

Shri Shivaji Science and Arts College, Chikhli.
Department of Botany
Program Outcome, Program Specific Outcome and Course Outcome

PROGRAM OUTCOME

- At the end of the B.Sc. Programme, graduates will be able to
- Understood the basic concepts, fundamental principles, and scientific theories related to various scientific phenomena and their relevance in routine life.
- To inculcate Scientific Aptitude among the students.
- To make them aware of Environment and living things.
- To make them to use scientific logics and Soft Skills.
- Developed various communication skills such as reading, listing, speaking, etc., which will help in expressing ideas and views clearly and effectively.
- Acquired skills in handling scientific instruments, planning and performing laboratory experiments noting down the observations and drawing logical inferences from them.

PROGRAM SPECIFIC OUTCOME

- Identify and become familiar with the scope, methodology and application of modern botany and learn to appreciate its ability to explain various aspects.
- Understand theoretical and practical concepts of instruments that are commonly used in practical of botany.
- Design and carry out scientific experiments and record the results of such experiments.
- Understand safety use of instruments like autoclave, laminar air flow etc, and how they are applicable in botanical study in various fields.
- It explains how botany is useful for social, economic and environmental problems and issues facing our society regarding pollution, toxic food, energy, medicine and health etc.

COURSE OUTCOME

B.Sc. I Sem I

CO-I

- Understand the diversity of microbes and plants (cryptogams).
- Understand the different microbe's structure and their role in different areas.
- Understand the diversification of plant on the basis of Habitat, forms, nutrition's and ecological adaptations.

CO-II

- Understand the classify algae up to classes.
- Understand the different classes of algae on the basis of habitat, thallus, pigmentation, reserve food and reproduction.

CO-III

- Understand the classification of fungi by Ainsworth.
- Understand the different classes of fungi on the basis of their morphology and reproduction.
- Understand the different forms of lichens and their importance.

CO-IV

- Understand the classification of bryophyte.
- Understand the different Bryophytic forms on the basis of thallus organisation i.e. *Marchantia* and *Funaria*.
- Understand the evolution in Bryophyta and affinity to Pteridophyta.
- Learn about some Indian bryologist.

CO- V

- Understand about the first vascular plant i.e. pteridophyta.
- Understand the classification of pteridophyta.
- Understand the different examples of pteridophyta i.e. *Equisetum* and *Marsilea*.
- Understand about the evolution of stele and heterospory and seed habit in pteridophytes.

CO- VI

- Understand the applications of microbes and their economic importance in different areas.
- Understand the plant diseases by different microbes i.e. Fungal diseases ,viral diseases and Bacterial diseases.
- Understand the importance of cryptogams i.e.Bryophyta.

Practical

CO-I

- Study of preparation of temporary mount, identification and classification of algae, bryophyte, and pteridophytes materials.

CO-II

- Study of permanent slides of various materials plant pathology with the help of field study and excursion tour.

B.Sc. I Sem- II

CO- I

- Understand the process of fossilization and types of fossils.
- Understand the geological Time Scale and fossils of gymnosperm.

CO- II

- Understand the classification of gymnosperm.
- Learn about the gymnospermic plant i.e. *Gnetum* and *Pinus* by studying morphology anatomy and life cycle.
- Understand the affinity of gymnosperm to pteridophytes and angiosperm.
- Understand the economic importance of gymnosperm.

CO- III

- Understand the morphology of plant on the basis of root, stem and leaves.
- Understanding diversity of plant i.e. annual plant biannual plant and perennial plant.
- Understand the different morphological parts of the plants their types and characteristics.

CO- IV

- Understand the types of inflorescence.
- Understand the types of flower, structures their parts.
- Understand the placentation in plant and types of pollination.

CO- V

- Understand the types of fruit.
- Understand the utilisation of plants i.e. the food plants , fibre plants and oil yielding plants.

CO- VI

- Understand the about spices and their importance.
- Understand the different medicinal plants with their medicinal uses and their characters.

Practical

CO-I

- Morphology, anatomy, double stains, permanent mount preparation of gymnosperm plants and fossils study.

