOTA 307)	Mushroom Cultivation Technology	<p>They understand the concept and nutritional value of edibles mushroom.</p> <ul style="list-style-type: none"> ● Also, understands the medicinal and phytochemicals present in mushroom. ● Cultivation practices of Agaricus and Volvoriella and composting technology in mushroom production, low-cost technology and how to prepared bed for mushrooms ● Storage of mushrooms and different diseases and pests of mushroom