



PATHFINDER ACADEMY

Syllabus: (M.Sc Biotech)

IIT JAM BIOTECHNOLOGY

Biology (10+2+3 level) weightage : 44%

General Biology : Taxonomy; Heredity; Genetic variation; Conservation; Principles of ecology; Evolution; Techniques in modern biology.

Biochemistry and Physiology : Carbohydrates; Proteins; Lipids; Nucleic acids; Enzymes; Vitamins; Hormones; Metabolism; Photosynthesis. Nitrogen fixation, Fertilization and Osmoregulation; Nervous system; Endocrine system; Vascular system; Immune system; Digestive system, Reproductive system.

Basic Biotechnology : Tissue culture; Application of enzymes; Antigen-antibody interaction; Antibody production; Diagnostic aids. Molecular Biology: DNA; RNA; Replication; Transcription; Translation; Proteins; Lipids; Membranes; Gene transfer. Cell Biology: Cell cycle; Cytoskeletal elements; Mitochondria; Endoplasmic reticulum; Chloroplast; Golgi apparatus; Signaling. Microbiology : Isolation; Cultivation; Characterization and enumeration of virus; Bacteria; Fungi; Protozoa; Pathogenic micro-organisms.

Chemistry (10+2+3 level) weightage: 20%

Atomic structure: Bohrs theory and Schrodinger wave equation; Periodicity in properties; Chemical bonding; Properties of s,p,d and f block elements; Complex formation; Coordination compounds; Chemical equilibria; Chemical thermodynamics (first and second law); Chemical kinetics (zero, first, second and third law order reactions); Photochemistry; Electrochemistry; Acid-base concepts; Stereochemistry of carbon compound; Inductive, Electromeric, conjugative effects and resonance. Chemistry of Function groups: Hydrocarbons, alkyl halides, alcohols, aldehydes, ketones, carboxylic acids, amines and their derivatives; Aromatic hydrocarbons, halides, nitro and amino compounds, phenols, diazonium salts, carboxylic and sulphonic acids; Mechanism of organic reaction; Soaps and detergents; Synthetic polymers; Biomolecules-aminoacids, proteins, nucleic acids, lipids and carbohydrates (polysaccharides); Instrumental techniques-chromatography (TLC, HPLC), electrophoresis, UV-vis-IR and NMR spectroscopy, mass spectrometry, etc.

Mathematics (10+2 level) weightage: 18%

Sets, Relations and Functions, Mathematical induction, Logarithms, Complex numbers, Linear and Quadratic equations, Sequences and Series, Trigonometry, Cartesian system of rectangular coordinates, Straight lines and family, Circles, Conic sections, Permutations and combinations, Binomial theorem, Exponential and logarithmic series, Mathematical logic, statistics, Three dimensional geometry, Vectors, stocks, shares and debentures, average and partition values, index numbers, matrices and determinants, Boolean algebra, probability, functions, limits and continuity, differentiation, application of derivatives, definite and indefinite integrals, differential equations, elementary statics and dynamics, partnership, bill of exchange, linear programming, annuities, application of calculus in commerce and economics.

Physics (10+2 level) weightage: 18%

Physical world and measurement, kinematics, law of motion, work, energy and power electrostatics, current electricity, magnetic effects of current and magnetism, electromagnetic induction and alternating current, electromagnetic waves, optics, dual nature of matter and radiations, atomic nucleus, solids and semiconductor devices, principles of communication, motion of system of particles and rigid body, gravitation, mechanics of solids and fluids, heat and thermodynamics, oscillations, waves.

JNU combined Biotechnology entrance examination

There is no defined or prescribed syllabus for JNU biotech entrance examinations. The Question Paper for Entrance Examination will be divided into two main parts

PART A will have question at the level of 10+2 level carrying a total 50% marks. This part is subdivided into sections I, II, III. While Section-I will have question from physics and chemistry and must be answered by all candidates, section II will have question from Mathematics and section III will have questions from Biology. Students have option to answer question from either section II or Section III

PART B carrying the remaining 50% marks will cover questions upto Bachelors level from all or some of the areas indicated below Physics, Chemistry, Mathematics, Biology (both plant and animal). There could be a possibility of change in the pattern and designing of the question paper.

AIIMS Biotechnology entrance examination

There is no defined or prescribed syllabus for AIIMS biotech entrance examinations.

IISc, Biological Sciences entrance examination

General Biology
Taxonomy and Physiology, Pro- and eukaryotic organisms; Cell organelle and their function; multicellular organisms; Energy transformations; Internal transport systems of plants; Respirations; Regulations of body fluids and excretory mechanisms; Cellular reproduction; Mendelian genetics and heredity; Biology of population and communities; Evolution; Genesis and diversity of organisms; Animal behavior; plant and animal diseases.

Basics of Biochemistry, Biophysics, Molecular biology

Buffers; trace elements in biological systems; enzyme and proteins; vitamins; biological oxidation, carbohydrates and lipids and their metabolisms; digestion and absorption; detoxifying mechanisms; plant and animal hormones and their action, neuromuscular systems, nucleic acids, nature of gene and its function, genetic code, synthesis of nucleic acids and proteins. Structure of biomolecules; intra and intermolecular forces; thermodynamics and kinetics of biological systems, principles of x-ray diffraction, IR and UV-spectroscopy and hydrodynamic techniques.

Microbiology and Cell biology

Classes of microorganisms and their characterization, nutrient requirements for growth; laboratory techniques in microbiology, pathogenic microorganisms and disease; applied microbiology; viruses, microbial genetics. Cell theory; cell architecture; methods of cell fractionation; cell division; types of chromosome structure; biochemical genetics- inborn errors of metabolism; viruses and fungi; principles of processes of development.