

Department of Botany

Govt. Degree College, Nowshera

Program Outcomes, Program Specific Outcomes and Course Outcomes

Name of the Program: - Bachelor Degree Program (UG).

A. PROGRAM OUTCOMES (POs)

Upon successful completion of their graduation with Botany as Core Subject, students will gain:-

- PO1.** Knowledge and understanding about Plant Diversity.
- PO2.** Practical skills in the field and laboratory experiments.
- PO3.** Presentation skills (Oral & Writing) in Life Sciences.
- PO4.** Scientific knowledge in Life Sciences and fundamental metabolism of plants.
- PO5.** Knowledge about Plant Biodiversity, exploration, estimation and conservation.

B. PROGRAMME SPECIFIC OUTCOMES (PSOs)

On successful completion of the B. Sc. Program in Botany, the students will be able to:-

- PSO1.** Demonstrate the basic knowledge on the various aspects of plant life.
- PSO2.** Develop the ability to communicate effectively the concepts related to the Plant world that he/she has learned in the class.
- PSO3.** Apply the knowledge acquired in the classes to solve the problems using critical thinking and analytical reasoning.
- PSO4.** Imbibe the moral and ethical values to lead a peaceful life in a world of multicultural competence.
- PSO5.** Develop the scientific attitude to become a good researcher in Plant Sciences.
- PSO6.** Effectively utilize the knowledge so acquired to prepare for the various competitive examinations for career development.

C. COURSE OUTCOMES (COs)

Semester-I

COURSE TITLE: - The Diversity of Microbes and Cryptogams

COURSE CODE: - UBOTC 101 (THEORY)- 4 Credits

UBOPC 102 (PRACTICAL)- 2 Credits

Upon completion of the course, students will be able to:-

- CO1.** Illustrate the characters of micro-organisms (Viruses, Bacteria, Cyanobacteria, Mycoplasma).

- CO2.** Identify the micro-organisms and understand their economic importance.
- CO3.** Understand the structure of plant viruses, their transmission and control measures.
- CO4.** Learn about the important characteristics, thallus organization and classification of algae; life histories of important algal genera and their economic importance.
- CO5.** Know about the general characteristics and classification of Fungi; life histories of important fungal genera and the economic importance of Fungi.
- CO6.** Identification of disease symptoms in host plants infected by fungi, viruses and mycoplasmas.
- CO7.** Understand the morphology, anatomy and reproductive details of the important genera belonging to Bryophytes and Pteridophytes.
- CO8.** Learn about the roles of Bryophytes in monitoring and controlling pollution, preventing soil erosion, geobotanical prospecting, horticulture and industries.
- CO9.** Evolution of sporophyte and alternation of generation in bryophytes.
- CO10.** Evolution of heterospory, stelar system and alternation of generation in pteridophytes.

Semester-II

COURSE TITLE: - Characteristics and Systematics of Seed Plants

COURSE CODE: - UBOTC 201 (THEORY)- 4 Credits

UBOPC 202 (PRACTICAL)- 2 Credits

Upon completion of the course, students will be able to: -

- CO1.** Learn about the process of fossilization, types of fossils and few representatives of gymnosperm and angiosperm fossils.
- CO2.** Know about the general characteristics and classification of gymnosperms.
- CO3.** Compare the morphology, anatomy and reproductive details of important gymnosperms (Cycas, Ephedra and Pinus).
- CO4.** Understand the origin of angiosperms; history of angiosperm taxonomy and various systems of angiosperm classification.
- CO5.** Analyse the role of ICN, BSI and herbarium preparation techniques.
- CO6.** Understand the principles and rules of Botanical Nomenclature; taxonomic ranks and principle of priority.
- CO7.** Know about the classification systems and tools in angiosperm taxonomy; contributions of anatomy, embryology, cytology and phytochemistry in the field of taxonomy.
- CO8.** Learn about various angiosperm families and their economic importance.
- CO9.** Evaluate the features of dicotyledonous and monocotyledonous plants.
- CO10.** Construct the floral diagram, compile the floral formulae and discuss the floral features of various angiosperm families.

CO11. Describe the plants growing in the surroundings in taxonomic language and know the botanical names of local plants.

Semester-III

COURSE TITLE: - Plant Anatomy, Embryology and Ecology.

