

Faculty of Life Sciences

M.Sc. Botany

The living world; biological classification; plant kingdom : Characteristics and classification of viroids, viruses, bacteria and fungi, host-virus interaction, Reproduction in fungi and bacteria.

Nematodes : Elementary idea of nematodes; diseases caused by nematodes (Ear cockle of wheat, root knot of okra).

Diseases : General account of diseases caused by plant pathogens including viruses (tobacco mosaic virus), bacteria (citrus canker), phytoplasma (little leaf of brinjal), fungi (late blight of potato, stem rust of wheat, green-ear disease of bajra, white rust of crucifers, powdery mildews of cucurbits, red rot of sugarcane).

Algae : Characteristics and classification; structure and reproduction of Nostoc, Chlamydomonas, Volvox, Vaucheria, Chara, Batrachospermum, Ectocarpus; economic importance.

Bryophytes : Characteristics and classification; structure and reproduction of Riccia, Marchantia, Anthoceros, Funaria; economic importance.

Pteridophytes : Characteristics and classification, structure and reproduction of Psilotum, Lycopodium, Selaginella, Equisetum. Telome theory, evolution, heterospory and seed habit.

Gymnosperms : Characteristics and classification, structure and reproduction of Cycas, Pinus and Ephedra.

Angiosperms : Bentham and Hooker's system of classification: Diagnostic features of Ranunculaceae, Papaveraceae, Caryophyllaceae, Rutaceae, Cucurbitaceae, Apiaceae, Rubiaceae, Apocynaceae, Solanaceae, Acanthaceae, Lamiaceae, Euphorbiaceae, Arecaceae, Poaceae.

Anatomy : Anatomy of root, stem and leaf of dicots and monocots. Secondary growth.

Cell : Prokaryotic and eukaryotic cells, structure and functions, cell cycle and cell division (amitotic, mitotic and meiotic cell divisions).

Physiology : Plant water relations; mineral nutrition; photosynthesis; translocation of food material; respiration; nitrogen and nucleic acid metabolism; growth and development.

Reproduction : Asexual and sexual reproduction; structure and functions of flower, microsporogenesis, megasporogenesis, fertilization, development of embryo, endosperm and seed; apomixes.

Genetics and Plant breeding: Mendel's principles of inheritance, gene interactions, quantitative genetics, cytoplasmic inheritance. Composition and roles of different forms of nucleic acids; DNA replication, transcription, translation, techniques of hybridization and emasculation, suction method of emasculation, hot water emasculation, bagging, tagging, pollination. Physical and chemical mutagens, gamma garden, polyploidy.

Ecology : Organisms and environment, population, biotic community and succession; ecosystem – structure and function; natural resources and biodiversity and their conservation.

Anomalous Plant Anatomy : Scattered vascular bundles in dicots (Podophyllum), vascular bundles in a ring in monocots (Triticum), Separate xylem and phloem bundles, Dorsiventral, unifacial and isobilateral leaves. Kranz anatomy.

Methods of Environmental Analysis : Cell fractionation (Homogenization and centrifugation), Analysis of water : Colour, odour, turbidity, dissolved oxygen.

Experiments in Cytology and Genetics : Flower bud fixation; preparation of slides. Test cross methods-monohybrid cross, dihybrid cross.

Introduction to Environment : Environmental issues (species invasion, biodiversity, urbanization), control of environmental degradation (Phytoremediation, hot spot concept). Air, water, soil, noise and radioactive pollutions.

Tissue Culture and Plant Biotechnology : Cellular totipotency, callus and cell suspension culture, anther and pollen culture, micropropagation; organogenesis, application in crop improvement, synthetic seeds and their applications; somatic hybridization; somaclonal variation; cryopreservation. Applications of plant biotechnology. White's medium (1983), preparation of stock solution, sterilization methods, types of culture (Leaf, shoot, nodal Segment, callus, cell suspension cultures).