

## B.Sc Botany

<b>PROGRAMME SPECIFIC OUTCOMES (PSOs)</b>	
1	<b>Scope and importance of Botany:</b> Understand scope and importance of Botany
2	<b>Environmental concern:</b> Create awareness on natural resources and their importance in sustainable development, analyze the importance of biodiversity conservation, estimate biodiversity loss and develop conservation strategies.
3	<b>Scientific temper:</b> Develop scientific temper and undertake scientific projects.
4	<b>Practical applications:</b> Identify and classify plants according to the principles of plant systematics, apply techniques like plant propagation methods, organic farming, mushroom cultivation, preparation of biofertilizers, biopesticides etc.
5	<b>Awareness on life processes:</b> Understand plant life processes, biomolecules, and basic hereditary principles.

### BSc BOTANY CORE

#### Course outcomes

#### BOT1B01T - CORE COURSE 1: ANGIOSPERM ANATOMY, REPRODUCTIVE BOTANY & PALYNOLOGY

1	Identify non-living inclusions in the cells and their significance.
2	Differentiate tissues in the plant body and their functions.
3	Compare primary and secondary anatomical structure of plants.
4	Distinguish normal and anomalous growth by anatomical features.
5	Develop sectioning and drawing skills in plant anatomy.
6	Recognise the micro and megaspore development in angiosperms.
7	Analyse the structure of embryo and pollen in angiosperms.
8	Analyse the anther structure of angiosperms.
9	Identify the embryological features of angiosperms.
10	Perform germination and viability tests of pollen grains.

#### BOT2B02T - CORE COURSE 2: MICROBIOLOGY, MYCOLOGY, LICHENOLOGY AND PLANT PATHOLOGY

1	Understand the structure and lifecycles of bacteria and viruses.
2	Realise the economic importance of bacteria in industry.
3	Demonstrate bacterial staining and culture.
4	Recognise characters, distribution and biology of major fungal groups.
5	Comprehend ecological and economic importance of fungi.
6	Demonstrate fungal micro slide preparation.
7	Know the structure, reproduction and importance of Lichens.
8	Examine thallus and fruiting body for identification of lichens.
9	Comprehend the symptoms of plant diseases and control measures
10	Analyse the symptoms of local plant diseases.

**BOT3B03T - CORE COURSE 3: PHYCOLOGY, BRYOLOGY AND PTERIDOLOGY**

1	Understand structure, pigmentation, reproduction and lifecycle of algae.
2	Identify morphology, anatomy and reproduction of major types of algae.
3	Recognise the economic importance and commercial products of algae.
4	Differentiate the vegetative and reproductive structures of algae.
5	Comprehend morphology, anatomy, reproduction and lifecycle of bryophytes.
6	Analyse morphology and anatomy of thallus and reproductive organs of bryophytes.
7	Describe the characters, distribution and economic importance of bryophytes.
8	Recognize the morphology, anatomy, reproduction and life cycle of pteridophytes.
9	Explain the evolution, ecology and economic importance of pteridophytes.
10	Examine the anatomy of stem and reproductive organ of pteridophytes.

**BOT4B04T- CORE COURSE 4: METHODOLOGY AND PERSPECTIVES IN PLANT SCIENCE**

1	Understand the nature of science and steps in scientific method.
2	Develop skills in ICT tools and bibliography.
3	Recognise the basic tools for data collection and its interpretation.
4	Comprehend the basic biostatistical tools and its applications.
5	Apply biostatistical tool in research projects and derive conclusions.
6	Understand the properties of biological solutions and separation techniques.
7	Demonstrate preparation and analysis of solutions and buffers.
8	Describe the principles of microscopy and micrometry.
9	Explain the paraffin method of permanent slide preparation.
10	Demonstrate experiments in microscopy, micrometry and microtomy.

**BOT5B06T: CORE COURSE 5: GYMNOSPERMS, PALAEOBOTANY, PHYTOGEOGRAPHY, EVOLUTION**

1	Understand morphology, anatomy, reproduction and life cycle of gymnosperms.
2	Demonstrate anatomy of stem, leaf and reproductive organs of gymnosperms.
3	Describe the formation and types of fossils with geological time scale.
4	Discuss the Indian contributions in paleobotany.
5	Analyse the anatomy of fossils pteridophytes and gymnosperms.
6	Explain the phytogeography and its significance.
7	Understand the endemism and phytochoria.
8	Differentiate the phytogeographical zones of India.
9	Comprehend the theories of evolution.
10	Evaluate the process of organic evolution of species and speciation.

**BOT5B07T: CORE COURSE 6: ANGIOSPERM MORPHOLOGY& SYSTEMATICS**

1	Understand the morphology of an angiosperm plant.
2	Recognise the types of fruits in angiosperms.
3	Categorise the morphological parts of the angiosperm plant for taxonomy.
4	Explain the components of taxonomy and systems of classification.

