

SCHOOL OF STUDIES IN BIOTECHNOLOGY

**Pt. Ravishankar Shukla University
Raipur 492 010, Chhattisgarh**



Syllabus

**Entrance Test
for
M.Sc. in Biotechnology**

**Session
2024-2025**

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.