

Department of Biological Science & Engg.

Syllabus for Institute Test for Admission in M. Tech in Biotechnology (Self-Financed)

- Biochemistry: Biomolecules – structure and function; Biological membranes – structure, membrane channel and pumps, molecular motors, action potential and transport processes; Basic concepts and regulation of metabolism of carbohydrates, lipids, amino acids and nucleic acids; Photosynthesis, respiration and electron transport chain. Enzymes – Classification, catalytic and regulatory strategies; Enzyme kinetics – Michaelis-Menten equation; Enzyme inhibition – competitive, non-competitive and uncompetitive inhibition.
- Microbiology: Bacterial classification and diversity; Microbial Ecology – microbes in marine, freshwater and terrestrial ecosystems; Microbial interactions; Viruses – structure and classification; Methods in microbiology; Microbial growth and nutrition; Nitrogen fixation; Microbial diseases and host-pathogen interactions; Antibiotics and antimicrobial resistance.
- Immunology: Innate and adaptive immunity, humoral and cell mediated immunity; Antibody structure and function; Molecular basis of antibody diversity; T cell and B cell development; Antigen-antibody reaction; Complement; Primary and secondary lymphoid organs; Major histocompatibility complex (MHC); Antigen processing and presentation; Polyclonal and monoclonal antibody; Regulation of immune response; Immune tolerance; Hypersensitivity; Autoimmunity; Graft versus host reaction; Immunization and vaccines.
- Cell Biology: Prokaryotic and eukaryotic cell structure; Cell cycle and cell growth control; Cell-cell communication; Cell signalling and signal transduction; Post-translational modifications; Protein trafficking; Cell death and autophagy; Extra-cellular matrix.
- Molecular Biology: Molecular structure of genes and chromosomes; Mutations and mutagenesis; Regulation of gene expression; Nucleic acid – replication, transcription, splicing, translation and their regulatory mechanisms; Non-coding and micro RNA; RNA interference; DNA damage and repair.
- Computational tools: Bioinformatics resources and search tools; phylogeny; Genomics, proteomics, metabolomics; Gene prediction; Functional annotation; Secondary structure and 3D structure prediction; Knowledge discovery in Biochemical databases; Metagenomics; Metabolic engineering and systems Biology.