



**BHARATI VIDYAPEETH'S  
Dr. PATANGRAO KADAM MAHAVIDYALAYA, SANGLI.**

**DEPARTMENT OF BOTANY**

**B.Sc. BOTANY**

**PROGRAM OUTCOMES**

- 1. To increase knowledge of basic natural sciences**
- 2. To aware about scientific knowledge**
- 3. To study modern technique**
- 4. To understand advanced biotechnological techniques**
- 5. To create awareness about Environment and sustainability**
- 6. Successful career in Botany like Forestry, Plant Nursery, Plant Tissue Culture, Plant Research Institutes**

## Programme Specific Outcomes: **PSOs of B.Sc. Botany**

- PSO1. Critically evaluation of ideas and arguments by collection relevant information about the plants.
- PSO2. Identify problems and independently propose solutions using creative approaches, acquired through interdisciplinary experiences., and a depth and breadth of knowledge/expertise in the field of Plant Identification.
- PSO3. Accurately interpretation of collected information and use taxonomical information to evaluate and formulate a position of plant in taxonomy.
- PSO4. Students will be able to use the evidence of comparative biology to explain how the theory of evolution offers the only scientific explanation for the unity and diversity of life on earth.
- PSO5. Students will be able to present scientific hypotheses and data both orally and in writing in the formats that are used by practicing scientists.
- PSO6. They will be able to use specific examples to explicate how descent with modification has shaped plant morphology, physiology, and life history.

## Course Outcomes of B.Sc. Botany – 2023-24

Class/ Program	Course Code and Name/ Title	Outcomes
B. Sc. I SEM – I NEP	<b>P – I - 88181 - Microbes, Algae, and Bio fertilizers</b>	<ol style="list-style-type: none"> <li>1. The students will develop understanding about the diversity, identification, classification and economic importance of Viruses.</li> <li>2. The students will develop understanding about the diversity, identification, classification and economic importance of Bacteria</li> <li>3. The students will develop understanding about the diversity, identification, classification and economic importance of Algae.</li> <li>4. They learn the use of Organic Biofertilizers such as <i>Rhizobium, Nostoc and Trichoderma</i> etc</li> </ol>
	<b>P – II - 88181 – Cell Biology and Analytical Techniques</b>	<ol style="list-style-type: none"> <li>1. Students Gain knowledge about Cell Science Cell biology gives knowledge about cell organelles, importance and their function</li> <li>2. Understand component of cell is cell wall, Plasma Membrane, organelles and Cytoplasmic matrix.</li> <li>3. Cell organelles w. r. t. ultra structure, chemical composition and functions</li> <li>4. They Understand Research Techniques such as Microscopy, and Chromatography.</li> </ol>
B. Sc. I SEM - II	<b>Paper – III- Mycology, Phytopathology and Mushroom Cultivation</b>	<ol style="list-style-type: none"> <li>1. The students will develop understanding about the diversity, identification, classification and economic importance of Fungi.</li> <li>2. Understand the scope and importance of Plant Pathology. To give knowledge about plant disease, plant growth, plant metabolism and structure between different groups of plant.</li> <li>3. Know the diseases caused by fungal, bacterial, mycoplasma, nematodal and viral pathogens</li> <li>4. Understand the mushroom cultivation techniques.</li> </ol>
	<b>Paper -IV – Archegoniate (Bryophytes and Gymnosperms)</b>	<ol style="list-style-type: none"> <li>1. Understand the diversity of Pteridophytes and Gymnosperms</li> <li>2. Understand the economic importance of Pteridophytes and Gymnosperms .</li> <li>3. They understand Internal structure.</li> <li>4. They come to know the life cycle of archegoniate</li> </ol>
B. Sc. I SEM – II	<b>Botany Practical Paper</b>	Students understand practically by handling of plant materials, Equipments and apparatus

