Maratha Vidya Prasarak Samaj's

K. P. G. Arts. Commerce and Science College,

Igatpuri

DEPARTMENT OF BOTANY

Program Outcomes (PO)

(2024Pattern)

PO -01	Attain thoughtful proficiency in the field of plant sciences.
PO-02	Acquire the ability to perform in multidisciplinary domains.
PO-03	Attain the ability to exercise intelligence of scientific knowledge for investigation and innovation and nourishment of the world.
PO-04	Learn value based ethical practices and principles committed to professional ethics.
PO-05	Incorporate 21st century skill oriented self-directed and life-long learning.
PO-06	Obtain ability to inculcate the knowledge of plant science in diverse contexts with global perspective.
PO-07	Attain maturity to harness the destiny and responds to one's calling.

Program Outcomes (PO)

(2019Pattern)

PO -01	Apply the knowledge of biology to make scientific queries and enhance the comprehension potential.
PO-02	It also provides opportunities to learn experimental concepts related with life sciences.
PO-03	Successful transfer of scientific knowledge both orally and in writing.
PO-04	Function as an individual, as a member or a leader to perform a task in class room situation or during field study.
PO-05	Acquired the skills handling scientific instruments, planning and performing in laboratory experiments. The skills of observations and drawing logical inferences from the scientific experiments.

PO-06	Insist the significance of conserving a clean environment for perpetuation and sustainable development. Study incessantly by self to cope with growing competition for higher studies and employment.
PO-07	Developed scientific outlook not only with respect to science subjects but also in all aspects related to life. Realized that knowledge of subjects in other faculties such as humanities, performing arts, social sciences etc.

Program Specific Outcomes (PSO)

(2024Pattern)

PSO -01	Recall the diversity, classification, evolution and developmental changes among the plants with reference to lower and higher plant groups and create a knowledge base in understanding the basis of plant diversity, economic values and taxonomy of plants.
PSO-02	Understand the advanced concepts of Genetics, Cell biology and Plant Biotechnology of plants and its implementation for the improvement of crop productivity.
PSO-03	Acquire and utilize the skills of post-harvest, flower design, fruit processing and dehydration techniques, organic farming and various plant processing technologies for developing the economy to the growing world.
PSO-04	Know about the importance of Medicinal plants and its useful parts, economically important plants in our daily life and also about the traditional medicines and herbs, and its relevance in modern times.
PSO-05	Inoculate the methodology followed in plant breeding, pharmacognosy, herbal drug technology, plant protection, propagation and improvement.
PSO-06	Adapt methods of scientific research in plant improvement program and create entrepreneurships, employment to the society.
PSO-07	Analyze the impact of scientific and technological advances on the environment and society and understand the importance of biodiversity conservation, green cover development, carbon sequestration and utilize the knowledge for sustainable development.
PSO-08	Explore the knowledge of biotic and abiotic stress tolerance, plant microbe interaction and Integrate pest management for making the revolution in the agriculture.
PSO-09	Enrich the ability of critical thinking, development of scientific attitude, handling of problems and generating solutions, improve practical skills, and enhance communication skill.

PSO-10	Apply the fruitful knowledge of plant sciences and plant resources for the sustainable development, betterment of society and environment by recognizing the ethical values.
PSO-11	Become competent enough in various analytical and 21st century technical skills related to plant sciences for their exploration.
PSO-12	Exhibit the potential to effectively accomplish tasks independently and as a member or leader in diverse teams, and in multidisciplinary settings.
PSO-13	Employ critical thinking based problem solving and practical skills pertaining to botanical techniques and computational knowledge and apply strategies for environmental conservation.
PSO-14	Demonstrate knowledge and scientific understanding to identify research problems, design experiments, use appropriate methodologies, analyze and interpret data.

Program Specific Outcomes (PSO)

(2019Pattern)

PSO -01	Understand the nature and basic concepts of cell biology, genetics, anatomy, morphology, biochemistry, physiology, taxonomy and ecology of plants.
PSO-02	Students learn to carry out practical work, in the field and in the laboratory, gain skills and proficiency in Interpreting plant morphology and anatomy, Plant identification etc.
PSO-03	Identify the taxonomic position of plants, formulate the research literature and analyze plants with substantiated conclusions using first principles and methods of nomenclature and classification in Botany.
PSO-04	Identify problems and finding of solutions using creative approaches, acquired through interdisciplinary experiences, and a depth and breadth of knowledge/expertise in the field of Plant Identification.
PSO-05	Demonstrate hands on skill in the experimental techniques and methods of analysis in various fields of Botany.

