



Maratha Vidya Prasarak Samaj's
Karmaveer Shantarambapu Kondaji Wavare
Arts, Science and Commerce College, CIDCO, Nashik
Uttamnagar, Nashik- 422 008 (Maharashtra)

Affiliated to Savitribai Phule Pune University

Id. No. PU/NS/ASC/047/1993

AISHE C-42086

NAAC Re-accredited 'A' Grade (III Cycle 2017-22, CGPA 3.20)

Best College Award of Savitribai Phule Pune University Pune in 2009-10 and 2021-22

**Programme
Outcomes (PO's)**

Internal Quality Assurance Cell



**Programme
Specific Outcomes
(PSO's)**



**Course Outcomes
(CO's)**

Syllabus: 2019 Pattern





Programme Outcome (PO's), Programme Specific Outcome (PSO's), Course Outcome (CO's)

Department: Botany

Syllabus: 2019 Pattern

Sr. No.	Name of the Programme	Year of introduction of programme	Duration of introduction of Programme
2	MSc Botany	2021-2022	2 Years

Programme Specific Outcome (M.Sc Botany)

Sr. No.	Programme Specific Outcome (M.Sc Botany)
PSO-1	Procure updated and quality knowledge in the specialized areas of Botany.
PSO-2	Acquire practical skills in plant diversity and related topics.
PSO-3	Identify plants applying classical and modern taxonomical skills.
PSO-4	Evolve entrepreneurial skills related to advanced fields of Botany.
PSO-5	Equip with various computational skills applied in the field of Bioinformatics.
PSO-6	Gain knowledge in organization of plants at gene, molecular, cellular and tissue level.
PSO-7	Design and carryout biological experiments, projects and interpret data providing meaningful solutions and recommendations.
PSO-8	Beware of environmental issues and live-in harmony with nature.
PSO-9	Utilize bio resources without profiteering motives.
PSO-10	Become competent enough in various analytical and technical skills related to Plant Science.

Couse outcomes M.Sc. Botany

Class	Subject code	Title	Cos: After successful completion of This course, student will be able to
MSc Sem-I	BOUT 111	Plant systematics I	CO1: Identify various algae and understand the economic uses of algae
			CO2: Understand the structure and life cycle of different group of algae
			CO3: Classify different fungi based on morphology and reproduction
			CO4: Differentiate different lichens
			CO5: Classify various bryophytes and understand their economic uses
	ZOUT 112	Cell Biology and Evolution	CO 1: Students can label the various cell parts and sketch and label various types of cells and cell organelles.
			CO 2: Students will learn as carbon as backbone of biomolecules and the concepts of cell signaling.
			CO 3: Get knowledge about the ultra-structure and functions of various cell organelles.
			CO 4: Understand the types, development and causes of tumor, the cell cycle phases and its regulation
			CO 5: Students will learn different terms in developmental biology
			CO 6: Understand the significance of model organism for developmental studies, types of eggs, concept of fertilization and cleavage pattern.
			CO 7: Get knowledge about concept of mesoderm induction and pattern formation with examples, neural competence and induction.
CO 8: Students will compare and contrast spermatogenesis and oogenesis.			
BOUT 113	Cytogenetics and plant briding	CO 1: Students will understand the basic terminologies in genetics, concept of Mendelian genetics, gene, gene regulation and multiple alleles.	
		CO 2: Get knowledge about various genetic disorders	

			based on karyotypes and traits
			CO 3: Get information about principles of Population genetics.
			CO 4: Students can illustrate the modified Mendelian laws of inheritance.
			CO 5: Able to identify the inheritance of qualitative and quantitative traits.
			CO 6: Students are able to write the outline of a scientific paper also write the title, abstract, discussion and citations of a given scientific article.
			CO 7: Students can prepare a scientific presentation using PowerPoint.
			CO 8: Students will understand language as a tool for effective scientific communication.
			CO 9: Understand the importance of plagiarism check and Proof-read given article.
			CO 10: students will learn the unique qualities of professional rhetoric and writing style, such as sentence conciseness, clarity, accuracy, honesty, avoiding wordiness or ambiguity, using direct order organization, readability, coherence and transitional devices.
	BODT 114	Biofertilizar and Algal technology	CO1: define cryptogamic plants.
			CO2: classify algae and fungi according to their systems of classification.
			CO3: recall the contribution of Indian phycologist and Mycologist.
			CO4: explain the structure, reproduction and life cycle of Algae and Fungi.
			CO5: describe the development based on reproductive structure.
			CO6: diagram the life cycle of algal and fungal forms.
			CO7: interpret uses and economics importance of algae and fungi.
			CO8: evaluate mycorrhiza and lichens and their forms.

