



***THE LEARNING OUTCOME
FRAME OF UG AND PG
COURSE OF BOTANY***

**PSO'S of B.Sc.
BOTANY**

1. Students will understand and learn about the plant kingdom, plant physiology, taxonomy and diversity of lower and higher plants.
2. They can do M.Sc. in (Botany, plant genetics, human genetics, microbiology etc.) after that they can prepare for SET, and NET (JRF).
3. Students can get opportunities in various fields like-
 - (i) Lab – Technician
 - (ii) Biologist- In any institute
 - (iii) Teaching in middle and primary school
 - (iv) Medical representative in any pharmaceutical companies.

Course Out-Come

B. Sc. I Year

Paper- I: Diversity of Lower Plants

1. They will be able to understand about general characters of viruses, TMV and bacteriophage.
2. They will understand the general characters of bacteriophage, mycoplasma, cyanobacteria and actinomycetes.
3. They will learn about structure, nutrition, reproduction and economic importance of bacteria.
4. They will learn about the classification of algae and its economic importance and life cycle of important algal members.
5. Students learn to identify the characters of fungi and its classification.
6. They will be able to learn and understand about the general characters and classification of bryophytes.
7. They will be able to learn and understand about the general characters and classification of pteridophytes, morphology, anatomy and reproduction of their members.
8. They will learn about stellar organization in pteridophytes.

Paper-II: Diversity of Higher Plants

1. They will learn about the general characters and classification of Gymnosperms.
2. They will understand about morphology, anatomy, reproduction and life cycle of their members-Cycas, Pinus and Ephedra.

3. They will learn about Heterospory and origin of seed habit of gymnosperm.
4. They will learn about the fossilization and fossils members of gymnosperm.
5. They will learn about the origin of root, shoot and leaf system
6. They will learn about the vascular bundles.
7. They will know and understand about the monocot and dicot (root, stem and leaf).
8. They will know about the anomalous secondary growth of different members.

B.Sc. II Year

Paper-I: Taxonomy and Embryology of Angiosperms

1. They will know about the origin and evolution, nomenclature, classification, herbarium of angiospermic plants.
2. They will know about the terminology of plant identification description.
3. They will learn about diagnostic characters and economic importance of different families of angiosperms.
4. They will learn about the embryology of angiospermic plants, microsporogenesis megasporogenesis, pollination and fertilization.
5. They will know about the development of endosperm embryo and development of fruits.

Paper-II: Plant Ecology, Biodiversity and Phytogeography

1. They will understand about the ecosystem and their types.
2. They will know about the trophic structure, ecological pyramids and energy flow.
3. They will learn about the morphological, anatomical and physiological adaptation.
4. They will learn about the biodiversity and sanctuaries and national parks.
5. They will learn about the structure and properties of soil.
6. They will know about the phytogeographical regions of India.

B.Sc. III Year

Paper-I : Plant physiology and biochemistry

1. Students will understand the water relations and mechanism of transpiration
2. They will know about the nutrition uptake in plants and translocation of organic solutes in plants.
3. They will understand the physiological process in plants like photosynthesis and respiration.

4. They will learn and understand the classification of enzymes their nomenclature and its mechanism.
5. They will learn to describe the plant hormones their discovery and mode of actions.

Paper-II: Cell Biology, Genetics and Biotechnology

1. They will know about the cell structure and its organells.
2. They will learn the chromosomal organization and its structure & function.
3. They will learn about the structure and function of DMA and RNA
4. They will know about the genetic inheritance and gene interaction
5. They will know about the current knowledge of biotechnology and genetic engineering.

PSO's of M.Sc. BOTANY

1. Students will thoroughly learn and understand about the diversity of plants physiological process, genetics, ecology, bio-informatics and ethnobotany
2. They can prepare for JRF NET and join (ICAR,ICMR,CSIR etc) as research fellow.
3. They can prepare for lectureship in any education department
4. Students can get opportunities in various fields like-
 - i. Pharmaceutical Industries
 - ii. Forest department
 - iii. Herbal Industries

M. Sc. I sem

- I. Biology and Diversity of Viruses, Bacteria and Algae
- II. Biological Diversity of Bryophytes, Pteridophytes and Gymnosperms
- III. Basic Ecology
- IV. Biology and Diversity of Fungi

M.Sc. II sem

- I. Taxonomy of Angiosperms
- II. Resource Utilization and Conservation
- III. Biochemistry
- IV. Biostatistics and Computer Application

M.Sc. III Sem

- I. Plant Physiology
- II. Genetics and Molecular Biology
- III. Plant Reproduction and Development
- IV. Biotechnology

M.Sc. IV Sem

- I. Plant cell, Tissue and Organ Culture
- II. Biotechnology and Genetic Engineering
- III. Ethnobotany
- IV. Plant Protection

COURSE OUT-COME

M.Sc. I Sem Botany

Paper I: Biology and Diversity of Viruses, Bacteria and Algae

1. They will understand the ultra structure of Bacteria and its biological importance.
2. They will know about the viruses, and its transmission.
3. They will learn and understand the classification of algae into different divisions and the life history of different members.
4. They will know about the association of Algae in different field like Fishries, soil forestry etc.

Paper II: Biological Diversity of Bryophytes, Pteridophytes and Gymnosperms

1. They will learn and understand the classification of Bryophyta, Pteridophyta and Gymnosperms.
2. They will understand the morphological structure of Bryophytes, Pteridophytes and Gymnosperms.
3. They will know about the anatomical structure of Bryophytes, Pteridophytes and Gymnosperms.

