

Programme Outcome and Programme Specific Outcome Subject Botany

UNDERGRADUATE COURSES

A. F.Y. B.Sc.

The syllabus includes basic as well as advanced concepts in the plant sciences from first year to the third year shall inspire the students for pursuing higher studies in Botany and for becoming an entrepreneur and also enable students to get employed in the Botany subject based industries.

Introduction: Objectives:

1. This course is to ensure that you can achieve an up-to-date level of understanding of plant science.
2. Botany is a branch of biological science that focuses on the study of plants and how they survive and interact with other living and nonliving things in the environment. At the undergraduate and graduate levels, the curriculum for a botany degree typically consists of lecture-based courses, labs and field research.
3. A three-year bachelor's degree program in botany provides the foundation for prospective botanists to pursue a graduate level education or find an entry-level career.
4. To highlight the potential of these studies to become an entrepreneur.

Program Outcome:

1. Knowledge and understanding of the range of plant diversity in terms of structure, function and environmental relationships. The role of plants in the functioning of the ecosystem. A selection of more specialized, optional topics. Statistics as applied to biological data.
2. Intellectual skills – able to think logically and organize tasks into a structured form. Assimilate knowledge and ideas based on wide reading and through the internet.
3. Practical skills: Students learn to carry out practical work, in the field and in the laboratory, with minimal risk. They gain introductory experience in applying each of the following skills and gain greater proficiency in a selection of them depending on their choice of optional modules.
 - a. Interpreting plant morphology and anatomy.
 - b. Plant identification.
 - c. Vegetation analysis techniques.
 - d. A range of physiochemical analyses of plant materials in the context of plant physiology and biochemistry.
 - e. Analyze data using appropriate statistical methods and computer packages.
 - f. Plant pathology to be added for sharing of field and lab data abstained.
4. Scientific Knowledge: Apply the knowledge of basic science, life sciences and fundamental process of plants to study and analyze any plant form.
5. Problem analysis: Identify the taxonomic position of plants, formulate the research literature, and analyze non reported plants with substantiated conclusions using first principles and methods of nomenclature and classification in Botany.
6. Design/development of solutions: Design solutions from medicinal plants for health problems, disorders and disease of human beings and estimate the phytochemical content of plants which meet the specified needs to appropriate consideration for the public health
7. Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern instruments and equipment for Biochemical estimation, Molecular Biology, Biotechnology, Plant Tissue culture experiments, cellular and physiological activities of plants with an understanding of the application and limitations.
8. Environment and sustainability: Understand the impact of the plant diversity in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

9. Ethics: Apply ethical principles and commit to environmental ethics and responsibilities and norms of the biodiversity conservation.

SEMESTER-I: PAPER-I: BO-111: PLANT LIFE AND UTILIZATION I

Students will learn about the plant and their use to mankind because the human population has been increased day by day and increases their food demand. Whatever resources are present they are not sufficient to this increasing population that's why we want to study as well to search new resources which will fulfill the need of mankind.

In this subject i.e. Plant life and utilization-I the students study different types of plants like algae, fungi, lichens & bryophytes.

From the above mention curriculum students also learn general characters, classification, life cycle and utilization of *Spirogyra*, *Agaricus*, *Riccia* and various Lichens

SEMESTER-I: PAPER-II: PLANT MORPHOLOGY AND ANATOMY

Outcome-The external morphological characters of plant are important for evaluation of medicinal plants and their proper identification so students can basically understand and identify the medicinal plants for better life.

The anatomical studies are helpful for perfect plant identification of plant organs as well as the individual plant. The qualitative phytochemicals can be estimated with anatomical methods.

SEMESTER-II: PAPER-I: BO-121: PLANT LIFE AND UTILIZATION-II

SEMESTER-II: PAPER-II: BO-122: PRINCIPLES OF PLANT SCIENCE

B. S. Y. B.Sc.

Sem I, Paper I: Taxonomy of Angiosperms and Plant Community

Sem I, Paper II: Plant Physiology

1. Impart an insight into the various plant water relations viz; osmosis, diffusion, active-passive transport, ascent of sap, transpiration pull etc.
2. Understand the mechanism of various metabolic processes in plants.
3. Acquire basic knowledge about the plant growth and development.
4. Equip with skills and techniques related to plant physiology like growth measurement, soil pH, water holding capacity of the soil, DPD, plasmolysis, rate of transpiration etc.
5. Describe flowering plants in botanical terms, their identification, uses etc.

Sem II, Paper I: Plant Anatomy and Embryology

Sem II, Paper II: Plant Biotechnology

C. T. Y. B.Sc.

Semester- III

Paper- I: BO : 331 Cryptogamic Botany

1. Plants are predominantly eukaryotic, multicellular, photosynthetic & current definition of the Plant Kingdom exclude Bacteria, few Algae (Cyanophyta) & Fungi.
2. Cryptogams as lower plants are thalloid & reproduce by spores. As compared to Phanerogams, the cryptogams due to their size & intricate structure have to be studied as fundamental in botanical courses.
3. Lower Cryptogams- Algae & Fungi are small, microscopic & special methods with apparatus are necessary in fieldwork.
4. Cryptogams have an important role & function in bioprospecting. The vast majority of earth's species are microbial & less than 1% of all species described have been studied beyond SIMPLY NOTING THEIR EXISTENCE.

