

Bioscience Ph.D entrance examination syllabus

Unit-1 BIOMOLECULES: Structure of atoms, molecules and chemical bonds
Classification, Structure,, Properties, Functions of Carbohydrates, Proteins and Lipids,
Characteristics & Physico-Chemical properties of nucleic acids, Conformation of nucleic
acids, vitamins.

Unit-2 PLANT PHYSIOLOGY: Photochemistry and Photosynthesis, Photosynthetic
Pigments, Light harvesting complexes, Photo Oxidation of Water, mechanism of electron
&Proton transfer, Carbon assimilation, Calvin cycle, Photorespiration and its
significance, C₄cycle and CAM Pathway, Plant hormones, Phytochromes

Unit-3 ANIMAL PHYSIOLOGY AND HORMONES: Digestion, Excretion, respiration,
circulation, sensory physiology, muscle contraction, Thermoregulation, Endocrine & its
regulation in man.

Unit-4 BIOPHYSICS & BIOCHEMICAL TECHNIQS: Principles and techniques of
Chromatography, Electrophoresis, Spectroscopy (Visible, UV, NMR, ESR, IR, Mass
Spectroscopy), Centrifugation, Biological Solutions, X-ray Diffraction, Radiation Biology
(Radioisotopes detection & measurement).

Unit-5 ADVANCED CELL BIOLOGY&CELL BIOLOGY TECHNIQUES

Origin of Life & evolution of cell, cell cycle& its regulation, ultra structure of eukaryotic
chromosome, cell-cell interaction, transport across membranes, cytoskeleton, and
microscopy. Mitotic and meiotic chromosome preparations, karyotyping, ideogram,
camera Lucida, flow cytometry, FISH, chromosome painting.

Unit-6 GENETICS: Drosophila & mouse as model organisms, Mendelian principles,
deviations from Mendelism, extra nuclear inheritance, Molecular mechanism of Sex-
determination, Transposable elements, mutations & genotoxicity screening in different
organisms, genetic repair mechanisms. Syndromes and genetic diseases of human.

Unit-7 MOLECULAR BIOLOGY: Central dogma, DNA replication, Transcription,
Translation, Post transcription & translation modification, gene regulation, Oncogenes &
proto-oncogenes. Cancer therapy.

Unit-8 GENETIC ENGINEERING & BIOTECHNOLOGY: Enzymes in genetic Engineering, Plasmids, Vectors, Recombinant DNA Technology, Screening of clones & its application, Transgenic plants and animals and their applications, IPR, Biosafety regulation, Biofertilizers & biopesticides. Applications of biotechnology.

Unit-9 MICROBIOLOGY & CELL CULTURE: Microbial diversity, Classification & general account of microbes Fermentation technology and industrial applications. Food spoilage and preservation, food borne diseases, bacterial and fungal toxins, Dairy microbiology, production of milk products. Microbial, Plant and animal cell culture and their application is biology

Unit-10 BIOSTATISTICS & COMPUTER APPLICATIONS: Mathematical Principles & their applications, measure of central tendency and dispersion, Probability distribution, sampling distribution, Hypothesis test. Parametric & nonparametric tests, regression and correlation. Generation of computers, computer hardware & soft ware, input & output devices, Bits & bytes, Memory, Languages, Logical and Boolean operations, Search Engines, Applications of computers in Biology.