

Learning outcomes for Postgraduate Programme M.Sc. Botany

Upon successful completion of M.Sc. Botany Post-Graduates are expected to-

PSO1: Develop a conceptual understanding of principles and importance of Botany. Students would be benefited with knowledge of core subjects like plant diversity, physiology and biochemistry, molecular cytogenetic and application of statistics etc. which are offered in these subjects Modules on analytical techniques, plant tissue culture and photochemistry would make them obtain skills that help in doing research.

PSO2: Learn about practical technique in lab for detail study of plant cell structure, reproduction, anatomy, breeding procedures for hybridization. Maintain a high level of scientific excellence in botanical research with specific emphasis on the role of plants. Create, select and apply appropriate techniques, resources and modern technology in multidisciplinary way. Practice of subject with knowledge to design experiments, analyze and interpret data to reach to an effective conclusion.

PSO3: They would identify, formulate and analyze the complex problems with reaching a substantiated conclusion. Logical thinking with application of biological, physical and chemical sciences. Learning that develops analytical and integrative problem-solving approaches.

PSO4: Students would perform functions that demand higher competence in national/international organizations with sporty and helping spirits. Prepare the students for many competitive exams like MPSC, UPSC NET SET GATE.

PSO5: Best problem-solving skills in students would encourage them to carry out innovative research projects thereby making them to use knowledge creation in depth. Enable the students to be resourceful in identifying the plants

PSO6: Knowledgeable, disciplined students with good values, ethics, and kind heart will help in nation building globally. Student should be aware of ethical issues and regulatory considerations while addressing society needs for growth with honesty

M.Sc. I Semester I

COURSE OUTCOMES

Code PSCBOTT01 Contents: Microbiology, Algae & Fungi

After completion of this course -

CO1: Students will be able to understand the structure, type and identification of Bacteria and cyan bacteria.

CO2: Students will gain understanding of Thallus structure, reproduction and economic importance algae.

CO3: Students will gain understanding of the classification, structure of mycelium reproduction of fungal species. They will know about the hazardous and useful fungi. Student will also know and learn classification and evolutionary trends in fungi.

CO4: Students will gain understanding of the plant diseases, causal organism, host and their relationship and control measure for plant diseases, Understanding of fungicide and use of chemical physical and biological controlling of diseases mentioned in the unit.

Code PSCBOTTO2 Contents: Bryophytes and Pteridophytes

After completion of this course students will gain knowledge of -

CO1: the characters, distribution, classification and regeneration in Bryophytes.

CO2: the characters of different orders of Bryophytes.

CO3: How the stele evolution occurs in Pteridophytes and also familiar with the work done by Indian pteridologist.

CO4: the classification of Pteridophytic classes and the morphological and anatomical characters of genus included in the different Pteridophytic order.

Code PSCBOTPO1 (Lab Work) 25 Laboratory exercise

Contents: Microbiology, Algae & Fungi&Bryophytes and Pteridophytes

CO1: Student can identify different types of forms of cyanobacteria.

CO2: Student can classify and identify the Algal and fungal genus and specimen included.

CO3: Student can make micropreparation of the material of Pteridophyta and bryophytes and identified anatomically.

CO4: Student can collect few species from locality and identify morphologically during collection of material in the local visit.

Code PSCBOTTO3 Contents: Gymnosperm and Paleobotany

After completion of this course -

CO1: Students will gain Understanding the meaning of fossil and its use in the determination of age of plant materials, Understanding the applied knowledge and different aspects of Paleobotany.

CO2: Students can critically differentiate fossil and living fossil. Students will also understand the evolutionary tendencies and comparative morphology of Cycadales, Cycadeodales and Pteridospermales.

CO3: Students can compare the characters of different orders & relationship of each order from Cordaitales to Gnetales.

CO4: Student can critically differentiate the characters of three orders of Gymnosperm i.e., Ginkogales, Coniferales, and Taxales.

Code PSCBOTTO 4: Contents: Cytology and Genetics

After completion of this course students will gain -

CO1: Understanding of the history of gene from 'something', 'factor'; and gene and one gene one enzyme one characters hypothesis. Student will also know the interaction of gene, genetic recombination producing the characters differently.

CO2: Understanding of the structure of chromosome and how the packaging of DNA occurs. Student can differentiate Euchromatin and heterochromatin region of chromosome on the basis of staining properties. Student can draw a good karyotype and Idiograms of Karyotype, and also how the evolution of Karyotype takes place.

