



J.S.M. COLLEGE, ALIBAG- RAIGAD

Department of Botany

**Programme outcome (POS)
Programme Specific Outcomes (PSO)
and Course Outcomes (COS)**

Programme Outcome: On completion of B.Sc. Botany, students will learn:

PO1 Specific core discipline knowledge: Students can recall details and information about the evolution, anatomy, morphology, systematics, genetics, physiology, ecology, and conservation of plants and all other forms of life. Students can recall details of the unique ecological and evolutionary features of the local and Indian flora.

PO2 Communication skills: Students can communicate effectively using oral and written communication skills

PO3: Problem solving and research skills: Students can generate and test hypotheses, make observations, collect data, analyze and interpret results, derive conclusions, and evaluate their significance within a broad scientific context

PROGRAMME SPECIFIC OUTCOMES FOR B.Sc. BOTANY

- To recognize and identify major groups of non-vascular and vascular plants and their phylogenetic relationships.
- To understand the phylogeny of plants and study various systems of classification.
- To explore the morphological, anatomical, embryological details as well as economic importance of algae, fungi, bryophytes, pteridophytes, gymnosperms and angiosperms.
- To understand physiological processes and adaptations of plants.
- To provide knowledge about environmental factors and natural resources and their importance in sustainable development.
- To be able to carry out phytochemical analysis of plant extracts and application of the isolated compounds for treatment of diseases.
- To be able to deal with all microbes and the technologies for their effective uses in industry and mitigation of environmental concerns.
- To explain how current medicinal practices are often based on indigenous plant knowledge and to get introduced to different perspectives on treating ailments according to ethnomedicinal principles.
- To understand patterns of heredity and variation among individuals, species and populations and apply principles for improvement of quality and yield.
- To be able to apply statistical tools to gain insights into significantly different data from different sources.
- To acquire recently published knowledge in molecular biology, such as rDNA technology; PTC and bioinformatics and their applications.
- Students acquire knowledge about Basic horticultural science terminology.
- Students will gain knowledge on post harvesting techniques which will explore the possibility of entrepreneurship in this field.
- Focus of the Horticulture program is the development of a well-rounded Horticulturist.
- Demonstrate knowledge and understanding in Current applications of horticultural principles and practices: propagation, pest management, production, maintenance, and business practices.

PROGRAMME SPECIFIC OUTCOMES FOR M.Sc. BOTANY

- Students will be able to identify the major groups of organisms amongst plants and be able to classify them within a phylogenetic framework. Students will be able to compare and contrast the characteristics of Cryptogams and Phanerogams that differentiate them from each other and from other forms of life.
- Students will be able to explain how organisms function at the level of the gene, genome, cell, tissue, organ and organ-system. Drawing upon this knowledge, they will be able to give specific examples of the physiological adaptations, development, reproduction and behaviour of different forms of life.
- Students will be able to explicate the ecological interconnectedness of life on earth by studying ecological principles and nutrient flow through the environment. They will be able to relate the physical features of the environment to the structure of populations, communities, and ecosystems.
- 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. They will be able to use specific examples to explicate how descent with modification has shaped plant morphology, physiology, and life history.
- Students will be able to carry out a thorough study of the active constituents of medicinal plants with an emphasis on the use of plant based food as medicine.
- Students will be able to demonstrate proficiency in the experimental techniques and methods of analysis appropriate for understanding the above.

Course Outcomes:

F.Y.B.Sc. Sem I & II		
Paper I Plant Diversity I	CO1	The students will learn about the diversity, identification, classification and economic importance of some specific algae, fungi, bryophytes and gymnosperm.
	CO2	Students will also become familiar with various taxonomic aspects like how to identify the plants on the basis of morphological characters like root, stem, leaves and flowers.
	CO3	Students will also become familiar with specific plant families with study of economic important plants.
Paper II Form and Function I	CO1	The students will acquire knowledge about some important cell organelles like chloroplast and endoplasmic reticulum and their function under broad topic of cell biology.
	CO2	Students will also learn about basic concepts of ecology like energy pyramids, how energy flows in an ecosystem and various types of biotic and abiotic factors in different ecosystems.
	CO3	Students will also learn about basic concepts of Mendelism and how genes interact under topic genetics.
	CO4	Students will also solve basic biostatistics problems based on mean mode and median, standard deviation and frequency distribution.

