

NSSR'S

## **Vasantdada Patil Arts, Commerce & Science College**

### **Patoda. Dist. Beed. Maharashtra**

#### **DEPARTMENT OF BOTANY**

##### **Learning Outcomes**

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### **VISION**

Attempt is to prepare students for lifelong learning by drawing attention to the vast world of knowledge of plants and introducing to the methodology of systematic academic enquiry with this in mind, we aim to provide a firm foundation in every aspect of Botany and to explain a broad spectrum of modern trends in Botany

### **MISSION**

- To know the importance and scope of Botany
- To impart knowledge of science as the basic objective of education.
- To develop a scientific attitude to make students open minded, critical & curious.
- To expose themselves to the diversity amongst life forms.
- To make aware of natural resources and environment and the importance of conserving it.
- To develop the ability for the application of acquired knowledge in the fields of life so as to make our country self-reliant and self-sufficient.

### **PROGRAM OUTCOMES**

- Critically evaluation of ideas and arguments by collection relevant information about the plants, so as recognize the position of plant in the broad classification and phylogenetic level.
- 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.
- Interpretation of collected information and use taxonomical information to evaluate and formulate a position of plant in taxonomy.
- Students will be able to apply the scientific method to questions in botany by formulating testable hypotheses, collecting data that address these hypotheses, and analyzing those data to assess the degree to which their scientific work supports their hypotheses.
- Students will be able to access the primary literature, identify relevant works for a particular topic

## PROGRAM SPECIFIC OUTCOME

- Understand the diversity among know diversity of Viruses, Bacteria Algae and their useful and harmful activities. Understand the structure of Mycoplasma and its activities. Know the systematic, morphology and structure, of Algae. Understand the life cycle pattern of Algae. Understand the useful and harmful activities of Algae. Understand the Biodiversity of Fungi. Know the Economic Importance of Fungi
- Understand basic body plan of flowering plants, diversity of plat forms. Know morphology of vegetative organs, reproductive organs of plants. Understand fruit and seed types
- Understand the morphological diversity of Bryophyta & Pteridophyta. Understand the economic importance of the Bryophyta & Pteridophyta
- Understand the scope & importance of Anatomy. Know various tissue systems. Understand the normal and anomalous secondary growth in plants and their causes. Perform the techniques in anatomy.
- Know the methods of pollination and fertilization. Know fertilization, endosperm and embryogeny
- Know the conceptual development of taxonomy and systematic. Understand the Phylogeny of angiosperms -A general account of the origin of Angiosperms. Understand the general range of variations in the group of angiosperms. Trace the history of development of systems of classification emphasizing angiospermic taxa.
- To learn the wide activities in angiosperm and trends in classification. Learn about the characters of biologically important families of 37 angiosperms. Know the floral variations in angiospermic families, their phylogeny and evolution. Understand various rules, principles.
- Useful for the understanding of ecological concepts as well as the ability to apply ecological knowledge to manage and remediate environmental problems
- Understand the diversity of Gymnosperms in India. Know the evolutionary trends and affinities of living gymnosperms with respect to external and internal features. Understand the role plants in human welfare. Gain knowledge about various plants of economic use.
- Know importance of plants & plant products. Understand the chemical contents of the plant products. Know about the utility of plant resources.
- Understand the Biochemical nature of cell. Know the chemical nature of biomolecules. Understand the different types of interaction in Biomolecules. Structure and general features of enzymes.
- Concept of enzyme activity and enzyme inhibition. Learn about the movement of sap and absorption of water in plant body.
- Understand the plant movements. Understand the process of photosynthesis in higher plants with particular emphasis on light and dark reactions, C<sub>3</sub> and C<sub>4</sub> pathways.
- Understand the respiration in higher plants with particular emphasis on aerobic and anaerobic respiration
- Know cell structure, prokaryotic and eukaryotic cell. Structure and organization of cell wall and organelles. Understand nucleus its structure and functions.
- Know cell cycle, cell division-Mitosis & Meiosis and its significance.
- Know organization of nucleic acid DNA, RNA and its functions. Understand chromosome organization, chemical composition, giant chromosomes, aberrations and its functions of chromosomes.