CO3: Understanding of the different structural and numerical changes why? And how? It occurs in the chromosome students, can able to use the trisomic and monosomic for the chromosome mapping.

CO4: Understanding the role and process of mutation and different mutagenic agent which brings about mutation in the organism. Students will also understand the role of mutation in crop improvement and permutation.

Code PSCBOTPO2: 20 Laboratory exercise

Contents: Gymnosperm and Pale botany & Cytology and Genetics

CO1: Student will develop the skill and will be able to prepare double stained micro preparation of the given material and identify on the basis of observation.

CO2: Students gain the skill of identifying the fossil specimen.

CO3: Understands the action of low treatment of colchicine and para-dichlorobenzene to plant tissue creating polyploidy in the organism

CO4: Student can also draw good figure of chromosome directly from microscope with the help of Camera Lucida and prepared an ideogram of chromosome on graph paper.

Semester II

Code PSCBOTTO5 Contents: Plant physiology and Biochemistry

After completion of this course -

CO1: Students will understand the importance of photosynthesis in plants. They will also understand photosynthesis is one of the most important processes that allow plants to Live.

CO2: Students will come to know that, energy produced by respiration is essential for normal functioning of body.

CO3: Student will understand importance of metabolism to maintain living state of cells. They also understand role of nitrogen cycle in environment.

CO4: Students will understand how enzymes serve important function in body, in digestion and metabolism. They have developed knowledge about pathways of water through xylem and phloem.

Code PSCBOTTO6 Contents: Plant development and Reproduction

After completion of this course -

CO1: Student will understand the role of various hormones in plant development. They will understand how growth of shoot apical meristem takes place.

CO2: Student will get knowledge about the various arrangement of leaf in plants. They will have developed knowledge about photoperiodisms.

CO3: Student will understand the structure of anther and role of gene expression during pollen development. They will get to know about fertilization and how pollen stigma interaction takes place.

CO4: Students will understand how endosperm provides nutrition to embryo development. They also understand how germination of seed takes place in plants.

Code PSCBOTPO3: Laboratory exercise 22 experiments

Contents: Plant Physiology and Biochemistry & Plant Development and Reproduction

CO1: Student can extract chloroplast pigment from leaves.

CO2: Student can identify structure of stomata while peeling epidermis leaves of Tradescantia.

Code PSCBOTTO7 Contents: Cell and Molecular Biology-I

After completion of this course -

CO1: Student will understand the importance of cell wall. They also get to know about plasmodesmata.

CO2: Student will understand the role of various cell organelles. They will have developed knowledge about various phases of cell division.

CO3: Students will have developed knowledge about nucleus and its ultrastructure. They will also identify various forms of DNA.

CO4: Student will understand the importance of stresses in plants and how it responses.

Code PSCBOTTO8 Contents: Angiosperm-I

After completion of this course -

CO1: Student will understand floral structure of Angiospermic plants and how stamens and carpels are evolved. They will also understand adaptive feature of pollinators.

CO2: Students will get to know about scope, aim, principles of taxonomy. They will get knowledge about concepts of taxa, genus etc.

CO3: Students will get knowledge about various taxonomic evidences. They will also understand how to prepare herbarium sheets and how to read floras.

CO4: Students will understand about biosystematics. They will also understand adaptive features of ICBN.

Code PSCBOTPO4: 17 experiment for exercise

Contents: Cell and Molecular biology-I & Angiosperm-I

CO1: Students will develop skill and will be able to prepare staining of salivary gland chromosomes of Chironomous larva.

CO2: Students will be able to understand the isolation of chloroplast.

CO3: Students will gain knowledge about floral symmetry and anatomical features of various taxa.

CO4: Student can also draw good diagrams of pollen types and stamens and carpels.

Semester III

Code PSCBOTTO9 Contents: Plant Ecology

After completion of this course -

CO1: Students will understand the vegetative organization in community. Students will get to know about how changes take place during ecological succession.

CO2: Student will have developed knowledge about structure and function of ecosystem. They also will understand about biogeochemical cycle in environment and its role.

CO3: Students will understand the effect of air, water and soil pollution in environment. They will also develop knowledge about greenhouse gases its sources and role.

CO4: Student will get knowledge about invasive species of plant. They will get to know about how ecological management takes place.

Code PSCBOTT10 Contents: Cell and Molecular biology-II

After completion of this course -

CO1: Students will understand the structure and functions of ribosomes. They will get to know about how transcription and translation takes place in Prokaryotes and Eukaryotes.

