

**Department of Botany and Environmental Science**  
**Sri Guru Granth Sahib World University, Fatehgarh Sahib**

**Syllabus for Ph.D. (Botany) Entrance Test-2016**

**Diversity of Life Forms:** Principles and methods of taxonomy and outlines of latest classification in Viruses, Fungi, Bacteria and Plants including structure reproduction and evolutionary relationships among taxa of different groups of organisms

**Cell Biology and Cytogenetics:** Membrane structure and function, Structural organization and function of intracellular organelles, Organization of genes and chromosomes, Cell division & cell cycle Genomic (Chromosomal aberrations, aneuploidy, polyploidy) and point mutations

**Fundamental Processes:** DNA replication, repair and recombination; RNA synthesis and processing, Protein synthesis, Control of gene expression at transcription and translation level

**Cell Communication & Cell Signalling:** Host parasite interaction against pathogens in plants, Signal transduction in plants

**Developmental Biology:** Microsporogenesis, Megasporogenesis and Post fertilization development. Morphogenesis and organogenesis in plants; Cell and tissue culture techniques and applications. Programmed cell death, aging and senescence.

**Plant Physiology:** Photosynthesis, Respiration & photorespiration; Nitrogen metabolism, Plant hormones, their mechanism of action and functions, Sensory photobiology, Solute transport & photo-assimilate translocation, Secondary metabolites, Stress physiology.

**Molecules & their Interaction:** Bioenergetics, coupled reaction, group transfer, biological energy transducers, Principles of catalysts, enzymes and enzyme kinetics, enzyme regulations mechanism of enzyme catalysis, isozymes, Conformation of proteins (Ramachandran plot, 2°, 3° & 4° structures, domains, motif and folds), Conformation of nucleic acids (A-, B, Z-, DNA), t-RNA, micro-RNA).

**Ecological Principles:** The Environment; Habitat and niches, Population ecology, Species interactions, Community ecology, Ecological succession, Ecosystem, Environmental pollution, global environmental change, Conservation biology

**Applied Biology:** Microbial fermentation and production of small and macro molecules, Transgenic plants, molecular approaches to diagnosis and strain identification, Genomics and its application to health and agriculture Bioresource and uses of biodiversity, Breeding in plants, including marker- assisted selection, Bioremediation and phytoremediation, Economic importance of Algae, Fungi, Lichens and Bacteria Economic plants as a source of Food, Timber, Drugs, Essential oils, Rubber, Beverages and Fiber.

**Methods in Biology:** Techniques of molecular biology and recombinant DNA technology and applications.