

DEPARTMENT OF BOTANY, EGRA SSB COLLEGE, 721429

BOTANY (UNDER GRADUATE) PROGRAM OUTCOMES

Program Specific Outcomes and Course Outcomes

Botany Program outcomes:

PO1. Knowledge and understanding:

1. The range of plant diversity in terms of structure, function and environmental relationships. 2. The evaluation of plant diversity. 3. Plant classification and the flora of INDIA. 4. The role of plants in the functioning of the global ecosystem. 5. A selection of more specialized, optional topics. 6. Statistics as applied to biological data.

PO2. Intellectual skills:

1. Think logically and organize tasks into a structured form. 2. Assimilate knowledge and ideas based on wide reading and through the internet. 3. Transfer of appropriate knowledge and methods from one topic to another within the subject. 4. Understand the evolving state of knowledge in a rapidly developing field. 5. Construct and test hypothesis. 6. Plan, conduct and write a report on an independent term project.

PO3. Practical skills:

Students learn to carry out practical work, in the field and in the laboratory, with minimal risk. They gain introductory experience in applying each of the following skills and gain greater proficiency in a selection of them depending on their choice of optional modules. 1. Interpreting plant morphology and anatomy. 2. Plant identification. 3. Vegetation analysis techniques. 4. A range of physiochemical analyses of plant materials in the context of plant physiology and biochemistry. 5. Analyse data using appropriate statistical methods and computer packages. 6. Plant pathology to be added for sharing of field and lab data obtained.

PO4. Transferable skills:

1. Use of IT (word-processing, use of internet, statistical packages and databases). 2. Communication of scientific ideas in writing and orally. 3. Ability to work as part of a team. 4. Ability to use library resources. 5. Time management. 6. Career planning.

PO5. Scientific Knowledge:

Apply the knowledge of basic science, life sciences and fundamental process of plants to study and analyze any plant form.

PO6. Problem analysis:

Identify the taxonomic position of plants, formulate the research literature, and analyze non reported plants with substantiated conclusions using first principles and methods of nomenclature and classification in Botany.

PO7. Design/development of solutions:

Design solutions from medicinal plants for health problems, disorders and disease of human beings and estimate the phytochemical content of plants which meet the specified needs to appropriate consideration for the public health.

PO8. Conduct investigations of complex problems:

Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and development of the information to provide valid conclusions.

PO9. Modern tool usage:

Create, select, and apply appropriate techniques, resources, and modern instruments and equipment for Biochemical estimation, Molecular Biology, Biotechnology, Plant Tissue culture experiments, cellular and physiological activities of plants with an understanding of the application and limitations.

PO10. The Botanist and society:

Apply reasoning informed by the contextual knowledge to assess plant diversity, its importance for society, health, safety, legal and environmental issues and the consequent responsibilities relevant to the biodiversity conservation practice.

PO11. Environment and sustainability:

Understand the impact of the plant diversity in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

PO12. Ethics:

Apply ethical principles and commit to environmental ethics and responsibilities and norms of the biodiversity conservation.

PO13. Individual and team work:

Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

Program Specific Outcomes:

PSO1- Students will be able to identify various types of bacteria and algae of their habitat by staining technique with microscope

PSO2- Students can classify and distinguish the prokaryotic and eukaryotic cells and they learn about the origin of eukaryotic cell.

PSO3- Students can develop the phenomenon of plasmolysis and deplasmolysis.

4. PSO4- Students are able to know practically how different plant species are distinguished microscopically and morphology

PSO5- Students will identify easily the various plant diseases by observing the symptoms and will be benefited in agriculture.

PSO6- Students' knowledge increases about the taxonomical and ecological characters of plant stem, root, leaves, flowers in practical classes.

PSO7- They earn their knowledge and can easily distinguish different monocot and dicot families, their characteristic features, economic importance and medicinal value of some plants

PSO8- Students are able to know how artificially transgenic plants and transgenic animals are produced through application of Genetic Engineering.

PSO9-. Learn about various economically important plants and their value for benefit of the society.

PSO10- Acquiring practical knowledge on anatomy of different plant parts.

PSO11- Students are able to learn how to manage biodiversity, conservation and control of pollution. They can learn the distribution of different vegetation in different geographical regions. Learn about the different ecological factors responsible for vegetation differentiation.

PSO12- Students enrich their knowledge about various physiological processes and metabolism in life systems and their regulation which is manifested on crop productivity.

PSO 13- Learn about the various reproductive organs and their development in plants along with their modifications

PSO 14- Student will learn various techniques of tissue culture in plants for economic and environmental aspects.

PSO 15- They also can develop their knowledge about cultivation, propagation and harvesting of different medicinal plants.

Course Outcomes:

CO1: Algae & Microbiology:

1. To learn the types of virus and bacteria and their harmful and beneficial effects.
2. To learn how to prevent bacterial and viral diseases in society as well as immunization systems by vaccines.
3. To learn the uses of algae along with their respective life forms along with their consumption as food, fodder and medicine in human society.