CO2: Students will understand about fine structure of gene. They will also understand machinery involved in protein sorting.

CO3: Students will get to know about the structure of phage genome. They will also develop knowledge about genetic recombination.

CO4: Students will understand about cell cycle and apoptosis. They will get knowledge about the process of signal transduction.

Code PSCBOTPO5: 18 Experiment for exercise

Contents: Plant Ecology & Cell and molecular biology-I

CO1: Student will have developed knowledge about distribution of various plant species by quadrat Method.

CO2: They will understand presence of specific by Elisa method.

Code PSCBOT11 Contents: Reproductive Biology of Angiosperms-I

After completion of this course -

CO1: Students will understand the structure of Anther and its various. They will understand about pollen wall protein.

CO2: Students will understand the development of male gametophyte. They will get to know about biochemical aspects of pollen.

CO3: Students will understand carpel determination of pistil. They will also understand megasporogenesis.

CO4: Students will understand pollination mechanism. They will understand the concept of Incompatibility.

Code PSCBOTPO6: 13 Experiment for exercise

Contents: Reproductive biology of Angiosperms-I

CO1: Student will be able to understand the pollen production in given flower.

CO2: They will also get knowledge about structure and various types of ovules.

Code PSCBOT12 Contents: Basic Botany-I

After completion of this course -

CO1: Students will understand the diversity Cryptograms. They will also understand plant pathology about various diseases in plant.

CO2: Students will understand diversity of phanerogams. They will also know about difference between monocotyledons and dicotyledons

CO3: Students will understand about various part species in technical terms. They will also get knowledge about various angiospermic families.

CO4: Students will understand tissue system in Angiosperms. They will also have developed knowledge about anatomical feature of Angiospermic plant.

Semester IV

Code PSCBOTT13 Contents: Plant Biotechnology

After completion of this course -

CO1: Students will get knowledge about importance of recombinant DNA technology for the production of vaccines. Students will be able to know about crop developed by genetic engineering used to enhance yields & nutritional quality.

CO2: Students will have knowledge about creative genetically modified bacteria. They will get knowledge that advance proteomic technologies can help us to develop better drugs.

CO3: Students will know how they can grow disease free plant by tissue culture technique. They will develop understanding about how gene technology has helped in improving various qualities in Crops.

CO4: Students will know about the use of computational approach to analyze, manage & store biological data. They are able to know, the use of information technology in biotechnology for data storage, Analyzing the DNA sequences.

Code PSCBOTT14Contents: Angiosperm-II

After completion of this course -

CO1: Students will have developed the knowledge of identifying floral variation.

CO2: Students will know the interesting features & systematic position of cucurbitaceae, cactaceae, orchidaceae, etc.

CO3: Students will be able to know the probable ancestors of angiosperms, extinct species.

CO4: Students will develop understanding about the role of biodiversity in Ecosystem functions.

Code PSCBOTPO7: 10 Experiment based on Angiosperm-II for exercise

Contents: Plant Biotechnology & Angiosperm-II

CO1: Students are able to isolate protoplast and determine its viability

CO2: Students will be able to conduct experiment on preparation of media for plant tissue culture.

CO3: Students are able to comments on specimen from locally available families.

CO4: Students are able to make herbaria

Code PSCBOTT15Contents: Reproductive biology of Angiosperms-II

After completion of this course -

CO1: Students will get knowledge about reproduction in plants. They are able to differentiate the types of endosperms.

CO2: Students can understand the relation between embryo and endosperm. Students will get idea about practical importance of polyembryony.

CO3: Students are able to know overall development of endosperms. Students will develop understanding of the formation of embryo from somatic cell

CO4: Students are able to know protoplast culture. They will also know production of useful compounds through cell culture.

Code PSCBOTPO8: Experiment based on theory

Contents: Reproductive biology of Angiosperms-II

CO1: Students are liable to perform experiment on embryo culture.

CO2: They also can prepare culture medium for plant tissue culture.

Code PSCBOT16Contents: Basic Botany-II

After completion of this course students will gain knowledge of -

CO1: Students will develop understanding of the movement of water in plants. Students will have knowledge about much physiological process in plants.

CO2: Student will know about, how environmental pollution affects life on earth. They are able to know evolution of plants.

CO3: Students will have knowledge about the economically important plants.

CO4: Students will get idea about the process of fossilization.