COURSE OUTCOME

(2024Pattern)

SN	Class	Sem	Subject With Code	COURSE OUTCOME
1	F.Y.B.Sc	I	Course Code- BOT-101-T Course Title: Basics of Plant Sciences	• By the end of the course, students will be able to understand and classify plants into major groups (algae, fungi, lichens, bryophytes, pteridophytes, gymnosperms, and angiosperms) based on their morphological and reproductive features. • Students will be able to identify and explain the economic significance of various plant groups, recognizing their applications in industries such as food, pharmaceuticals, biofuels, textiles, and environmental sustainability. • Students will gain the ability to describe the reproductive cycles and morphological characteristics of plants like algae, fungi, lichens, bryophytes, and others, with examples from groups such as Nostoc, Agaricus, Riccia, Azolla, Cycas, and others • Students will understand the various applications of plant sciences in real-world scenarios such as environmental monitoring, bioremediation, medicine, and industrial processes like biofuel production, food processing, and landscaping. • By the conclusion of the course, students will be well-equipped to pursue careers or further education in fields related to plant biology, biotechnology, agriculture,

				environmental science, and various industries benefiting from plant-derived products and services.
2	F.Y.B.Sc	I	BOT-102-P-Practical Based on BOT-101-T	• Students will gain a strong foundation in plant and fungal taxonomy, being able to classify and describe various organisms, including algae, fungi, lichens, bryophytes, pteridophytes, gymnosperms, and angiosperms. •Students will be able to apply their knowledge of plant and fungal morphology to practical situations, including the identification of species and the exploration of their applications in industries like food, pharmaceuticals, and bioremediation. • Students will develop an understanding of the environmental and economic significance of different plant and fungal groups, recognizing their role in sustainability, bioremediation, agriculture, and carbon sequestration. • Students will gain hands-on experience in plant diversity and field research methods through visits to natural ecosystems, fostering observational skills and a deeper connection to the natural world. • Students will be able to describe and analyze the applications of plants and fungi in various industries, such as food processing, cosmetic manufacturing, environmental monitoring, and biofuel production, preparing them for careers in applied biology and biotechnology .

3	F.Y.B.Sc	I	SEC-101-BOT-P-Flower Design Techniques	• Develop proficiency in creating various basic floral arrangements, including handtied bouquets, vase arrangements, and table centre pieces, using proper techniques and principles of design. • Acquire advanced skills in creating complex floral designs, such as cascading bouquets, floral arches, and large-scale installations, demonstrating creativity and attention to detail. • Gain knowledge of different floral design styles, such as traditional, contemporary, and seasonal, and stay updated with current trends in the floral industry. • Develop the ability to create customized floral designs tailored to specific occasions, themes, and client preferences, demonstrating creativity and versatility in design • Understand the principles of flower selection, care, and handling, including proper conditioning, storage, and use of floral foam and other design tools.
4	F.Y.B.Sc	I	BOT-102-OE-T: Plants & Human Welfare	•Develop a comprehensive understanding of the diversity of plant species and their utility in various aspects of human life, including food, medicine, shelter, and clothing. •Gain knowledge about medicinal plants, their active compounds, and their therapeutic uses in traditional and modern

				medicine. •Acquire awareness of sustainable practices in plant resource management, including conservation, cultivation, and utilization, to ensure long-term benefits for both humans and the environment. •Appreciate the significance of traditional knowledge systems related to plants and their role in preserving cultural heritage and biodiversity. •Develop critical thinking and problem-solving skills to evaluate the ethical, social, and environmental implications of plant use and propose sustainable solutions.
5	F.Y.B.Sc	II	BOT-151-T: Plant Morphology	• Students will be able to identify, describe, and differentiate between the various types of plant organs (roots, stems, leaves, flowers) and their modifications, based on morphological traits. • Students will develop the ability to analyze how specific morphological features of plants such as modified roots, stems, and leaves serve particular ecological functions, enhancing their survival in various habitats. • Students will be able to explain the morphology of flowers and inflorescences, including the different types and structures of floral whorls and their roles in the plant's reproductive process.