	BODP 114	Practical Based on BODP 114	CO 1: Understanding of the lower plant groups and Microbial world CO 2: To accumulate the knowledge about economical and ecological importance of algae and microbes. CO 3: Utilization of algal community and microbes in medicinal industry for human welfare. CO 4: Understanding of their importance in relation to the biodiversity.
	BOUP 115	Practical on 121, 122,123	CO1: explain the basic morphological characters of some forms of algae and fungi for systematic treatment CO2: choose identification clue for algae and fungi. CO3: operate protocols for isolation of cell organelles. CO4: explain the histo-chemical analysis of cells. CO5: describe cell and its structure. CO6: interpret the organelle structure.
M.Sc Sem-II	BOUP 121	Plant Systematic II	CO1: explain General Aspects and Fossil Gymnosperms. CO2: describe morphology of Living Gymnosperms. CO3: interpret various rules of Nomenclature and their use in classification. CO4: apply taxonomic aspect of Angiosperm and their use for identification of plants on field. CO5: describe plant systematics and its role in classification. CO6: classify various systems of classification and their role to solve the taxonomy of ambiguous taxa. CO7: recognize phytogeography and endemism in western Ghats. CO8: evaluate affinities of pteridophytes and angiosperms.
	BOUP 122	Molecular Biology	CO 1: students will be able to explain the DNA structure & types, topology, Physical properties; chromatin structure and organization

			CO 2: Understand genome organization, DNA and Protein sequencing with their application in evolutionary studies.
			CO 3: Can explain the mobile DNA elements, mechanism of DNA damage and repair.
			CO 4: Can explain the process of DNA replication, transcription, translation and their Regulations, schematically represent the processes of central dogma.
	BOUT 123	Biochemistry	CO1: define the importance of metabolites and their biosynthesis process.
			CO2: explain the metabolism of plants and their application for mankind.
			CO3: interpret the biochemical pathways in the plant.
			CO4: discuss the physiology of plant and their various activities.
			CO5: recall the basic principle of development of the plant.
			CO6: use knowledge of the biomolecules from plant source.
			CO7: illustrate Agri-Electronic equipments for plant physiological studies.
			CO8: evaluate sensory photobiology.
	BODP 124	Mushroom cultivation and Biopesticide technology	To facilitate self-employment.
			To know the nutrient value of mushroom.
			To study the morphology and types of Mushrooms.
			To know the spawn production technique.
			To aware the identification of edible and poisonous Mushrooms.
			To learn the prospects and scope of mushroom cultivation in small scale industry.
			To understand the Diseases. Post harvesting techniques of Mushrooms.


		Practical Based on BODP 124	<p>Students can start small scale industry of Mushroom cultivation.</p> <ul style="list-style-type: none"> • Understood the Diseases. Post harvesting techniques of Mushrooms. • Studied the technique of Mushroom cultivation. • Learned the prospects and scope of mushroom cultivation in small scale industry. • Students will be able produce spawn on their own. • They are aware of the identification of edible and poisonous Mushrooms. • Students study the morphology and types of Mushrooms.
	BOUP125	Practical Based on 121,122,123	<p>CO1: perform different methods for isolation of DNA and its characterization.</p> <p>CO2: apply advanced experimental Botany at molecular level.</p> <p>CO3: understand the minute principle during the bio-molecular study</p> <p>CO4: describe the various eco-physiological properties of plant</p> <p>CO5: classify different ecosystem, vegetation study and various biodiversity indices</p> <p>CO6: implement the recent techniques in plant improvement.</p> <p>CO7: determine physicochemical analysis of soil</p>
MSc Sem III	BOUT 231	Computational Botany	<p>CO1: interpret statistical analysis of the biological data.</p> <p>CO2: recall basic principles behind the experimental design</p> <p>CO3: explain testing of hypothesis.</p> <p>CO4: prepare the experimental planning for laboratory work.</p> <p>CO5: avail the conclusion w.r.t. biological data.</p>



HoD, Botany



IQAC Coordinator

Principal
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			CO6: apply the computer based software for concluding the information gathered from biological source.
			CO7: determine phylogenetic relationships using DNA and protein sequences.
			CO8: analyze nucleotide sequence by molecular tools in proteins.
	BOUT 232	Developmental Biology	CO1: explain the basic process of development.
			CO2: describe the properties and unique features of plant development.
			CO3: discuss the embryological process of plant.
			CO4: interpret the molecular events during the developmental pathway.
			CO5: explain the signalling mechanism during developmental events.
			CO6: recognize developmental pattern in various plants along with its evolutionary aspects.
	BOUT 233	Plant Physiology	CO1: Define the terminologies: Plant water relations, Growth, Transpiration, Ascent of Sap, Plant growth regulators and Nitrogen metabolism.
			CO2: Explain processes of mineral nutrition, absorption of water, ascent of sap, mechanisms of water loss from plants.
			CO3: Demonstrate processes imbibition, Osmosis, Diffusion and Plasmolysis, measure growth by arc auxanometer, Bose Cresco graph.
			CO4: Describe Plant growth regulators and their types.
			CO5: Discuss nitrogen metabolism in plants
			CO6: Explain mechanisms and application of Photoperiodism
		Angiosperm Taxonomy	CO1: Memorize general characters of gymnosperms and origin of angiosperms
			CO2: Define fossil and fossil groups.

