

KHAJA BANDANAWAZ UNIVERSITY
FACULTY OF SCIENCE
DEPARTMENT OF BOTANY

Syllabus for Ph.D. Entrance Examination 2025-26

Modules	Syllabus
Module - 1	Plant Diversity and Evolution: Classification: Modern systems (Bentham and Hooker, APG); Structure and Reproduction: Algae, Fungi, Bryophytes, Pteridophytes and Gymnosperms; Evolutionary trends in plants
Module - 2	Plant Anatomy, Embryology and Development: Tissue systems, Secondary growth, Anatomical adaptations, Embryogenesis, Endosperm, Seed development, Apomixis and Polyembryony; Morphogenesis and Differentiation
Module - 3	Plant Physiology: Photosynthesis: C ₃ , C ₄ and CAM pathways; Respiration: Glycolysis, TCA cycle, ETC and oxidative phosphorylation; Phytohormones: Auxin, Gibberlin and Cytokinin; Nitrogen metabolism, mineral nutrition and stress physiology; Secondary metabolites (alkaloids, terpenoids, phenolics)
Module - 4	Cell Biology and Molecular Biology: Cell structure, Membranes, Organelles, Cell cycle, Cell division and Apoptosis; DNA replication, Transcription, Translation, Regulation of Gene expression; Recombinant DNA technology, Cloning vectors, PCR and Blotting techniques
Module - 5	Genetics: Mendelian and Non-Mendelian inheritance; Linkage, Crossing over, Chromosomal aberrations and Polyploidy; Population genetics and Hardy-Weinberg equilibrium
Module - 6	Ecology and Environmental Botany: Ecosystem structure, Energy flow, Productivity, Population and Community ecology, Ecological succession, Biodiversity conservation, Climate change, Pollution biology and Environmental Impact Assessment
Module - 7	Plant Pathology and Microbiology: Plant-microbe interactions: Symbiotic and Pathogenic, Mechanisms of plant disease resistance; Mycorrhizae, Rhizobia, Endophytes, Viruses, Bacteria and Fungal plant diseases
Module - 8	Economic Botany and Pharmacognosy: Origin of crops, Centers of diversity (Vavilov); Ethnobotany and Traditional medicine, Medicinal & Aromatic plants, Herbal drugs and Plant-based industries (food, fiber, timber, oil and beverages)