

BOTANY

BSc I

Paper I

- History, latest classification, nature & structure of virus, bacteria and fungi
- How virus infect the plants, their symptom, transmission, genome organisation, replication, purification, serology and reproduction of bacteriophages
- In case of bacteria, their nutrition, genome, cell structure, cell division, genetic recombination, culture and economic importance
- In case of fungi-thallus organisation, their reproduction and life cycles of some important genus of lower & higher fungi & their economic importance

Paper II

- Thallus organization, classification of algae & lichens, ultra structure of algae & cyanobacterial cell & economic importance of algae.
- In lichens-their reproduction, physiology and role in environmental pollution
- The characteristics and life cycles of some important algae of cyanophyta, chlorophyta, xanthophyta and phaeophyta and rhodophyta
- In Bryophytes-general characteristics, classification reproduction and affinities
- Gametophytic and sporophytic organisation of some important genus of Bryopsida, Anthocerosida and Hepaticopsida

Paper III

- Students will know general features of pteridophytes (vascular cryptogams), their stellar system and its evolution. Can compare the morphology, anatomy, developmental vegetative and reproductive systems of lycodium.
- Should be able to compare the general features and gametophytes & Sporophytes in Equisetum (Sphenopsida), Marsilea (Filicopsida). Student should know about the heterospory and how it leading to seed habit
- Student should know the morphology, development and reproductive part in Pinus (Coniferales) and Ephedra (Gnetales). Affinities & Evolutionary significant
- Students should know the elementary idea of Paleobotany, general account of fossil & types methods of fossilisation & geological time scale

BSc II year

Paper I

- Taxonomy- Comparative study of different classification systems e.g. Linnaeus, Bentham & Hooker, Engler & Prantl & Hutchison, nomenclature, Herbarium techniques & important Botanical Garden
- Study of Different Important Families of Dicots & monocots and their economic importance
- Anatomy: External morphology, modifications, phyllodes, cladodes & Phyllocades, Tissue system- Epidermal, ground and vascular, anatomy of root, stem and leaves, abnormal growth in roots and stems.
- Embryology-Structure and development of male & female gametophytes, microsporogenesis, microgametogenesis, megasporogenesis, and megagametogenesis, embryo & its development, endosperm development, apomixis and polyembryony

Paper II

- Cytology: Complete cell structure, chromosome structure, nucleosome and solenoid model, salivary gland, lampbrush and B chromosome, cell division-mitosis & meiosis chromosomal aberrations

- Genetics: Law of inheritance, gene interaction linkage, cytoplasmic inheritance & sex determination
- Mutation: spontaneous & induced mutation, molecular mechanism and evolutionary significance, polyploidy, theories of evolution
- Ecology - Relation with other discipline, plant types different hydrophytes, xerophytes, plant succession, xerophytes, hydrophytes, ecosystem and types components & functioning

Paper III

- Plant & Water relationship - Osmosis, Plasmolysis, water uptake, conduction, transpiration, mineral nutrition macro & micronutrients their role deficiency & toxicity symptoms, plant culture practices, ion uptake & Translocation
- Photosynthesis: Photosynthesis pigments, O₂ Evolution, Photophosphorylation, CO₂ fixation, C₃-C₄ and CAM Plants. Respiration-aerobic, anaerobic, respiratory pathways, glycolysis, Krebs cycle, electron transport, oxidative phosphorylation, pentose phosphate pathway, photorespiration
- Nitrogen Metabolism. Nitrogen fixation, Nitrogen cycle, Nitrogen assimilation
- Growth - Phytohormones, inhibitors, auxins, kinetin, gibberellins and ethylene. Photoperiodism and vernalisation. Germination, growth movements, parthenocarpy, abscission & senescence
- Biomolecules - classification, properties, biological role of carbohydrates, protein & lipids, nucleic acids, enzymes, concepts of holoenzymes, apoenzymes, coenzymes and cofactors, enzyme activity & mechanism of action.

BSc III

Paper I

- Plant Resource Utilisation Palynology & Biostatistics
- Origin and domestication of cultivated plants, to learn about the centres of diversity of plants, concepts of sustainable development. Cultivation, production and uses of wheat, rice, legumes & sugarcane.
- A general account of plants yielding oils, spices beverages, major fibre medicinal crops and plants of Uttar Pradesh
- To know about the conservation of plant resources for agriculture and forestry. In situ conservation, sanctuaries, national parks, biosphere reserves, wetlands, mangroves, Ex situ conservation botanical garden, field gene banks, seed banks, cryobanks
- Students should know about the introductory knowledge to palynology, morphology, viability and germination of pollens. Elementary statistics, classification of data, mean median and mode. Standard deviation, standard error, variance, correlation test and experimental designs

Paper II

- Students should have the knowledge of nucleic acid as genetic material, nucleotides, structure of nucleic acids and properties of genetic code, codon assignment, chain initiation of code mechanism of protein synthesis and its regulation
- Structure and properties of polysaccharides, amino acids, protein, vitamin and hormones. Idea about enzymes, its active sites, specificity, mechanism factors, general aspects of enzyme kinetics. Bioenergetics including laws of thermodynamics concept of Gibbs' free energy, high energy compounds (ATP, GTP)
- The entire dogma of molecular biology including replication of DNA in prokaryotes and eukaryotes, gene expression and regulation. Hormonal control and secondary messengers Ca⁺⁺, cyclic AMP, IP₃ etc

- The general introduction of biotechnology recombinant DNA technology plant tissues culture, methods of gene transfer transgenic plants, biotechnology and healthcare and microbial and environmental biotechnology

Paper III

- The knowledge of mineral resources of planet earth, conservation of mineral resources study of soils, their types, properties and problem soils, water, the sources, physico-chemical and biological properties of water, sustainable management of water. Energy resources in India. About the global forest wealth, importance of forests, deforestation
- The knowledge of environmental pollution, its type of air, water, soil, radioactive, thermal and noise pollution, their sources effects and control. Idea of greenhouse effect, ozone depletion and acid rain. Co₂ enrichment and climate change
- The knowledge of biodiversity and phyto geography, biotic communities and population their characteristics and population dynamics. Natural vegetation of India, static and dynamic plant geography, basic principles governing geographical distribution of plants
- Plant Pathology: Students should know etymology of viral, bacterial, fungal and insect and pest diseases, general idea about mosaic disease on tobacco and cucumber yellow vein mosaic of bhindi, citrus potato scab, little leaf of brinjal, damping off of seedlings, late blight of potato, red rot of sugarcane. Idea of integrated pest management.