

Swami Rama Himalayan University

Ph.D. Syllabus for Entrance Examination

BIOSCIENCES

(Biotechnology, Microbiology, Biochemistry)

Unit-I: Biophysics & Biochemical Techniques

Water: physical properties and structure of water, pH, acid, base and buffers. Ionization behavior of amino acids and proteins, pH meter. Chromatography: Paper, TLC, GLC, HPLC, gel filtration, ion exchange & affinity chromatography. UV & Visible Spectrophotometry.

Unit-II: Chemistry & Metabolism of Biomolecules

Carbohydrates, Lipids, Proteins, Nucleotides, Vitamins, Minerals. Introduction and Classification of Enzymes, Kinetics of Enzyme-Catalyzed Reactions, Inhibition of Enzymes.

Unit-III: Molecular Biology & RDT

Structural aspects of genetic material, Prokaryotic and Eukaryotic replication, transcription and translation. Regulation of gene expression, DNA repair-mechanisms.

Recombinant DNA Technology: Introduction, restriction endonucleases and their types Cloning vectors, Plasmids, phages: lambda and M13, cosmids. Construction of genomic DNA library and cDNA library, Selection and screening of recombinants.

Unit-IV: Immunology

Innate and acquired immunity, Determinants of innate immunity, Cells and organs of immune system, Organization and structure of lymphoid organs and their role in immunity, Humoral and cell-mediated immunity, Nonspecific immune mechanisms, Antigens: Structure and properties; Haptens, Adjuvants, Immunogenicity, Immunoglobulin: Structures, Heterogeneity, Types and subtypes, Antibody diversity.

Unit-V: General Microbiology

Microbial cultures: Concept of pure culture, isolation, staining methods, Microbiological media-Natural and synthetic; autotrophic, heterotrophic and phototropic media. Cultivation of aerobes and anaerobes, Reproduction in bacteria and spore formation. Morphology, Ultra structure and chemical composition of bacteria. Normal microflora of the human body, Host pathogen interaction.