- Know the concept of methodology in taxonomy. Learn about conservation of biodiversity, major causes for loss of biodiversity and conservation measures.
- Discover botanical regions of India and vegetation types of Maharashtra. Understand Bioremediation, Global warming and climate change. Studies on phyto-taxonomy and angiosperms families.
- Understand Mendel's biography. To study the phenomenon of dominance, segregation and independent assortment.
- To understand the different types genetic interaction, incomplete dominance, co-dominance, non-allelic and inter-allelic genetic interactions and multiple alleles. Understand sex determination in different organism and sex linked inheritance mechanism.
- Know structure and functions of gene and genetic diseases.
- Understand the fundamentals of Recombinant DNA Technology. Know about the Genetic Engineering
- Know the conceptual development of taxonomy and systematic. Understand the Phylogeny of angiosperms -A general account of the origin of Angiosperms.
- Understand the general range of variations in the group of angiosperms. Trace the history of development of systems of classification emphasizing angiosperm taxa.
- To learn the wide activities in angiosperm and trends in classification. Learn about the characters of biologically important families of angiosperms. Know the floral variations in angiosperm families, their phylogeny and evolution.
- Understand various rules, principles and recommendations of plant nomenclature produces in plant identification.) Understand major evolutionary trends in various parts of angiosperm plants
- The B.Sc programme enabled the students to enhance their critical thinking, during the three year period of study and the curriculum stimulates the mental thoughts and assumptions of the students.
- This helps the students to take up practical work and compare the results with their assumptions, there by leading to accuracy and validity of the practical knowledge.
- This Analysis leads to take decisions at intellectual, organizational and personal from different perspectives of life.
- On successful completion of Bachelor of Science programme, students will develop a scientific temper, critical thinking, problem solving skills, and research attitude for the betterment of the society.
- Solve the problem and also think methodically independently and draw a logical conclusion.

## **COURSE OUTCOMES**

### **Paper No. I Diversity of Cryptogams - I**

- Learn microscopic plants e.g. viruses, bacteria, algae and fungi. Importance in human life
- Understand the life cycle pattern of viruses, bacteria, algae and fungi.
- Economic importance of viruses, bacteria, algae and fungi.

### **Paper No. II Morphology of Angiosperms**

- Understand the habit of Angio spermic plants.
- Understand Vegetative and reproductive character's of plants
- Study of types of various organs of flowering plants

### **Paper No. IV Diversity of Cryptogams-II**

- Learn first land plants groups e.g. Bryophyta & Pteridophyta.
- Economic importance & life cycle of Bryophyta & Pteridophyta.

### **Paper No. V Histology, Anatomy and Embryology**

- Understand Types of tissue.
- Primary structure of Monocot & Dicot Root, Stem & Leaf.
- Secondary growth in root and stem of dicot. Anomalous secondary growth in *Dracaena*
- Heart wood and sap wood ,Growth rings, Periderm, Mechanical tissue system, Types of vascular bundles.
- Understand Structure and development of Male & Female gametophytes.
- Structure and Development of dicot embryo, structure and development and types of endosperms. Structure of Dicot and Monocot seed types of seed germination.

### **Paper No. VII Taxonomy of Angiosperms**

- Understand the status of Angiosperms in plant kingdom, diversity of Angiosperms
- Realize the origin of Angiosperms with respect to time, place, origin & probable Ancestor's
- Studies on various important plant families with their morphology, distinctive features & Biology.
- Classification systems, Uses of plants in human life.

### **Paper No. VIII Plant Ecology**

- Know the scope & importance of the discipline
- Understand plant communities and ecological adaptations in plants.
- Learn about community ecology, lifeforms Biological spectrum, Ecosystem, food web, food chain, pyramids etc.
- Discover Phytogeographic regions & Biogeographic regions of India.
- To understand the nature of environmental influences on individual organisms, their populations, and communities, on ecosystem and ultimately at the level of the biosphere .

### **Paper No. IX Gymnosperms and Utilization of plants**

- Understand Gymnosperms with respect to distinguishing characters, comparison with Angiosperm's, economic importance and Classification .
- Understand the life cycles of *Cycas & Pinus*.
- Understand the process of fossilization, Geological time scale
- Learn link of evolution between angiosperms and gymnosperms, structure. Use of plants in human life.

#### **Paper No. XIV Plant Physiology**

- Understand importance & scope of plant Physiology.
- To understand the plants & plant cell in relation to water.
- Understand the process of Photosynthesis, Respiration, fermentation etc.
- Understand the process of Mineral Nutrition, Enzymes, Growth, Growth Regulators & plant Movements.
- To understand metabolism of plants by learning various physiological cycles

#### **Paper No. XV Cell Biology and Molecular Biology**

- Cell Biology gives the idea about ultra- structure of cell organelles, chromosomes.
- Molecular Biology helps to understand the different physiological processes and Biochemical phenomenon like bio-synthesis and functions of Proteins.
- Molecular Biology helps the students for understanding the expression of the genes and basis of the phenotypic characters, regulation of gene expression

#### **Paper No. XVI Plant Breeding & Seed Technology**

- Different Methods of crop improvement programmes like selection methods, hybridization methods are studied by the students.
- Different stages of seed production, types of seed, seed certification procedure, seed processing, seed sampling, storage, and packaging and seed purity testing and analysis methods helps students to know seed technology and its importance

#### **Paper No. XIX Genetics and Biotechnology**

- The knowledge of Mendel's experimental work on the pea plant helps to understand the basic phenomenon behind the inheritance of qualitative and quantitative characters
- Study of DNA, inheritance, mutation.
- Use of genetics in human welfare by using technology

#### **Paper No. XX Economic Botany.**

- Understand Economic Botany, utilization of food plants, sugar, fiber, oil, Medicinal plants, timber, gum, cosmetics, spices & condiments yielding plants
- Studies on various important plant families with similar characters. Various classification systems.