5. Algae, Fungi along with Bryophyte & Pteridophyte have many ecological, economic & industrial applications which can be grasped by students only if they are well studied in detail in theory & practicals.
6. The proper understanding will facilitate efforts on research and development directed on the Cryptogams.

Paper II: BO.332: CELL AND MOLECULAR BIOLOGY

1. Understand molecular basis of life. Various process in molecular terms.
2. Exhibit knowledge base in cell biology and molecular biology.
3. Demonstrate the knowledge of common and advanced laboratory practices in cell and Molecular Biology. Particularly cell division, chromosome morphology, chromosome count, DNA isolation and estimation, RNA isolation & estimation etc.
4. Exhibit clear and concise communication of scientific data.
5. Identify cryptogams, different separation techniques like TLC, paper chromatography, Electrophoresis, various steps in plant tissue culture etc.

Paper III: BO: 333: GENETICS AND EVOLUTION

1. It will enable the students to understand the mechanism, role and importance of cell division, linkage and crossing over.
2. The students will also know the various gene mutations and variations & their adverse effects.
3. Students will know about Genetic Counseling and Gene Therapy

Paper IV: BO.334: SPERMATOPHYTES AND PALAEOBOTANY

1. It includes Angiosperm Gymnosperm taxonomy as well as the fossilized members.
2. Angiosperm taxonomy helps in identification of various plants from local as well as regional areas.
3. The exploration of biodiversity is always with the help of taxonomy. The students will be absorbed in various Herbarium Institute in India as well as Abroad.
4. The knowledge of taxonomy is helpful for conservation of biodiversity

Paper –IV BO.335: HORTICULTURE AND FLORICULTURE

1. A subject of applied botany which deals with practice of field & garden cultivation for food, materials, comfort, beauty & aesthetics.
2. It generally deals with garden crops like fruits, vegetables & ornamental plants especially mass cultivation, field as well as greenhouse management practices.
3. It also deals with harvest, post harvest, transportation & marketing strategies which are important for any business enterprises.
4. The subject has wide scope in domestic & International market especially since Government of India has developed a special interest in this field.
5. Students must be able to distinguish between agriculture & horticulture, in order to acquire better theoretical and practical understanding & skills in either specialized field.
6. The proper understanding will facilitate efforts on research and development on specific plants of interest.

PAPER V: BO 336 - COMPUTATIONAL BOTANY

1. It will enable the students to understand Basic concept of Biostatistics, the terminologies used, handling and representation of data.
2. The students will also know the various tests used for statistical analysis.

3. The students will get abreast with the fundamental concepts of Plant growth indices, vegetation study and computation of vegetation biomass using satellite data.
4. Students will know about biostatistics counselling.

Semester- IV

Paper I: BO. 341: PLANT PHYSIOLOGY AND BIOCHEMISTRY

Paper II: BO.342: PLANT ECOLOGY AND BIODIVERSITY

1. Students will be able to evaluate the tradeoffs occurring among our biological, social, political and economic worlds and will be able to determine the importance of environmental biology.
2. Students will learn how to diminish the effect of pollution and will be able to cope with the global warming side effects.

PAPER III BO.343: PLANT PATHOLOGY

1. It will enable the students to understand the fundamentals of plant pathology, disease development, and defence mechanism.
2. The students will also know the various defences exerted by the plant against plant pathogens, methods of studying plant diseases.
3. The students will learn about certain fungal, bacterial, Mycoplasma, Nematode, Viral and non-parasitic diseases
4. Students will know about principles of plant disease control, Molecular Diagnostics and Transgenic in Crop Protection.

Paper IV: BO.344: MEDICINAL AND ECONOMIC BOTANY

Paper V: BO. 345 PLANT BIOTECHNOLOGY

Paper VI: BO346: PLANT BREEDING AND SEED TECHNOLOGY

Anticipated knowledge, skills and/or attitude to be developed by the student are

1. Describe sources and types of genetic variation and explain their importance for plant improvement.
2. Describe the progression of stages within a modern breeding programme from the setting of breeding objectives, through the development and implementation of breeding strategies to the commercialization of plant varieties and the protection of intellectual property.
3. Describe methods that are used in plant breeding.
4. Study about flowering Processes in Plants. Seed Formation and Development.
5. Seed Germination. Seed Viability and Viability Testing. Seed Dormancy. Seed Vigor and Vigor Testing. Seed Storage and Deterioration.
6. Seed Production. Seed Conditioning and Handling. Seed Drying. Seed Enhancements. Seed Certification. Seed Testing.
Seed Marketing. Seed Legislation and Law Enforcement.
7. The introduction of quality seed of new varieties and combined with other inputs significantly increased yield level.

PROGRAM OUTCOME:

1. Judge which plant breeding methods are appropriate for specific objectives and situations.
2. Formulate and justify a plan for the application of plant breeding methods to achieve a specific objective.
3. Carry out specific plant breeding activities, such as selection of parental germplasm, observation and recording of phenotypic variation and selection among progeny.
4. Students will get practical knowledge of production of seed and seed certification
5. knowledge about seed testing, seed viability etc. will help students to get position in Research and Development Laboratories.
6. Self-employment by starting their own seed marketing unit.