

Syllabus for Biology Bachelor's

Section 1: Subject Knowledge

Please Note: A Total of 40 Questions will be asked, combining the following topics, with the difficulty level commensurate to a Bachelor's Candidate.

Unit I: Biomolecules

Carbohydrates, lipids, vitamins, minerals, amino acids, fatty acids, proteins.

Unit II: Bioenergetics

Glycolysis, Oxidative phosphorylation, Gluconeogenesis, Ketone bodies, Photosynthetic reaction, Rate of photosynthesis, Uses of glucose from photosynthesis, Aerobic and anaerobic respiration, Response to exercise and Metabolism.

Unit III: Metabolism

Metabolic pathways, Energy derivation, Regulation, Metabolic disorders, Catabolism and anabolism, Metabolic reactions, Energy compounds, Cell metabolism and digestive organs.

Unit IV: Cell Biology

Cell structure and function, cell processes (growth, division, apoptosis), communication, and division (mitosis, meiosis), DNA organization and replication, and Cellular diversity (eukaryotic, cancer, and stem cells).

Unit V: Plant Physiology

Water in plant metabolism, water absorption, and stomatal function, Mineral nutrition, photosynthesis (C₃, C₄, CAM), and respiration, Plant growth regulators and their roles, Growth and development of crops, Overview of secondary metabolites and their role in plant defense.

Unit VI: Immunology

Antigens, immunogenicity, and antigen specificity, MHC types and functions, Antigen processing and presentation, Structure and diversity of immunoglobulins, Antibody production (monoclonal and polyclonal), Complement system pathways, Antigen recognition (TCR, BCR), lymphocyte activation, and acquired immune responses (HI, CMI, DTH).

Unit VII: Enzymology

Covalent modulation (adenylation, phosphorylation), zymogen activation, multienzyme complexes, Allosteric regulation, isoenzymes, enzyme models (lock and key, induced fit), Enzyme classification, coenzymes, and enzyme activity measurement, Factors affecting enzyme activity, Michaelis-Menten kinetics, and bi-substrate reactions, Allosteric behavior and cooperativity models in enzymes.

Unit VIII: Biophysical Chemistry

Structure of water, chemical potential, and hydrophobic/hydrophilic interactions, Protein-solvent interactions, structure, stability, folding/unfolding, and ligand binding, Structure-function relationships and membrane equilibria.

Section 2: Fundamental Skills

Please Note: A Total of 28 Questions will be asked, combining the following topics, with the difficulty level commensurate to a Bachelor's Candidate.

Unit I: Data Analysis

Unit II: Math and Statistics

Unit III: Lab Skills

Unit IV: Reading and Writing

Section 3: Specific Skill Proficiency

This section has more than 30 skills. You can select the ones you are proficient in from the enrollment form. You can choose a maximum of 2 skills. Each skill contains 10 questions.