COURSE CODE:- UBOTC 301 (THEORY)- 4 Credits

UBOPC 302 (PRACTICAL)- 2 Credits

Upon completion of the course, students will be able to:-

- CO1.** Understand the concept, types and organization of meristems.
- CO2.** Work out the anatomical details of monocot and dicot tissues; the concept of vascularization and the organization and systematic value of epidermal modifications (trichomes and stomata).
- CO3.** Illustrate the structure and derivatives of secondary meristems; the composition of food and water conducting tissues in plants and the concept of secondary growth.
- CO4.** Examine the structure and development of male and female reproductive parts of a flower; assess the types of pollination; attractants and rewards for pollinators and pollen-pistil interaction.
- CO5.** Understand the process of fertilization; post-fertilization events leading to formation of fruit and development of embryo and endosperm.
- CO6.** Learn the seed formation and seed dispersal strategies.
- CO7.** Know about atmosphere stratification and composition; greenhouse effect; climate change; community ecology and energy flow through the ecosystem.
- CO8.** Understand the concept, process and types of ecological succession; climax communities; growth curves; ecotypes and ecads.

Semester-IV

COURSE TITLE: - Plant Physiology and Metabolism

COURSE CODE: - UBOTC 401 (THEORY)- 4 Credits

UBOPC 402 (PRACTICAL)- 2 Credits

Upon completion of the course, students will be able to:-

- CO1.** Appreciate the various mechanisms underlying the important activities of plants such as absorption of water, minerals, solute transport, transpiration etc.
- CO2.** Spell out the water relations of plants and infers its relation to plant growth and function.
- CO3.** Organize the photosystems and experiment with C₃, C₄ and CAM plants and identify their significant characters.
- CO4.** Examine the mechanism of photosynthesis; light reaction; dark reaction; oxygen evolving complex etc.
- CO5.** Understand the mechanism of respiration; ETC and synthesis of ATP.

CO6. Know about the biological Nitrogen Fixation; concept and roles of secondary metabolites; pathways in the synthesis of sec. metabolites etc.

CO7. Gain knowledge about the various types of stresses faced by the plants and the mechanisms adopted by them to overcome these.

CO8. Assess the roles and modes of action of various plant hormones; the concept of seed dormancy and germination; physiology of flowering etc.

CO9. Discuss the roles of photomorphogenesis, photoperiodism and vernalization in plant growth and development

Semester-V

COURSE TITLE: - Cell Biology and Genetics

COURSE CODE: - UBOTE 501 (THEORY)- 4 Credits

UBOPE 502 (PRACTICAL)- 2 Credits

Upon completion of the course, students will be able to: -

CO1. Understand the structure and functions of cell wall, plasma membrane and various cell organelles typical of a eukaryotic cell.

CO2. Elucidate the physical and chemical structure of chromosomes; reductional and equational divisions; the structure and replication of DNA.

CO3. Know the structure and function of extranuclear genomes; mitochondrial and plastid DNA and plasmids.

CO4. Discuss the organization of DNA in prokaryotes and eukaryotes; concept of gene; genetic code; transcription and translation.

CO5. Understand the types, effect and detection of various chromosomal alterations; types and origin of euploidy and aneuploidy.

CO6. Work out the various types and sources of mutations; transposable elements; DNA damage and repair mechanisms.

CO7. Explain Mendel's laws of inheritance and work out the allelic and non-allelic gene interactions.

CO8. Understand the mechanism of linkage and crossing over; the role of linkage in mapping of genes.

Semester-VI

COURSE TITLE: - Economic Botany and Biotechnology

COURSE CODE: - UBOTE 601 (THEORY)- 4 Credits

UBOPE 602 (PRACTICAL)- 2 Credits

Upon completion of the course, students will be able to: -

CO1. Understand the origin of major food crops i.e. wheat, maize and rice and their cultivation patterns in India.

- CO2.** Discuss the Botany, processing and utilization of fibres, non-alcoholic beverages and spices & condiments.
- CO3.** Learn the cultivation and utilization of major oil crops, pulses, vegetables and fruits.
- CO4.** Gain knowledge of medicinal plants, firewood and timber-yielding of J&K; sources and extraction of Rubber.
- CO5.** Assess the cultivation and maintenance of indoor & outdoor ornamental plants.
- CO6.** Understand the basic concepts of plant tissue culture; micropropagation; somatic embryogenesis and somaclonal variations.
- CO7.** Learn the concept of biotechnology; recombinant DNA technology; gene cloning and c-DNA library.
- CO8.** Elaborate the salient features of cloning vectors; mechanism and applications of PCR; use of *Agrobacterium* vectors for gene delivery.
- CO9.** Know about the transgenic plants and salient achievements in crop biotechnology.

PREPARED BY

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