			CO3: Discuss gymnosperms with example of plants Pinus and Gnetum,
			CO4: Describe morphology and anatomy of gymnosperms
			CO4: Classify different theories of angiospermic origin.
			CO5: Summarize types and forms of fossils.
			CO6: Classify Artificial, natural and phylogenetic systems.
		Practical Based on BODP 234	CO1: Understand the habit of the angiosperm plant body.
			CO2: Know the vegetative characteristics of the plant.
			CO3: Understand the plant morphology.
			CO4: Learn about the reproductive characteristics of the plant.
		Practical Based on BOUT 231,232,233	CO1: apply the basic morphological characters for preparation of artificial keys of some families for systematic treatment, development and anatomical aspects of angiosperms and gymnosperms.
			CO2: explain role of economic botany in society.
			CO3: recognize various industrial products from algae and fungi.
			CO4: prepare forest field visit notes and report of locally available medicinal, endemics and exotic plants.
			CO5: perform various culture techniques of tissue culture.
			CO6: compare between vegetative SA and reproductively induced SA.
			CO7: determine fossil specimens of gymnosperm.

			CO8: evaluate stages of embryo development in plants.
MSc Sem IV	BOUT 241	Botanical Techniques	CO1: define principles of botanical techniques.
			CO2: discuss the concept of microscopy, chromatography, electrophoresis, spectroscopy, centrifuge, immunology and molecular biology.
			CO3: illustrate applications of different types of microscopes, chromatography, spectrophotometers, centrifuges, pH meter and oxygen electrode.
			CO4: analyse tissue/cell by histochemical and cytochemical techniques.
			CO5: demonstrate TLC, ELISA, PCR and SDS-PAGE techniques.
			CO6: determine radioactive techniques used in biology.
			CO7: justify Immunological techniques.
			CO8: relate electrochemical techniques in plant sciences.
	BOUT 242	Advanced Ecology	CO1: Define ecology, remote sensing, In situ conservation and ex situ conservation.
			CO2: Summarize the characterization of biodiversity.
			CO3: Explain environmental crisis
			CO4: Apply Environmental Impact Assessment in ecology.
			CO5: Explain data analysis of remote sensing technique.
			CO6: Evaluate the EIA and Environmental audit.

			CO7: Analyse inventorying and monitoring biodiversity.
BOUT 243	Advanced Medicinal Botany		CO1: Define concept and scope of Pharmacognosy and economic botany. CO2: Explain concept of Ayurvedic Pharmacy. CO3: Discuss Ayurvedic principles and Ayurvedic formulation. CO4: Recognize drug adulteration, methods of extraction and evaluation. CO5: Discuss the process of cultivation, collection and processing of herbal drugs. CO6: Recognize medicinally important drugs. CO7: Explain principles and scope of ethnic societies in India. CO8: Describe the methods in Analytical Medicinal botany.
BODP 243	Botany Practical		CO1: Discuss Ayurvedic principles and Ayurvedic formulation.
	paper based on BODT 243		CO2: Recognize drug adulteration, methods of extraction and evaluation. CO3: Discuss the process of cultivation, collection and processing of herbal drugs. CO4: Recognize medicinally important drugs.
BODT 244	Research Methodology		CO1: Understand some basic concepts of research and its methodologies CO2: identify appropriate research topics CO3: select and define appropriate research problem and parameters CO4: prepare a project proposal (to undertake a project) CO5: organize and conduct research (advanced project) in a more appropriate manner CO6: write a research proposal (grants)
	PG Dissertation		CO1: develop the research aptitude. CO2: evaluate the basic needs for research.

			CO3: execute research ideas and solve issues related with it.
			CO4: criticise the experimental data.
			CO5: design and construct research data for creative writing.
			CO6: defend while presenting their research work.
			CO7: persue further Research work.
			CO8: develop investigation skills for new innovations beneficial to society.
	BOUP 245	Practical Based on 241,242	CO1: analyse biological data by statistical methods.
			CO2: execute bioinformatics tools for retrieving data, pairwise and multiple sequence alignment
			CO3: identify mutualistic relationship between organisms.
			CO4: extract essential oils and bioactive compounds from plants.
			CO5: execute micropropagation technique for propagation of plants.
			CO6: solve the pathological issues of commercial crops.