Syllabus for M.Sc. Biotechnology / Microbiology / Bioinformatics Entrance Examination

Life Sciences

Cell Biology

Cell theory and history, animal cells and plant cells, cell organelles, cytoskeleton, cell membrane, types of cell junctions, intra and inter cellular communication.

Biochemistry

Chemistry and Function of Amino acids, proteins, Carbohydrates, Nucleic acids and Lipids, Energetics and Metabolism of Carbohydrates, lipids, proteins, and nucleic acids. Classification and Applications of Enzymes & Kinetics of Enzyme catalysed Reactions, methods in isolation and quantitation of proteins, important chromatographic techniques, electrophoresis and UV/Visible and fluorescence spectroscopic techniques.

Molecular Biology

DNA as genetic material, Basic mechanism of prokaryotic and eukaryotic DNA replication, transcription, translation, Gene regulation, Translational regulation in prokaryote and eukaryotes, Basic Principles of Gene Cloning and DNA Analysis, Applications and Techniques of Gene Cloning, Gene editing technology (CRISPR)

Genetics

Mendel and the idea of heritable factors, chromosomal and molecular basis of inheritance, genetic basis of development, population genetics. Extension and variation of Mendelism Mutation, DNA repair & Recombination Regulation of Cell Cycle. Genome editing

Immunology

Cells and Organs of the Immune system, innate and adaptive immune response and its components, Humoral immune responses defence mechanism against various pathogens adopted by both plants and animals.

Microbiology

Basic of microbiology-Systems of classification of microbes, General characteristics of microbes, Microscopy, sterilization techniques, Microbial physiology, Microbial ecology, Environmental microbiology, Mycology, Bacteriology, Virology, Parasitology, Industrial microbiology. Fermentation processes, downstream processing, Food Microbiology-Food preservation, spoilage of food, Food borne diseases, Food regulatory agencies.

Botany

Structural organization and function of plant cell, Growth and Division of the cell, Morphogenesis and organogenesis in plants Principles and methods of taxonomy, Outline classification of plants, Concepts of species and hierarchical taxa, biological nomenclature, classical and quantitative methods of taxonomy of plants Classification, isolation, characterization, Biosynthetic pathway of secondary metabolites, tracer techniques Plant hormones, transport mechanisms, meristems, primary& secondary tissues, primary structure of plant body, secondary growth, mineral nutrition, absorption, water & solute transport, transpiration, photosynthesis, respiration, plant movements, growth& senescence, plant tissue culture,

Zoology

Animal Diversity, General features and classification, Invertebrates and Vertebrates, Anatomy and physiology of Vertebrates- Skeletal System, Digestive System, Respiratory System, Circulatory System, Urinogenital System, Nervous System, Endocrine system, Molecular and Chemical basis of Muscle Contraction. Physiology of Vision and Hearing, Gametogenesis, Fertilization in mammals,

Types and Patterns of Cleavage, Role of Primary Organizers, Extra Embryonic Membranes, Basic Processes in Embryonic Development.

Ecology, evolution, and biodiversity

Introduction to ecology and the biosphere, behavioural, population and community ecology various ecosystems and conservation biology, prokaryotic and eukaryotic biodiversity, mechanisms of evolution.

Pharmaceutical Biotechnology

Drug discovery pipeline and process, nature and Source of drugs, Routes of drug administration, Pharmacokinetics, Pharmacodynamics, Chemotherapy.

Bioinformatics

Introduction to Bioinformatics, Databases, Format and Annotation, Common sequence file formats, Standard search engines, Data retrieval tools, Sequence Similarity Searches, scoring matrices, Dynamic programming algorithms, Heuristic Methods of sequence alignment, Multiple Sequence Alignment and software tools for pairwise and multiple sequence alignment, ORF finding, Phylogenetic analysis

Physical Sciences & Mathematics – Questions of the level of 10+2 in the subjects Physics, Chemistry and Mathematics

Computer Sciences - Class 10 Level

SUBJECT	WEIGHTAGE
Life Sciences	70
Physical Sciences & Mathematics	25
Computer Sciences	5
TOTAL	100