Pt. Ravishankar Shukla University
Raipur 492 010, Chhattisgarh

Syllabus

Entrance Test
for
M.Sc. in Biotechnology

Session
2025-2026

Approved by

Board of Studies : Biotechnology

Date : 21/05/2025

Name of Chairman : Prof. Keshav Kant Sahu

Name of Members : Prof. Afaqu Quraishi

: Dr. Sayal Saju Deo

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: Dr. Bharti Sahu

Dr. Nagendra Kumar Chandrakar KHEMRAJ

Ankita Raki

Syllabus for M.Sc. Entrance Test in Biotechnology

The cell (Prokaryotic & Eukaryotic):
The cell envelope: Plasma membrane; bilayer lipid structure; functions; the cell wall. Ultra structure and function of nucleus: nuclear membrane; nucleolus and other organelles: Golgi bodies, ER, peroxisomes, Vacuoles. Cell divisions (Mitosis & Meiosis)

Chromosome organization:
Morphology; centromere and telomere; chromosome alterations; deletions, duplications, translocations, inversions; variations in chromosome number aneuploidy, polyploidy; sex chromosomes

DNA the genetic material:
DNA structure; replication; DNA- protein interaction; the nucleosome model; genetic code; satellite and repetitive DNA. Extranuclear genome: Presence and function of mitochondrial and plastid DNA; plasmids.

Gene expression:
Structure of gene; transfer of genetic information; transcription, translation, protein synthesis; tRNA; ribosomes; regulation of gene expression in prokaryotes and eukaryotes; proteins, 1D, 2D and 3D structure.

Genetic variations:
Mutations, spontaneous and induced; transposable genetic elements; DNA damage and repair: Genetic inheritance: Mendelism; laws of segregation and independent assortment: linkage analysis; allelic and non-allelic interactions.

Genetic engineering:
Tools and techniques of recombinant DNA technology; cloning vectors; genomic and cDNA library; transposable elements; techniques of gene mapping and chromosome walking

Plant biotechnology:
Functional definition; basic aspects of plant tissue culture; cellular totipotency, differentiation and morphogenesis; biology of *Agrobacterium*; vectors for gene delivery and marker genes; salient achievements in crop biotechnology

Microbiology:
General and Applied microbiology; Microbiology of Domestic water and sewage; Microbiology of milk and milk products; Industrial microbiology

Biochemistry:
Amino acids and Peptides - Basic structure and biological function, Carbohydrate and its metabolism - Glycogenesis; Gluconeogenesis; glycolysis, Glycogenolysis Lipids - Basic structure and biological function.

Techniques in Biotechnology:
Principles and techniques about the following pH meter; Colorimeter; Microscopy- Light microscopes, Phase contrast and Electron microscopes; Centrifugation; Separation of bio-molecules by chromatography and Electrophoresis.