(Annual)	<b>(Based on Paper I, II, III and IV)</b>	<ol style="list-style-type: none"> <li>1. Students learn the Vegetative and Morphological characters of Plants.</li> <li>2. Study of diversity of Algae, Fungi, Bryophytes, Pteridophytes, and Gymnosperms.</li> <li>3. They learn the forms of Bacteria</li> <li>4. Students learn the use of bio fertilizers and organic manure.</li> <li>5. They know the structure of Prokaryotic and Eukaryotic cells.</li> <li>6. Learn the different lab techniques such as Microscopy, and Chromatography etc.</li> </ol>
B. Sc. II Sem. III	<b>P – V Plant Systematics and Anatomy</b>	<ol style="list-style-type: none"> <li>1. To know the scope and importance of the plant systematics.</li> <li>2. To understand plant morphology, nomenclature and classification</li> <li>3. To prepare and demonstrate herbarium and to understand importance of Botanical gardens.</li> <li>4. To examine internal organization of plant organs.</li> </ol>
	<b>P – VI Genetics and Molecular Biology</b>	<ol style="list-style-type: none"> <li>1. To understand the principles of Mendelian inheritance and gene interaction.</li> <li>2. To differentiate between structural and numerical variations in chromosomes.</li> <li>3. To know the composition and significance of nucleic acids.</li> <li>4. To summarize concept of central dogma and genetic code.</li> </ol>
B. Sc. II Sem. IV	<b>P – VII Plant Ecology and Economic Botany</b>	<ol style="list-style-type: none"> <li>1. To understand core concepts of biotic and abiotic components.</li> <li>2. To prepare map of Phytogeographical regions of India.</li> <li>3. Know importance of plants and plant products and their utility.</li> <li>4. To understand importance and conservation of Germplasm.</li> </ol>
	<b>P – VIII Plant Physiology, Nursery, and Gardening Techniques</b>	<ol style="list-style-type: none"> <li>1. To understand various physiological processes in plants.</li> <li>2. To understand significance and mechanism of photosynthesis.</li> <li>3. To design outlines of landscaping and home gardening.</li> <li>4. To prepare different types of gardens and to know garden equipments.</li> </ol>
B. Sc. II SEM – II (Annual)	<b>Practical Paper-I</b>	<p>Students understand practically by handling of plant materials, equipments and apparatus</p> <ol style="list-style-type: none"> <li>1. Students learn the Vegetative and Morphological characters of Plants.</li> <li>2. Students understand the diagnostic characters of some Angiospermic plant families</li> <li>3. Double staining technique</li> <li>4. Maceration technique</li> <li>5. They can calculate Protein sequence.</li> <li>6. They practically learn isolation of DNA.</li> </ol>
	<b>Practical Paper -</b>	Students understand practically

	<b>II</b>	<ol style="list-style-type: none"> <li>1. Students learn the different ecological adaptations and ecological instruments.</li> <li>2. They know the Phytogeographical regions of India</li> <li>3. To learn the different techniques such as Chromatography.</li> <li>4. To prepare millets product.</li> <li>5. Students come to know the different horticultural techniques such as Budding, Layering, Grafting, Potting, Bonsai etc.</li> <li>6. Understand use of Ganong's respirometer</li> </ol>
B.Sc. III Botany Sem. V	<b>P – IX - 79688 Genetics and Plant Breeding</b>	<ol style="list-style-type: none"> <li>1. Understand the Science of Heredity, Mendelism, laws of heredity</li> <li>2. Study of multiple alleles, linkage and crossing over</li> <li>3. Euploidy, aneuploidy and chromosomal aberrations.</li> <li>4. Understand the science of plant breeding.</li> </ol>
	<b>P – X - 79689 Microbiology, Plant Pathology And Mushroom Culture Technology</b>	<ol style="list-style-type: none"> <li>1. The students will develop understanding about the diversity, identification, classification and economic importance of different microbes such as viruses, bacteria etc.</li> <li>2. Understand the scope and importance of Plant Pathology. To give knowledge about plant disease, plant growth, plant metabolism and structure between different groups of plant.</li> <li>3. Know the diseases caused by fungal, bacterial, mycoplasma, nematodal and viral pathogens and Different control measures of plant diseases</li> <li>4. Understand the mushroom cultivation techniques.</li> </ol>
B.Sc. III Botany Sem. V	<b>P – XI - 79690 Cytology and Research Techniques in Biology</b>	<p>Students Gain knowledge about Cell Science Cell biology gives knowledge about cell organelles, importance and their function.</p> <ol style="list-style-type: none"> <li>1. prokaryotic and eukaryotic cell</li> <li>2. Understand component of cell is cell wall, Plasma Membrane, organelles and Cytoplasmic matrix.</li> <li>3. Cell organelles w. r. t. ultra structure, chemical composition and functions</li> <li>4. Understand Research Techniques such as Colorimetry, Micrometry, Spectrophotometry, Thin Layer Chromatography, Microscopy etc.</li> </ol>
B.Sc. III Botany Sem. V	<b>P – XII – 79691 Horticulture and Gardening</b>	<ol style="list-style-type: none"> <li>1. To understand scope , importance &amp; disciplines of horticulture.</li> <li>2. To understand different horticultural practices &amp; methods.</li> <li>3. To understand production technology, harvesting and preservation techniques of fruits, vegetables, Ornamentals, floriculture.</li> <li>4. Knowledge of horticulture and floriculture is useful for development of small scale industries for the youth.</li> </ol>