				• Students will gain a comprehensive understanding of the morphology of fruits and seeds. • By the end of the course, students will have the skills to examine plant specimens in the field and laboratory, classifying them based on morphological features and demonstrating an understanding of plant function.
6	F.Y.B.Sc	II	BOT-152-P-Practical Based on BOT 151-BOT-T	• Students will gain an understanding of the functional significance of morphological modifications, such as modified roots, stems, and leaves. • Students will be able to analyze and identify the structure and types of floral whorls calyx, corolla, androecium, and gynoecium • Students will gain an understanding of the functional significance of Morphology of Fruit and Seed. • Students will be able to analyze and identify the structure and types of Inflorescence.
7	F.Y.B.Sc	II	SEC-151-BOT-P Plant Preservation Techniques	• Students will gain skills in preparing and processing pressed specimens for herbarium storage, ensuring the longevity and utility of collected specimens for scientific research • Students will acquire hands-on experience in preserving plant specimens using wet

				preservation methods, ensuring the preservation of cellular structures and morphological details necessary for further scientific study. • Students will learn and demonstrate modern methods used in the preservation of botanical specimens, particularly in creating dry floral arrangements. • Through visits to museums, herbariums, and plant preservation units, students will integrate classroom learning with professional practices, understanding the operational standards and challenges in botanical preservation environments. • Students will successfully collect, prepare, and document a variety of preserved specimens, including herbarium sheets and wet preserved samples. • Students will be proficient in the use of various tools and equipment for plant preservation, understanding their specific uses and maintenance requirements. • Students will demonstrate mastery in several specimen drying techniques and will be able to choose and apply the best method based on the nature of the plant material and the intended use of the specimens.
8	F.Y.B.Sc	II	BOT-151-OE-P Fruit Processing & Flowers Arrangement	•Students will demonstrate the ability to perform various fruit processing techniques, such as canning, drying, freezing, and making jams, jellies, and preserves, ensuring the preservation of nutritional value, flavor, and texture of fruits. •Students will understand the chemical and biological processes involved in fruit spoilage and the methods used to prevent it. They will be able to apply different preservatives, packaging techniques, and storage conditions to enhance the shelf life

				and safety of processed fruits. •Students will be skilled in designing and creating various types of flower arrangements. They will apply principles of floral design and the use of different floral materials and tools. •Students will be able to express their creativity through innovative and aesthetically pleasing flower arrangements. •Students will bridge the gap between theoretical knowledge and practical applications by gaining exposure to the fruit processing industry and the floral design market.
9	S.Y.B.Sc.	III	BO-231: Taxonomy of plant Angiosperms & Ecology	• Gain knowledge of taxonomy. • Identify, classify and give the name. • Give comparative account of various systems of classification. • Learn various families with reference to systematic position and description. • Introduce ecology, diversity, methods of vegetation sampling and hotspots.
10	S.Y.B.Sc.	III	BO-232: Plant Physiology	• Correlate between practicals with theory to improve the understanding. • Participate actively in educational tour for the study of flora. • Learn the plant related practical skills.

11	S.Y.B.Sc.	III	BO-233: Practical based on BO231 & BO232	•Gain insights of research related methodology.
12	S.Y.B.Sc.	IV	BO-241: Plant Anatomy & Embryology	•Learn about plant anatomy with epidermal tissue and mechanical tissue system. •Gain knowledge of normal and abnormal secondary growth in Angiosperms. • Gain knowledge of embryology with respect to micro and megasporogenesis. • Gain information of flower pollination, fertilization and embryo development.
13	S.Y.B.Sc.	IV	BO-242 Plant Biotechnology	• Learn the concepts of plant tissue culture techniques and single cell protein. • Gain the knowledge of plant genetic engineering, genomics, proteomics and bioinformatics. • Learn the bioremediation and biofuel technology. • Use the techniques for the developments.
14	S.Y.B.Sc.	IV	BO-243: Practical based on BO241 &BO242	• Correlate between practicals with theory to improve the understanding. • Participate actively in educational tour for the study of flora. • Learn the plant related practical skills. • Gain insights of research related

