



# 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](http://www.gitam.edu)

## GITAM SCHOOL OF SCIENCE

Department of Microbiology & Food Science and Technology

PhD in Science: Microbiology

PhD Entrance Test Syllabus - 2024-2025

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### PhD in Science: Microbiology

#### Unit I

Morphology and ultrastructure of microorganisms. Sterilization techniques, Types of media, cultivation of microbes, preservation of microbial cultures, Microscopy, staining techniques, bacterial growth kinetics. Fermented foods, SCP, food microbiology. Biofertilizers, Biopesticides. Microbial ecology, Extremophiles. Design and types of fermentors, upstream and downstream processing.

#### Unit II

Classification, chemistry, properties and functions of metabolism Carbohydrates, Lipids, proteins, nucleic acids –of carbohydrates, amino acids, Enzymes : classification, nomenclature, assay & kinetics. Ribozymes and abzymes. Enzyme inhibition. Enzyme purification. Centrifugation, chromatographic techniques and electrophoresis.

#### Unit III

Types of immunity. Antigens & antibody, Ag-Ab reactions. The complement system. Major Histocompatibility Complex (MHC), Human leucocyte antigen (HLA) restriction. Hypersensitive reactions, Autoimmunity. Immunodeficiency diseases, MABs.; Immunization. Major infectious diseases. Antimicrobial agents, new emerging pathogens.

#### Unit IV

Microbial genetics- genome organisation, DNA structure function, mutations and repairs, recombination in bacteria. Recombinant DNA technology, Blotting techniques. PCR. Cloning vectors. Genomic / gene libraries. DNA sequencing methods. Restriction mapping. Microarrays. Transgenic organisms. Gene therapy. Bioethics.