

BIOLOGICAL SCIENCES (BL) Syllabus of IIT JAM

General Biology: Taxonomy of plants and animals; pro-and eukaryotic organisms; cell organelles and their function; multicellular organization; general physiology; energy transformations; internal transport systems of plants and animals; photosynthesis; respiration; regulation of body fluids and excretory mechanisms; reproductive biology; plant and animal hormones and their action; nervous systems; animal behavior; plant and animal diseases; Mendelian genetics and heredity; basics of developmental biology; biology of populations and communities; evolution; basic principles of ecology; genesis and diversity of organisms.

Basics of Biochemistry, Molecular Biology, Biophysics: Buffers; trace elements in biological systems; enzymes and proteins; vitamins; biological oxidations, photosynthesis; carbohydrates and lipids and their metabolism; digestion and absorption; detoxifying mechanisms; nucleic acids; nucleic acid metabolism; nature of gene and its function; genetic code; synthesis of nucleic acids and proteins; regulation of gene expression; operons.

Structure of biomolecules; intra and intermolecular forces; thermodynamics and kinetics of biological systems; enzyme mechanisms and kinetics; principles of X-ray diffraction; IR- and UV-spectroscopy; analytical and biochemical techniques.

Microbiology, Cell Biology and Immunology: Classification of microorganisms and their characterization; nutrient requirement for growth; laboratory techniques in microbiology; pathogenic microorganisms and disease; applied microbiology; viruses and fungi; microbial genetics; cell theory; cell architecture; cell division; types of chromosome structure; biochemical genetics- inborn errors of metabolisms; innate and adaptive immunity, antigen antibodies; principles of processes of development.

Mathematical Sciences: Mathematical functions (algebraic, exponential, trigonometric) and their derivatives (derivatives and integrals of simple functions); permutations and combinations; basic probability and volumetric calculations.