CO-II

- Detailed morphological study of root, stem, leaf flower its modification of various plants and utilization of plants study.

B.Sc.II Sem- III

CO- I

- Understand the origin and evolution of angiosperm with different theories.
- Understanding Botanical nomenclature and its principles, rules , taxonomic rank, type concept and valid Publication.
- Understand the herbarium with its techniques, significance and examples.
- Understand concept of biodiversity and its conservation i.e. ex situ conservation and in situ conservation.

CO- II

- Understand the Angiosperm classification system that is Bentham and hooker and englers and prantles.
- Understand the taxonomic studies of family Malvaceae, Brassicaceae leguminaceae and Apiaceae.
- Understand the systematic studies and importance of Asteraceae, Asclepidiaceae, Apocynaceae, Solanaceae, verbanaceae, lamiaceae euphorbiaceae, liliaceae, and poaceae.

CO- IV

- Understand the anatomy of plant.
- Understand the types of plant tissues i.e. simple tissues and complex tissues.
- Understand the anatomy of stem with their characteristics rings, sapwood and heart wood.
- Understand and roots systems, monocot and dicot root with secondary growth in dicot root.

CO- V

- Understand the embryology.
- Understand the development of male gametophyte.
- Understand the development of female gametophytes and its types.
- Understand the double fertilization process and triple fusion.
- Understand the classification of embryo and endosperm types and its significance.

CO- VI

- Understand the anatomy of stem i.e. monocot and Dicot stem.
- Understand the abnormal primary growth in boerhaavia stem and secondary growth in bignonia and dracenna stem.
- Understand the anatomy of leaf with respect to nerium leaf and Maize leaf.

Practical

CO-I

- Study of embryology, pollination, and mounting of parts of flower in angiospermic plants.

CO-II

- To study the anatomy and taxonomy of angiosperm plants with the help of laboratory study, field study by conducting excursion tours.

B.Sc. II Sem- IV

CO-I

- Understand the concept of cell and about the prokaryotic and Eukaryotic cells.
- Understand structures and functions of cell wall.
- Understand the structures and functions of plasma membrane with their models.
- Understand the structure and functions of nucleus.
- Understand the structure and functions of chloroplast.

CO- II

- Understand the structure and functions of different cellular organelles i.e. Golgi Complex ,vacuole, ribosome, Peroxisomes and mitochondria.
- Understand the cell cycle with mitosis and meiosis.

CO-III

- Understand the structure of chromosome with its types and their components.
- Understand the chromosomal aberrations structural and numerical chromosomal aberrations.

CO- IV

- Understand the mendel's laws i.e. law of dominance, law of segregation and law of independent assortment.
- Understand the interaction of genes i.e. complementary, supplementary and epistasis gene interaction.
- Learn the problem solving on the mendelism and interactions of genes.

CO- V

- Understand the linkage of genes its types with their theories.
- Understand the crossing over concept its types and theories.

- Understand the concept of mutation with spontaneous mutation and induced mutation.

CO- VI

- Understand the nomenclature of enzymes.
- Learn the characters of enzymes.
- Understand the concept of holoenzymes, coenzyme and cofactor.
- Understand the mechanism and action of enzymes.
- Understand the structure and functions of carbohydrate i.e. monosaccharide, disaccharide and polysaccharide.

Practical

CO-I

- Study the isolation of cell organelles using various techniques and study the stages of mitosis and meiosis.

CO-II

- Study of genetics using monohybrid and Dihybrid ratio with its related problems and demonstrate various tests for biochemical compounds.

B.Sc. III Sem- V

CO- I

- Understand the plant water relationship and process of imbibition, diffusion, osmosis and plasmolysis.
- Understand the absorption of water by active and passive transport.
- Understand the concept of ascent of sap by root pressure and transpiration pull theory.
- Understand the process of transpiration with its types, mechanism and significance.
- Understand the mineral uptake by active process by Carriers and by passive process by Ion exchange.

CO- II

- Understand the concept of photosynthesis their mechanism and process with light reaction and dark reaction.