B.Sc. III Botany Sem. VI	<b>P – XIII - 81680 Plant Biochemistry And Molecular Biology</b>	<ol style="list-style-type: none"> <li>1. Students can Understand the current status of Biochemistry.</li> <li>2. Learn the scope and importance of molecular biology.</li> <li>3. Understand the biochemical nature of nucleic acids, their role in living systems, experimental evidences to prove DNA as a genetic material. (Watson &amp; Crick Model)</li> <li>4. Gene action and regulation in governing specific functioning and characters</li> </ol>
	<b>P – XIV -81681 Bioinformatics, Biostatistics and Economic Botany</b>	<ol style="list-style-type: none"> <li>1. students can Understand the concept of Bioinformatics and different databases and retrieval tools</li> <li>2. Understand the techniques of statistics to biological data</li> <li>3. Determine test of significance.</li> <li>4. Understand the scientific name, part used of some economically important plants.</li> </ol>
B.Sc. III Botany Sem. VI	<b>P – XV - 81682 Plant Biotechnology and Paleobotany</b>	<ol style="list-style-type: none"> <li>1. Understand the biotechnology scope, significance, To learn advanced techniques and achievement.</li> <li>2. Know the transgenic technology for the improvement of quality and quantity of plant and there by product.</li> <li>3. Understand the advantages of in vitro propagation in various areas.</li> <li>4. Know the scope of Paleobotany, types of fossils and geological time scale and fossil genera representing different fossil groups.</li> </ol>
	<b>P – XVI - 81683 Biofertilizers, Herbal Drug Technology</b>	<ol style="list-style-type: none"> <li>1. Study of Organic Biofertilizers such as Green Manures, <i>Rhizobium</i>, <i>Trichoderma</i> etc</li> <li>2. Learn the different herbal drugs and their uses.</li> <li>3. Learn the Adulterants used in herbal drugs</li> <li>4. They learn biochemical techniques to identify drug adulterants.</li> </ol>
Annual Pattern	<b>Practical paper I (Based On Paper No. X and XV)</b>	<p>Students understand practicals by handling and sectioning plant materials.</p> <ol style="list-style-type: none"> <li>1. Preparation of different culture media such as PDA and M.S.</li> <li>2. Learn the tissue culture techniques.</li> <li>3. Learn the plant diseases and their symptoms</li> <li>4. Isolation and Quantification of DNA molecule.</li> <li>5. Learn the Steps involved in genetic engineering.</li> <li>6. Learn the different types and forms of Fossils such as <i>Lyginopteris</i>, <i>Enigmocarpon</i></li> </ol>
	<b>Practical paper II (Based on Paper No. IX and XIV)</b>	<p>Students understand practicals by handling and sectioning plant materials.</p> <ol style="list-style-type: none"> <li>1. Genetic examples on Linkage, Crossing Over and Polygene inheritance</li> <li>2. The Mitosis and Meiosis techniques.</li> <li>3. Learn the karyotype analysis</li> <li>4. To know the emasculation and Breeding technique in</li> </ol>

		<p>various families such as Malvaceae, Poaceae, Fabaceae</p> <p>5. Study of the different economically important plants such as Gram, Soybean, Ground Nut, Cotton, Black Pepper etc.</p> <p>6. Learn the methods of Central tendency measurement and Graphical data presentation.</p>
Annual Pattern	<p><b>Practical paper III (Based on Paper no. XI and XVI)</b></p>	<p>Students understand practicals by handling and sectioning plant materials.</p> <p>1.They know the structure of Prokaryotic and Eukaryotic cells.</p> <p>2. Learn the different lab techniques such as Photomicrography, Micrometry, Spectrophotometry etc.</p> <p>3. Students learn the use of biofertilizers and organic manure.</p> <p>4.Learn the preparation techniques of herbal products.</p> <p>5.Students come to know the different techniques to identify drug adulteration.</p> <p>6. Know the techniques of Phytochemical analysis of Primary and Secondary Metabolites.</p>
	<p><b>Practical paper IV (Based on Paper no. XII and XIII)</b></p>	<p>1. Students come to know the different horticultural techniques such as Budding, Layering, Grafting, Potting etc.</p> <p>2. Student understands the procedure of making Bonsai, Bottle garden, floral Rangoli and floral pot</p> <p>3. They can learn the use of different garden implements such as Cutter, Scissors, Sprayer and Spade.</p> <p>4. Students learn the plantation techniques of some economically important Ornamental plants such as Rose, Gerbera, Marigold</p> <p>5. They know the technique of Identification and Preparation of Hedge, Edge and Indoor Plants.</p> <p>6. Learn the Qualitative analysis techniques of Sugar, Starch, Proteins and Lipids.</p>