CO2: Bio molecules and Cell Biology:

1. Students learn about the significance, classification and structure of carbohydrates, lipids, proteins and various types of nucleic acids present in life system
2. They develop the concept of free energy, role of energy currency molecule.
3. They learn about the structure, classification, features of enzyme and their role in cell.
4. Students can classify and distinguish the prokaryotic and eukaryotic cells and they learn about the origin of eukaryotic cell.
5. Students can gather the knowledge about the plant cell wall and plasma membrane.
6. Students can develop their knowledge about structure, function, signalling system of cell organelles.

CO3: Mycology and Phyto pathology

1. Students will identify easily the various plant diseases by observing the symptoms and will be benefited in agriculture.
2. Students will be self-development economically by mushroom culture which have been taught by the syllabus.

CO4: Archegoniate

1. Understand the diversity of Gymnosperms in India.
2. Know the evolutionary trends and affinities of living gymnosperms with respect to external and internal features
3. Know the conceptual development of „taxonomy“ and „systematics“
4. Understand the Phylogeny of angiosperms -A general account of the origin of Angiosperms.
5. Understand the general range of variations in the group of angiosperms.
6. Trace the history of development of systems of classification emphasizing angiospermic taxa
7. To learn the wide activities in angiosperm and trends in classification.
8. Learn about the characters of biologically important families of angiosperms.
9. Know the floral variations in angiosperm families, their phylogeny and evolution.
10. Understand various rules, principles and recommendations of plant nomenclature produces in plant identification.
11. Understand major evolutionary trends in various parts of angiosperm plants.
12. Know the methods of pollination and fertilization.

CO5: Plant Ecology and Taxonomy

1. Students knowledge increase about the taxonomical and ecological characters of plant stem, root, leaves, flowers in practical classes.
2. Students identify the various types of plants and increase their knowledge.
3. It promotes group works, research and community involvement.

CO6: Morphology and anatomy

1. Students are able to know how artificially Transgenic plants and transgenic animals are producing through application of Genetic Engineering.
2. Students are able to know how plants are protected from different pathogens.

CO7: Economic Botany

1. Learn about various economically important plants and their value for benefit of the society.
2. Learn about the parts of plants which bear the economic importance
3. Applying the knowledge on pharmaceutical industries for developing herbal medicines.

CO8: Genetics

1. To learn inheritance pattern of different characters from generation to generation by which students can predict the outcomes of different crosses in plants as well as in animals.
2. How genes are involved in character modification of biological organisms.
3. The students will be able to learn about the basics of cell and its inclusions and understand the basic concepts of mendelian genetics and its variations

CO9: Bio-fertilizer

1. Students are able to learn about different types of bio fertilizers.
2. Students are able to know how the green manure benefitted to plant development and eco-friendly uses, because chemical fertilizers are harmful which causes cancer, skin diseases.

CO10: Plant anatomy and Embryology

1. Student can learn about the anatomical characters of different plants along with respective identification.
2. Learn about the various embryological processes of plant development practically.
3. Acquiring practical knowledge on anatomy of different plant parts.
4. Practically learn about the influence of growth factors for embryogenesis of plant and their modification.

CO11: Molecular biology

1. Students will able to learn about the reasons and mechanism of mutation and its related genetic diseases.
2. Students can able to learn about the gene and its regulation and how far change the living system in society.
3. Develop practical knowledge on different blotting techniques.
4. Practically able to isolate genomic and plasmid DNA and estimation.

CO12: Plant ecology and phyto geography

1. Students are able to learn how can managed the biodiversity, conservation and control the pollution.
2. They can learn the distribution of different vegetation in different geographical regions
3. Learn about the different ecological factors responsible for vegetation differentiation.

CO13: Plant systematics

1. Students are able to learn the classification, taxonomy and systematics approach of plant. They collect their knowledge about modern evidence of plant taxonomy, botanical nomenclature.
2. Students are developing their knowledge about herbarium preparation, conservation technique.

3. They earn their knowledge and can easily differentiate monocot and dicot families, their characteristic features, economic importance and medicinal value of some plants.

CO14: Mushroom culture technology

1. Students also know about the technique of mushroom production, which they can produce those things for marketing to earn money.
2. Learn about the diseases of mushrooms and their management.
3. Students will be self-dependent economically by mushroom cultivation.

CO15: Plant physiology and Metabolism

1. Plant physiology is the most efficient part of students. Students enrich their knowledge about various physiological processes and metabolism in life systems and their regulation which is manifested on crop productivity.
2. Students will learn about plant growth regulators and their influences on plant metabolism.
3. Practically learn about the various factors influencing physiological processes and metabolism in plants.
4. Learn how metabolic processes influence productivity.

CO16: Mushroom culture technology

1. Students also know about the technique of mushroom production, which they can produce those things for marketing to earn money.
2. Learn about the diseases of mushrooms and their management.
3. Students will be self-dependent economically by mushroom cultivation.