	CO5	Students will go through basic plant physiological processes like photosynthesis and its importance.
	CO6	Students will learn about grandma's pouch containing various medicinally important plants and their uses.
S.Y.B.Sc. SEM III & IV		
Paper I Plant Diversity II	CO1	The syllabus is designed to train the students in all areas of the plant sciences with some applied areas of the subject.
	CO2	The students will learn about the diversity, identification, classification and economic importance of lower plants like algae, fungi, bryophytes and gymnosperm.
	CO3	Students will also become familiar with various taxonomic aspects like how to identify the plants on the basis of morphological characters and will also become familiar with various plant families with study of economic important plants.
	CO4	The students will learn about some important instrumentation techniques. • The students will also acquire knowledge about palaeobotany and various plants fossils.
Paper II Form and Function II	CO1	Students will also learn about basic concepts of cytogenetics like how sex is determined in different organisms, variation in chromosome number and concept of extra nuclear genetics.
	CO2	Students will be able to learn about the central dogma of life basis of molecular biology. • Students will go through basic plant physiological processes like respiration, Photoperiodism, photorespiration and its importance.
	CO3	Students will acquire knowledge about various biogeochemical cycles of nature and how soil formation occurs.
	CO4	The students will acquire knowledge about some important cell organelles and their function under broad topic of cytology.
Paper III Current Trends in Plant Sciences I	CO1	Students will also get exposed to various hands on practical of various tissue culture techniques and biotechnology based techniques and horticulture based practices like bonsai, dish garden, terrarium making.
	CO2	The students will also gain knowledge about the latest molecular biology techniques for isolation and characterization of genes.
	CO3	Students will learn about important bioinformatics-based practicals.
T.Y.B.Sc. SEM V & VI		
Paper I Plant Diversity III	CO1	The syllabus is designed to train the students in all areas of the plant sciences with some applied areas of the subject.
	CO2	The students will learn about the diversity, identification, classification and economic importance of lower organisms and plants like viruses, bacteria, algae, bryophytes, fungi and gymnosperms.

	CO3	The students will also develop understanding in different diseases caused by viruses, bacteria and fungi.
Paper II Plant Diversity IV	CO1	The students will also acquire knowledge about palaeobotany and various plants fossils.
	CO2	Students will also become familiar with various taxonomic aspects like how to identify the plants on the basis of morphological characters and will also become familiar with various plant families with study of economic important plants.
	CO3	Students will also develop understanding in plant anatomy.
	CO4	Students will also learn how biodiversity is important, what threats are there to biodiversity and how to conserve biodiversity.
	CO5	The students will understand the growth, development and reproduction in plants
Paper III Form and Function III	CO1	The students will acquire knowledge about few cell organelles and their function under broad topic of cytology.
	CO2	They will be understand some important physiological processes like osmosis, imbibition etc.
	CO3	Students will also get exposed to various hands on practical of various tissue culture techniques and biotechnology based techniques.
	CO4	The students would be able learn the technique of mushroom cultivation and explore the possibility of entrepreneurship in the same.
	CO5	Students will be able to understand how nitrogen cycle occurs in nature and why nitrogen is so important for plants and how it is assimilated in nature.
	CO6	The students will be able to draw genetic chromosome map on the basis of three point test cross and will also learn about mutations, its sources.
	CO7	Students will be able to solve biostatistics-based problems based on students t test, regression analysis and ANOVA.
Paper IV Current Trends in Plant Sciences II	CO1	Students will gain knowledge on post harvesting techniques which will explore the possibility of entrepreneurship in this field.
	CO2	The students will also gain knowledge about the latest molecular biology techniques for isolation and characterization of genes.
	CO3	Students will learn about important bioinformatics-based practicals.
M.Sc. SEM I, II, III & IV		
Plant Diversity- Cryptogams I (Algae and Fungi)	CO1	Classify algae into various groups, understand the importance in various fields and will be able to collect and identify them
	CO2	Classify fungi into various groups, understand the role of fungi in various fields and will be able to collect and identify fungi, fungal pathogens and culture them.

Plant Diversity- Cryptogams I (Algae and Fungi)	CO1	The students will be able to differentiate between gymnosperms and angiosperms, study their origin and nomenclature, understand evolutionary theories for origin of Angiosperms, understand characteristics of selected Angiosperm families and learn the rules governing the code of botanical nomenclature, also learn the recent developments as in molecular systematics.
Plant Physiology	CO1	Students should be able to understand how to apply the basic concepts of Plant Physiology in other fields and also to know and discuss the concept of physiological processes of plants.
Cytogenetics, Molecular Biology and Biotechnology	CO1	Students will be able to understand the control points in a cell cycle, Study and apply principles of microbial genetics, understand recombinant DNA technology and study applications of the same for the improvement of crops.
Plant Diversity- Cryptogams II (Bryophyta and Pteridophyta)	CO1	Classify Bryophytes into various groups, study their importance
	CO2	Classify Pteridophytes into various groups, study their importance and multiplication of important ferns
Plant Diversity: Spermatophyta II	CO1	Students will be able to understand the development of pollen, spore, fertilization and to apply palynological information to plant systematics
Plant Physiology and Environmental Botany	CO1	Distinguish key physiological processes underlying the seed germination <ul style="list-style-type: none"> • Identify the physiological factors that regulate growth and developmental processes of plants • Demonstrate clear understanding of crop-environment interaction and its implication on crop growth and yield • Integrate and apply their knowledge of crop physiology for analytical thinking and solving practical problems experienced in agricultural systems
	CO2	To understand and apply ecological principles and understand legislation and measures to solve environmental problems.
Medical Botany And Dietetics	CO1	Students will be able to identify medicinal plants and understand the effects of plant chemical constituents on humans and the use of plants in Dietetics and as nutraceuticals.