5	Identify the diagnostic features and economic importance of angiosperm families
6	Realise the taxonomic structure, hierarchy and character.
7	Elaborate the modern trends in taxonomy.
8	Comprehend the process of identification and nomenclature in plant taxonomy.
9	Differentiate and illustrate plants based on taxonomic keys.
10	Prepare herbarium specimens and artificial keys.

**BOT5B08T: CORE COURSE 7: TISSUE CULTURE, HORTICULTURE, ECONOMIC BOTANY & ETHNOBOTANY**

1	Understand the principles and techniques plant tissue culture.
2	Explain the applications of tissue culture.
3	Demonstrate culture medium preparation, sterilization and inoculation.
4	Demonstrate potting, manuring, irrigation and seed propagation in horticulture.
5	Comprehend the methods of gardening and production of horticultural crops.
6	Demonstrate cutting, grafting, layering and create indoor and outdoor gardens.
7	Recognize the binomial, family and useful part major economic crops of India.
8	Identify the economically important local plants and their useful parts.
9	Understand the significance of traditional botanical knowledge and its scope.
10	Identify local plants with ethnobotanical significance.

**BOT5B09T: CORE COURSE 8: CELL BIOLOGY AND BIOCHEMISTRY**

1	Understand the ultra-structure of a plant cell and its functions.
2	Recognise the structure of nucleus and chromosomes.
3	Identify the cell cycle and chromosomal aberrations.
4	Prepare slides of meiotic and mitotic stages.
5	Comprehend the structure and function of carbohydrates and lipids.
6	Explain the structure and function of acids and proteins.
7	Discuss the structure and function of nucleotides and nucleotides derivatives.
8	Understand the structure and function of secondary metabolites and enzymes.
9	Test the presence of macromolecules from samples.
10	Demonstrate colorimetry and spectrophotometry.

**BOT6B10T: CORE COURSE 9: GENETICS AND PLANT BREEDING**

1	Understand the Mendelian heredity and variations.
2	Comprehend the interaction of genes and multiple alleles.
3	Explain the quantitative inheritance, linkage and crossing over.
4	Identify the extra nuclear inheritance and population genetics.
5	Analyse and solve problems in gene inheritance.
6	Apprehend the plant genetic resources and plant introduction.
7	Recognise the various plant breeding techniques.
8	Comprehend modern tools for plant breeding.
9	Undertake hybridization experiments in plants.

10	Examine the floral biology of common crops.
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**BOT6B11T: CORE COURSE 10: BIOTECHNOLOGY, MOLECULAR BIOLOGY & BIOINFORMATICS**

1	Understand the recombinant DNA technology.
2	Recognise the application of biotechnology.
3	Demonstrate the DNA extraction of plants.
4	Describe the structure of Nucleic acids.
5	Explain the gene expression and regulation.
6	Elaborate types of mutation and significance.
7	Comprehend role and application of bioinformatics.
8	Understand the procedure of genomics and proteomics.
9	Describe the molecular phylogeny and drug designing.
10	Demonstrate the use of biological database for genomics.

**BOT6B12T: CORE COURSE 11: PLANT PHYSIOLOGY AND METABOLISM**

1	Recognise the water relationships of plants and transpiration.
2	Understand the ascent of sap and transpiration.
3	Comprehend the process of absorption and mineral nutrition.
4	Explain the process of photosynthesis and its significance.
5	Recognise the process of nitrogen fixation and phloem transport.
6	Discuss the plant growth and development.
7	Elucidate the seed dormancy and germination.
8	Describe the process of glycolysis.
9	Comprehend the oxidative phosphorylation.
10	Demonstrate plant physiological experiments.

**BOT6B13T: CORE COURSE 12: ENVIRONMENTAL SCIENCE**

1	Comprehend the structure and functions of ecosystems.
2	Understand the ecological adaptations of plants and succession.
3	Discuss the biodiversity and its conservation strategies.
4	Recognise the environmental pollution and its management.
5	Explain global environmental changes in climate.
6	Recognise the phytotechnological approaches in pollution management.
7	Elaborate the environmental legislations in India.
8	Understand the ecosystems and communities of biosphere.
9	Construct food web and ecological pyramids.
10	Conduct plant community and diversity studies.

**BOT6B14T(E1): CORE COURSE 14: Elective-1: GENETIC ENGINEERING**

1	Comprehend the method of gene cloning.
2	Identify protocols for preparation of genomic DNA.

3	Explain the process of Isolation and purification of RNA.
4	Recognise the principle and method of electrophoresis.
5	Discuss the method of molecular hybridization.
6	Describe the procedure of gene cloning and gene transfer.
7	Understand the production of transgenic plants.
8	Understand the applications of recombinant DNA technology.
9	Discuss the ethical, social and legal issues on recombinant DNA technology.
10	Demonstrate the spectrophotometry and electrophoresis.