CO17: Reproductive Biology of Angiosperms

1. Learn about the various reproductive organs and their development in plants along with their modifications.
2. Learn about the life cycles of plants and their modification in respect to changing the reproductive processes.
3. Microscopic studies on various reproductive organs of plants and applying these on plant identification.
4. Practical knowledge on changing the reproductive time span in the aid of increasing production.

CO18: Biostatistics

1. Students will be able to learn various statistical approaches to evaluate and to measure the productivity, number of plants in respect to various life supporting parameters.
2. Knowledge about the various methods of data representations and validation.

3. Practical approaches on testing the fitness of various biological rules in respect to observed data. 4. Handsome practice of data tabulation and measuring validity of phenotypic variation in respect to genetic variation.

CO19: Plant Breeding

1. Students will be able to learn how different types of hybrids are produced.
2. Learn about the different new crop varieties and their utility in human society.
3. How hybrids crops minimize the scarcity of food in world.
4. Students will be able to produce various types of hybrids plants and genetically modified plants by learning the syllabus which help to absorb them in various commercial companies.

CO20: Cell and molecular Biology

1. Students will be able to learn about the reasons and mechanism of mutation and its related genetic diseases in molecular level.
2. Students can be able to learn about the gene and its regulation and how far change the living system in society.
3. Learn about the various types of cells and different underlying mechanisms in cells.

CO21: Ethnobotany

1. Learn about the plants used by tribal people for curing different diseases and food and etc.
2. Learn about the active constituents of such herbal medicines used by ethnic people along with their distribution.

CO22: Plant Biotechnology

1. Learn about the process of tissue culture along with clone development
2. Learn about the various GM (Genetically modified) crops and their production.
3. Learn the application of biotechnology for welfare of human society in medical, environmental and industrial aspects.

CO23: Industrial and Environmental Microbiology

1. Learn about the names and role of different microbes used in food and pharmaceutical industries.
2. Knowledge about the modification of microbial colonization and its influence on economically important commodities.
3. Handsome practices on microbial inoculation and culture.
4. Able practically to develop various economically and pharmaceutically important products.

CO24: Analytical Technique in Plant Sciences

1. Learn about the principle of different microscopy.
2. Learn about the differential and density gradient centrifugation.
3. Learn about the statistical data analysis.
4. Learn about the separation of DNA, RNA and Protein.
5. Learn about DNA sequencing,
6. Learn about ELISA test.

CO25: Genetics and Plant breeding

1. Students will able to learn how different types of hybrids are produced.
2. Learn about the different new crop varieties and their utility in human society.
3. How hybrids crops minimizes the scarcity of food in world.
4. Students will able to produce various types of hybrids plants and genetically modified plants by learning the syllabus which help to absorb them in various commercial companies.

CO26: Medicinal Botany

1. Students can develop their knowledge about economic plant, medicinal plants, oil yielding plants, some vegetables and pharmacological concept of our daily life.
2. They also can develop their knowledge about cultivation, propagation and harvesting of different medicinal plants.

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13
CO1	✓	✓	✓	✓	✓					✓	✓	✓	✓
CO2	✓	✓	✓	✓	✓				✓	✓		✓	✓
CO3	✓	✓	✓	✓	✓					✓		✓	✓
CO4	✓	✓	✓	✓	✓					✓		✓	✓
CO5	✓	✓	✓	✓	✓	✓			✓	✓	✓	✓	✓
CO6	✓	✓	✓	✓	✓				✓	✓		✓	✓
CO7	✓	✓	✓	✓	✓		✓			✓	✓	✓	✓
CO8	✓	✓	✓	✓	✓				✓	✓		✓	✓
CO9	✓	✓	✓	✓	✓					✓		✓	✓
CO10	✓	✓	✓	✓	✓				✓	✓	✓	✓	✓
CO11	✓	✓	✓	✓	✓				✓	✓		✓	✓
CO12	✓	✓	✓	✓	✓				✓	✓	✓	✓	✓
CO13	✓	✓	✓	✓	✓	✓			✓	✓		✓	✓
CO14	✓	✓	✓	✓	✓				✓	✓		✓	✓
CO15	✓	✓	✓	✓	✓				✓	✓		✓	✓
CO16	✓	✓	✓	✓	✓				✓	✓		✓	✓
CO17	✓	✓	✓	✓	✓				✓	✓		✓	✓
CO18	✓	✓	✓	✓	✓			✓	✓	✓		✓	✓
CO19	✓	✓	✓	✓	✓				✓	✓	✓	✓	✓
CO20	✓	✓	✓	✓	✓				✓	✓		✓	✓
CO21	✓	✓	✓	✓	✓		✓		✓	✓	✓	✓	✓
CO22	✓	✓	✓	✓	✓				✓	✓		✓	✓
CO23	✓	✓	✓	✓	✓		✓		✓	✓	✓	✓	✓
CO24	✓	✓	✓	✓	✓			✓	✓	✓		✓	✓
CO25	✓	✓	✓	✓	✓			✓	✓	✓		✓	✓
CO26	✓	✓	✓	✓	✓		✓		✓	✓		✓	✓