- Understand the concept of respiration in mitochondria its types and with glycolysis, kreb cycle and electron transport chain.

CO- III

- Understand the nitrogen metabolism with role of Nitrogen, nitrogen fixation by symbiotic and non symbiotic process.
- Understand the concept of growth in plants by phases of growth, growth curve, geological role of growth hormones like Auxin, gibberellin cytokinins, Abscissic acid and Ethylene.
- Understand the concept of senescence and Abscission.

CO- IV

- Understand the concept of photoperiodism, concept of florigen and role of phytochrome.
- Understand the concept of vernalization and its significance.
- Understand Movement in plants i.e. phototropic, Geotropic, epinasty, hyponasty and seismonasty movement.
- Understand the stress physiology in plant- types of stress, water and salinity stress.

CO- V

- Understand the concept of ecology ,environment and scope of ecology.
- Understand ecological factors i.e. light, temperature and water.
- Understand the atmosphere and its composition.
- Understand the Edaphic factors, process of soil formation, soil profile, soil biota and their role.
- Understand the ecological adaptation morphological and Anatomical in hydrophytes and xerophytes.

CO- VI

- Understand the concept of ecosystem, structure and functions, food chain, food web concept and energy flow model.
- Understand the population Ecology, natality and mortality concept and characteristics of community like frequency, density and abundance.
- Understand the concept of ecological succession i.e. Hydrosphere and Xerosphere.
- Understand the types of ecosystem i.e. Pond ecosystem and desert ecosystem.

Practical

CO-I

- Studied major and minor experiments of plant physiology.

CO-II

- Studied major and minor experiments of ecology and environment.

B.Sc. III Sem- VI

CO- I

- Understand the historical account of DNA and genetic Material by Griffith and chase experiment.
- Understand the chemical composition of DNA and double helical model of DNA.
- Understand the DNA replication in eukaryotes.
- Understand the packaging of DNA.
- Understand the Satellite, repetitive DNA and transposable elements.

CO- II

- Understand the concept of gene and their structure.
- Understand the expression of gene, Central dogma, types of RNA, genetic code and ribosomes.
- Understand the concept of transcription in eukaryotes, mechanism and RNA processing.
- Understand the translation process in eukaryotes.
- Understand the concept of endo-membranous system i.e. flow of peptide.

CO-III

- Understand the regulation of gene expression in prokaryotes, concept of Operon example Lac Operon.
- Understand the regulation of gene in eukaryotes, Britton Davidson model.
- Understanding protein folding mechanism and structure of proteins.
- Understand the process of protein sorting for protein targeting to organelles.

CO-IV

- Understand the Recombinant DNA technology, Tools and techniques.
- Understand the concept of restriction enzymes and its nomenclature and types.
- Understand the concept of vector with some examples plasmid, cosmid and phage.
- Understand the source of gene ex. genomic library and c DNA library.
- Understand the gene transfer techniques, indirect technique- chemical and physical and direct technique- agrobacterium mediated gene transfer.
- Understand the concept of gene amplification by PCR method.

CO- V

- Understand the basics of plant tissue culture.
- Understand the laboratory equipment and infrastructure for plant tissue culture.
- Understand the cultural media and growth hormones used in plant tissue culture.
- Understand the different sterilization techniques.
- Understand plant tissue culture technique i.e. Callus culture, micro propagation and concept of cellular totipotency , differentiation and morphogenesis.

CO- VI

- Understand the application of biotechnology in agriculture i.e. haploid plant production, protoplast culture, somatic hybridization, transgenic plant like BT- cotton and synthetic seed production.
- Understand the improvement in crop biotechnology.
- Understand the applications of biotechnology in industries in fermentation Technology, Bakery product production and alcohol production.
- Understand the biotechnology applications in Health-care for example edible vaccine production.
- Understand the biotechnological applications in conservation for example ex-situ conservation and in situ conservation.

Practical

CO-I

- Studied various major and minor experiments on molecular biology.

CO-II

- Studied working principle and application of various biotechnological instruments and techniques.