Paper III: Basic Ecology

1. They will understand and learn about the ecosystem and their types.
2. They will understand about the community analysis.
3. They will learn about the soil structure and their characteristics.
4. They will understand and know about the global biogeochemical cycles.

Paper IV: Biology and Diversity of Fungi

1. They will understand the ultra structure of Fungi and its biological importance.
2. They will know about the transmission of fungi.
3. They will learn and understand the classification of Fungi into different divisions and the life history of different members.
4. They will know about the diseases caused by fungi.

M.Sc. II Sem BOTANY

Paper I: Taxonomy of Angiosperms

1. They will know about the classification and nomenclature of plant and its systematic position.
2. They can take a knowledge of Principles of Biodiversity & its conservation.
3. They will understand the modern trends in Taxonomy especially numerical taxonomy.
4. They will understand and learn about the plant used for fuel, fiber, oil and timber etc.
5. Students get knowledge about angiosperm families in details.(comparative studies)
They get knowledge about economic and medicinal importance of plants and their products.
6. They will know about the Herbarium and Botanical gardens of India and world.

Paper II: Resource Utilization and Conservation

1. They will learn about the major biomes of the world.
2. They will know and learn about the Biodiversity and threats to quality and quantity of Resources due to overexploitation.
3. They will know and learn about the conservation of resources.

4. They will know and learn about the air, water and soil pollution, ozone layer and ozone hole.
5. They will understand and learn about the remote sensing and its application in ecology.

Paper III: Biochemistry

1. The students will be able to impart an insight into the various biochemical studies.
2. They will understand the mechanism of various phyto-chemicals studies in plants.
3. They will know about the different biochemical techniques in lab.
4. These studies are helpful in research work.

Paper IV: Biostatistics and Computer Application

1. They will understand and learn about how biostatistics is useful in different fields.
2. They will understand what are the different methods about comparison, analysis of data.
3. They understand different techniques of calculation which are useful in research such as ANOVA, X² Square and 't' test and how to interpret their results .
4. They learn about the uses and application of computer, internet and how to use different softwares.

M.Sc. III Sem BOTANY
Paper I: Plant Physiology

5. The students will be able to impart an insight into the various plant water relations.
6. They will understand the mechanism of various metabolic processes in plants such as photosynthesis & Respiration.
7. They will know about the growth hormones, growth regulators and secondary plant metabolites.

Paper II: Genetics and Molecular Biology

1. They will learn about genetic material DNA structure various types and cot curve.
2. They will learn about restriction mapping, and in-situ hybridization techniques.
3. They will learn and understand about mechanism and factors which are responsible for mutation.
4. They will learn about DNA damage and repair mechanisms.
5. They will learn about different methods of recombination and its mechanisms.
6. They will understand independent assortment, linkage and crossing over.
7. They will learn about mechanism of DNA replication, and transcription process including splicing.
8. They will learn about translation process and protein synthesis inhibitors.
9. They will learn about gene expression in prokaryotes and eukaryotes.

Paper III: Plant Reproduction and Development

1. Students will understand the tissue differentiation.
2. They will learn and understand about the structure of root and stem and study in detail about their meristematic tissues.
3. They will understand about the root and shoot apex organization.
4. They will know about the structure of leaves.
5. They will learn about the microporogenesis, mega sporogenesis, endosperm development and Embryo.
6. Students will know about the fertilization, double fertilization, seed germination and seed dormancy.

PaperIV: Biotechnology

1. They will know about the scope and history of Biotechnology.
2. Genetic Engineering procedure will be learned by students.
3. They will learn about the culturing of microorganism for production of biomass.
4. strains are improved procedure and its used in different things will be learned.

M.Sc. IV Sem BOTANY

Paper I: Plant cell, Tissue and Organ Culture

1. They will understand the detailed aspects of invitro culture technique.
2. They will know about the various techniques of tissue culture such as organ culture, somatic embryogenesis, somatic hybridization.
3. They will learn about the scope of plant tissue culture technology.
4. They will understand the process of cryopreservation and germplasm storage.

Paper II: Biotechnology and Genetic Engineering

1. Students will learn about the concepts of Biotechnology and Genetic Engineering .
2. Principles and techniques of recombinant DNA technology will be understood by the students .
3. They will know about the microbial genetic manipulation.
4. They will learn about protein profiling and its significance.

Paper III: A-Ethnobotany

1. They will learn and understand about the ethnobotanical importance of plants.

2. They will know about the medicinal value of plants and how to cure various diseases.
3. They will learn about the various tribal group of plants and their mythical value such as taboos and totems in relation to plants, folklore and folktales, wild life protection in tribal plants.
4. They will know about the role of ethnobotany in the development of society.
5. They will understand about the presentation of genetic diversity, plants used in various system of medicines such as ayurvedic, unani, homeopathic and allopathic systems.

Paper IV: Plant Protection

1. Students will understand the basic concept of plant protection.
2. They will learn and understand about causal organism, symptoms and disease cycles of fungal diseases.
3. They will know about causal organism, symptoms and disease cycle of bacterial diseases viral diseases, disease caused by mycoplasma, and nematodes.
4. They will understand and learn about chemical, cultural and biological methods of plant protection.
5. They will learn about legislative methods of plant protection and plant quarantine.
6. They will be able to write about the remote sensing and integrated pest management