

PAHER UNIVERSITY, UDAIPUR

Ph.D. Entrance Examination Syllabus – Biotechnology

Unit I: Cell & Molecular Biology

- Basic structure and functions of cells
- Prokaryotic and eukaryotic cells
- Cell division and cell cycle
- DNA, RNA and proteins
- DNA replication, transcription and translation
- Basic concepts of genes and gene expression
- Mutations and genetic variation
- Cell communication and basic signalling

Unit II: Genetics, Biochemistry & Microbiology

- Basic principles of heredity and genetics
- Genes, chromosomes and mutations
- Basic biomolecules: carbohydrates, proteins, lipids and nucleic acids
- Enzymes and their functions
- Basic concepts of metabolism
- Introduction to microorganisms
- Bacteria, fungi and viruses
- Microbial growth and applications
- Role of microorganisms in health, agriculture and industry

Unit III: Applied Biotechnology

- Introduction to biotechnology and its applications
- Basic concepts of genetic engineering
- Recombinant DNA technology
- PCR and DNA sequencing
- Plant tissue culture and agricultural biotechnology
- Animal cell culture and medical biotechnology
- Vaccines and diagnostic biotechnology
- Industrial biotechnology and fermentation
- Food biotechnology
- Environmental biotechnology and bioremediation

Unit IV: Bioinformatics & Biotechnology Applications

- Introduction to bioinformatics
- Biological databases
- Basic concepts of DNA and protein sequence analysis
- Introduction to sequence alignment and BLAST
- Applications of bioinformatics in biological research
- Biotechnology in healthcare
- Biotechnology in agriculture
- Biotechnology in food production
- Biotechnology in environmental management
- Biotechnology and sustainable development