



GANDHI INSTITUTE OF TECHNOLOGY AND MANAGEMENT (GITAM)

(Declared as Deemed to be University u/s 3 of UGC Act, 1956)

Visakhapatnam | Hyderabad | Bengaluru

Accredited by **NAAC** with **A++** Grade

Website: www.gitam.edu

GITAM SCHOOL OF SCIENCE

Department of Biochemistry

PhD in Science: Bioinformatics

PhD Entrance Test Syllabus - 2023-2024

PhD in Science: Bioinformatics

Unit 1:

Structure, properties, functions and metabolism of carbohydrates, amino acids, proteins, lipids and nucleic acids. Principles of bioenergetics - Entropy, Enthalpy, Free energy, high energy compounds, Electron Transport Chain, substrate level and oxidative phosphorylation. Properties and classification of enzymes, factors affecting enzyme activity, Enzyme inhibition.

Unit 2:

Structure of prokaryotic and eukaryotic cells. Structure and functions of plasma membrane, mitochondria, chloroplast, golgi, ER and nucleus. Membrane channels and pumps. Transport mechanisms. Membrane receptors and second messenger systems in signal transduction. Cell division, cell cycle and its regulation. Stem cells – types and properties. Replication, Transcription, Translation in prokaryotes and eukaryotes.

Unit 3:

Photosynthesis - C₃, C₄ and CAM plants. Nitrogen fixation. Phytohormones. Principles of tissue culture. Regeneration pathways of plant tissue culture. Isolation and culture of protoplasts. Types of animal cell and organ cultures. Principles of inheritance. Linkage and crossing over. Mutagens and types of mutations. Sex determination, sex linked inheritance.

Unit 4:

Physiological role and disorders of hypothalamic, adenohipophysial, neurohipophysial, thyroid, parathyroid, renal, pancreatic, adrenal and sex hormones.

Innate and Adaptive immunity. Immune cells and organs of immune system. Antigens and Antibodies, Antigen presenting cells. MHC, Humoral and cell-mediated responses. Cytokines, Hypersensitivity and Auto immunity.