				methodology.
15	T.Y.B.Sc.	V	BO-351: Algae and Fungi	• Learn the knowledge of Lower Cryptogams. • Identify the Algal and Fungal thallus. • Study the life cycles of algae. • Identify the economic importance of algae. • Learn the symbiotic Association of Lichens, Mycorrhiza.
16	T.Y.B.Sc.	V	BO-352: Archegoniate	• Gain the knowledge of Archegoniate. • Identify the Bryophytes. • Collect the knowledge of range of thallus organization. • Study the life cycles of Bryophytes. • Compare different Bryophytes.
17	T.Y.B.Sc.	V	BO-353: Spermatophyta & Paleobotany	•Collect the information of origin of angiosperms. •Gain the knowledge of Speciation &Endemism. •Learn the classifications. •Gather the information of Herbaria and Botanical Gardens.
18	T.Y.B.Sc.	V	BO-354: Plant Ecology	•Learn the inter relationship between the living world and the environment. •Gain the knowledge of Biogeography. •Learn the population ecology and community ecology. •Study of biogeochemical cycles.
19	T.Y.B.Sc.	V	BO-355: Cell and Molecular Biology	•Define the terms in Cell Biology. •Collect the information on cell organelles. •Identify nucleus nucleolus and nucleolar organizer and nuclear envelope.

				•Learn about Chromosomes. •Gets idea of cell signalling.
20	T.Y.B.Sc.	V	BO-356: Genetics	•Define genetics and terms involved in it. •Gain the insights of Mendelism and Neo Mendelism (Gene Interaction). •Learn the multiple alleles, linkage, recombination and crossing over and mutation. •Solve the numerical and structural alterations of chromosomes. •Learn the sex linked chromosomes.
21	T.Y.B.Sc.	V	BO-357: Practical based on BO 351 &BO 352	•Correlate between practicals with theory to improve the understanding. •Participate actively in educational tour for the study of flora and characterization of bio different molecules.
22	T.Y.B.Sc.	V	BO-358: Practical based on BO353 & BO354	•Correlate between practicals with theory to improve the understanding. •Participate actively in educational tour. •Study of families Nymphaeaceae, Oleaceae, Amaranthaceae and Cannaceae. •Prepare Botanical keys by using vegetative and reproductive characters.
23	T.Y.B.Sc.	V	BO- 359: Practical based on BO355 & BO 356	•Correlate between practicals with theory to improve the understanding. •Cytological techniques-preparation of Fixatives, preparation of stains. •Isolation of nuclei and characterization. •Study of various stages of mitosis and meiosis. •Study of Chromosomes Morphology. •Isolation of plant genomic DNA by suitable method, Estimation of Plant DNA by DPA method.
24	T.Y.B.Sc.	V	SECI:BO-3510: Medicinal Botany	•Study of medicinal plants: History, Scope and Importance. •Define ions and Scope of Indigenous Medicinal Sciences. •Study of Ayurveda, Siddha and Unani.

				•Ethnobotany and Folk medicines. •Learn the conservation of endangered and endo medicinal plants. •Propagation of Medicinal Plants.
25	T.Y.B.Sc.	V	SECII:BO-3511: Plant Diversity & Human Health	•Study of plant biodiversity, agrobiodiversity and loss of biodiversity. •Study of Management of Plant Biodiversity and Conservation of Biodiversity. •Study of role of plants in relation to Human Welfare. •Prepare a list of plants.
26	T.Y.B.Sc.	VI	BO-361: Plant Physiology & Metabolism	• Learn minerals nutrition. • Gain the knowledge of mechanism of photosynthesis. •Learn the respiration, types of respiration, mechanism of aerobic respiration. • Learn stomatal biology. • Gain knowledge of translocation in phloem. • Learn plant growth regulators and Photomorphogenesis.
27	T.Y.B.Sc.	VI	BO-362: Biochemistry	• Learn the foundation of Biochemistry. • Define the terms involved in it. • Identify the importance of the solvent of life. • Define enzymes and learn nature of enzymes and co-factors. • Give classification and properties of enzymes. • Learn stomatal biology.
28	T.Y.B.Sc.	VI	BO-363: Plant Pathology	• Learn non-Parasitic Diseases. • Learn the fundamentals of Plant Pathology. • Learn the concepts of plant pathology. • Learn the defence mechanisms. • Identify and use methods of studying plant diseases. • Learn principles of plant diseases control.
29	T.Y.B.Sc.	VI	BO-364: Evolution & Population Genetics	• Learn the concept organic evolution. • Explain the evidence of evolution. • Learn the evolution through ages. • Study population genetics and evolution. • Learn the speciation an dis locating mechanisms.

