

Syllabus

PANJAB UNIVERSITY, CHANDIGARH (As Per Examination, 2022–2023)

Semester II

PAPER A: PLANT DIVERSITY-II

Objective: The basic objective of this paper is to make the students aware about the diversity in various life forms of plant kingdom. It gives an idea about how different life forms have evolved from simpler to complex ones. A sequential study ranging from Bryophytes (the amphibians of plant kingdom) and then to Pteridophytes-the first vascular land plants, would enable students to have a broad prospective of evolutionary trends in plant kingdom.

Unit I: Bryophyta: General characters; systematic position, structure, reproduction and life cycle of *Marchantia* and *Riccia* (Hepaticopsida) excluding developmental stages.

Unit II: Systematic position, structure, reproduction and life cycle of *Anthoceros* (Anthocerotopsida) and *Funaria* (Bryopsida) excluding developmental stages.

Unit III: Pteridophyta: General characters; systematic position, structure, reproduction and life cycle of *Rhynia* (Psilophytopsida) and *Selaginella* (Lycopsida) excluding developmental stages.

Unit IV: Systematic position, structure, reproduction and life cycle of *Equisetum* (Sphenopsida) and *Pteris* (Pteropsida) excluding developmental stages.

PAPER B: GENETICS

Objective: This paper deals with various aspects of hereditary trends observed in successive generations. It provides an insight into genetic basis of such evolutionary trends in plants. Coupled with the study of variations in life forms included in Paper A, the course material of Paper B provides an idea about the important role that genetics plays in structural and functional differentiation of plants.

Unit I: Mendelism: Mendel's experiments and results, Mendel's Laws of Dominance, Segregation and Independent assortment; Linkage: complete and incomplete linkage, linkage groups, linkage maps, importance of linkage, cytological interpretation of Mendelism.

Unit II: Non-allelic Gene Interactions: Dominant and recessive epistasis, supplementary genes, complementary genes, quantitative or polygenic inheritance, duplicate genes. Allelic gene interactions: Incomplete dominance, codominance, multiple alleles, pleiotropic genes.

Unit III: Chromosome theory of heredity, parallelism between chromosome and Mendelian factors, Sex linked inheritance; Characteristics and examples (Haemophilia, colour-blindness); Cytoplasmic or extranuclear inheritance: mitochondrial and plastid DNA; plastid inheritance in *Mirabilis*, mitochondrial inheritance in Yeast.

Unit IV: Genetic variations: Continuous and Discontinuous; Mutations: characteristics, types, importance, factors affecting mutations; Mutagens: Physical and chemical, mechanism of gene mutations; DNA damage and repair: Types of damage (Single base change and structural distortion), types of repair system in prokaryotes and eukaryotes.