**BOT6B14T(E2): CORE COURSE 14: Elective-2: ADVANCED ANGIOSPERM SYSTEMATICS**

1	Discuss the history of plant taxonomy.
2	Understand the methods in plant taxonomy.
3	Elaborate the taxonomic characters and its utilization in systematics.
4	Prepare herbarium specimens and taxonomic keys.
5	Utilize the plant taxonomic resources for plant identification.
6	Understand and practice ICN rules in plant nomenclature.
7	Review on the Angiosperm phylogeny group system of classification.
8	Recognize major plant families and their evolutionary trends.
9	Identify plants with flora and taxonomic keys.
10	Conduct floristic surveys for plant checklists.

**BOT6B14T(E3): CORE COURSE 14: Elective-3: GENETICS AND CROP IMPROVEMENT**

1	Understand crop genetics and breeding in economic plants
2	Discuss the plant genetic resources.
3	Recognise the crop improvement institutes in the world.
4	Comprehend the process of plant breeding by selection.
5	Realise the process of plant breeding by hybridization.
6	Explain the methodology of ploidy and mutation breeding
7	Understand the breeding methodology for stress and drought resistance.
8	Describe the breeding methodology for disease and insect resistance.
9	Demonstrate the hybridization techniques in local plants.
10	Illustrate the floral biology of common crop plants.

**BSc BOTANY COMPLEMENTARY**

**Course outcomes**

**BOT1C01: COMPLEMENTARY COURSE 1: ANGIOSPERM ANATOMY AND MICROTECHNIQUE**

1	Understand the types and functions of plant tissues.
2	Identify primary and secondary structure of plant organs with vascular bundles.
3	Illustrate primary and secondary anatomical structure of plant organs.
4	Sketch the normal secondary thickening of plants.
5	Identify the anomalous secondary growth in plants.

6	Explain the extra stelar thickening in plants.
7	Make anatomical micro-preparations of different plant parts.
8	Comprehend the basic botanical microtechnique.
9	Discuss the steps in paraffin method.
10	Demonstrate the preparation of preservatives and stains.

**BOT2C02: COMPLEMENTARY COURSE 2: CRYPTOGAMS, GYMNOSPERMS & PLANT PATHOLOGY**

1	Understand the structure, nutrition, reproduction of bacteria and viruses.
2	Demonstrate the bacterial staining technique.
3	Recognise the diagnostic features and evolutionary trends of major classes of Algae.
4	Comprehend the diagnostic features of major classes of fungi and lichens.
5	Demonstrate the structure and life history major groups of fungi.
6	Explain the morphology and life history of Riccia and Selaginella.
7	Familiarise the morphology and life history of Cycas.
8	Illustrate anatomical features of lower group of plants.
9	Elaborate common plant diseases and its control measures.
10	Identify common plant diseases based on symptoms.

**BOT3C03: COMPLEMENTARY COURSE 3: MORPHOLOGY, SYSTEMATIC BOTANY, ECONOMIC BOTANY, PLANT BREEDING AND HORTICULTURE**

1	Identify the types of inflorescences and floral morphology.
2	Understand the herbarium techniques, nomenclature and systems of classification.
3	Recognise the trends in taxonomy and characters of common plant families.
4	Illustrate morphology of common plant families and preparation of herbarium.
5	Understand the binomial and family of economically important plants.
6	Identify the economically important plants using its morphology.
7	Discuss the different plant breeding techniques.
8	Demonstrate hybridization technique in plants.
9	Explain the methods of plant propagation and plant growth control.
10	Demonstrate budding, grafting and layering.

**BOT4C04: COMPLEMENTARY COURSE 4: PLANT PHYSIOLOGY, ECOLOGY AND GENETICS**

1	Explain the water relations in plants.
2	Understand the process of transpiration and absorption in plants.
3	Recognise the process of photosynthesis and respiration.
4	Comprehend the growth, development and senescence of plants.
5	Demonstrate various physiological experiments in plants.
6	Understand the Ecological adaptations of plants and succession.
7	Identify the morphological and anatomical adaptations of ecological groups.
8	Discuss the Mendelian genetics and modified Mendelian ratios.
9	Explain the gene interactions in plants.

10	Solve problems in classical genetics.
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**BOT5D02: OPEN COURSE: APPLIED BOTANY**

1	Understand the plant propagation methods
2	Understand the properties of soil, irrigation and manuring
3	Construct vegetable garden and mushroom cultivation
4	Produce vermicompost and biofertilizer
5	Cultivate orchid, anthurium and bonsai
6	Understand binomial, family and useful part of major economic plants