30	T.Y.B.Sc.	VI	BO-365: Advanced Plant Biotechnology	• Introduce biotechnology. • Study plant tissue culture. • Identify the techniques of genetic engineering and methods of gene transfer. • Learn Cryopreservation and Germplasm Conservation. • Correlate the biotechnology and society. • Learn about microbial biotechnology and transgenic plants.
31	T.Y.B.Sc.	VI	BO-366: Plant Breeding & Seed Technology	• Define and give scope and objectives of Plant breeding. • Learn the techniques and practices of plant. • Identify and use advanced techniques in plant breeding. • Give the introduction of Seed Technology. • Give the importance of Seed Technology.
32	T.Y.B.Sc.	VI	BO-367: Practical based on BO361 &BO362	• Correlation between practical's with theory to improve the understanding. • To organize educational tour for study of flora. • To develop plant related practical skills among the students. • To research related methodology in students. • Determination of plasmolysis, stomatal index, catalase activity, Photosynthesis and paper chromatography. • To demonstration physiological experiments.
33	T.Y.B.Sc.	VI	BO-368: Practical based on BO363 &BO 364	• Study the preparation of any one culture media and culture technique for isolation of plant pathogens. • Study of any two of fungal, bacterial, viral and mycoplasma diseases. • Prepare1%Bordeauxmixture,10%Bordeaux paste and Jivamruta. • Study of Koch's Postulates, Fungicides and Microbial pesticides. • Study of geological time scale, types of fossils and evidences of Organic Evolution. • Solve numerical problems.

34	T.Y.B.Sc.	VI	BO-369: Practical based on BO365 & BO 366	• Identify the different tissue culture techniques. • Study of the equipment's used in genetic engineering and study of GM plants. • Prepare plant based nano-particles. • Demonstrate wine production from different fruits. • Demonstrate Hybridization Techniques. • Study of pollen viability and floral morphology of crops. • Study of seed moisture, germination, purity and viability to seed. • Visit to a Plant Breeding Research Centre/Seed Industry.
35	T.Y.B.Sc.	VI	SECI:BO-3610: Nursery & Gardening Management	• Study the different nursery management techniques. • Study of garden management and Sowing/raising of seed sand seedlings. • Prepare saplings.
36	T.Y.B.Sc.	VI	SECII:BO-3611: Biofertilizers	• Study the general account of the microbes used as Biofertilizers. • Study of bacterial, algal, Azolla and fungal biofertilizers. • Study the compost and manuring w.r.t. recycling, methods, Vermicomposting and applications. • Learn the marketing skills.

COURSE OUTCOME

(2019Pattern)

SN	Class	Sem	Subject With Code	COURSE OUTCOME
1	F.Y.B.Sc	I	BO-111: Plant life & Utilization I	• Learn the lower Cryptogams (Thallophytes and Bryophytes). • Know the lifecycle patterns. • Identify the applications of Algae, Fungi, Lichens and Bryophytes. • Participate in field visit.
2	F.Y.B.Sc	I	BO112: Plant Anatomy & Morphology	• Learn the importance of plant morphology. • Identify the morphology of reproductive parts of plants. • Gain knowledge of various tissues and internal organization of plant body. • Explore the knowledge.
3	F.Y.B.Sc	I	BO-113: Practical based on BO111&112	• Correlate between practicals with the or to improve the understanding. • Participate actively in educational tour for the study of flora.

				• Gain insights of research related methodology. • Learn the plant related practical skills.
4	F.Y.B.Sc	II	BO-121: Plant life & Utilization II	• Collect the information of plant diversity. • Gain knowledge of general characters. • Give classification. • Study of lifecycle of Pteridophytes, Gymnosperms and Angiosperms.
5	F.Y.B.Sc	II	BO-122: Principles of Plant Science	• Learn the fundamental concepts of plant physiology. • Gain the knowledge of cell, cell organelles and cell cycle. • Learn the nature of genetic material. • Learn the DNA replication, DNA organization in chromosome.
6	F.Y.B.Sc	II	BO-123: Practical based on BO121 & BO122	• Correlate between practicals with theory to improve the understanding. • Participate actively in educational tour for the study of flora.
7	S.Y.B.Sc.	III	BO-231: Taxonomy of plant Angiosperms & Ecology	• Gain knowledge of taxonomy. • Identify, classify and give the name.

				• Give comparative account of various systems of classification. • Learn various families with reference to systematic position and description. • Introduce ecology, diversity, methods of vegetation sampling and hotspots.
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HOD

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Department of Botany
K.P.G. Arts, Com. & Sci. College
Igatpuri, Dist. Nashik.

IQAC

Co-ordinator
IQAC
K.P.G. Arts, Com. & Sci. College
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PRINCIPAL

PRINCIPAL
M.V.P. Samaj's
K.P.G. Arts, Com. and Sci.College
Igatpuri, Dist. Nashik