



School of
Postgraduate Studies

Subject-specific Entrance Test Table Of Specification PhD in Biotechnology

Sr. No.	Core Areas	Percentage
1.	<p><u>Agriculture Biotechnology</u></p> <p>Introduction, Plant Molecular Markers, Phyto-hormones and growth hormones, Cell and Tissue culture, farm productivity, Protoplast culture. Somaclonal variations as breeding tool, Somatic Hybridization, Plant Transformation, Chloroplast Transformation, Genetically modified crops, and animals (transgenic), Biofertilizers, Plant Growth promoting rhizobacteria, Natural Pesticides (Biodegradable), Biosafety and concerns</p>	10%
2.	<p><u>Health Biotechnology</u></p> <p>Introduction; Molecular basis of diseases, Molecular and genetic markers, Mutation, Detection of infectious agents, Active and passive immunization, Vaccines; Transgenic animals; Drug delivery systems, Blood transfusion, Organ transplantation and Grafting techniques; Strategies of gene therapy; Stem cell technology. Nanotechnology in diagnostic and treatment; Biosensors; Biopharmaceuticals; Drug development process (Pharmacogenetics, Initial product characterization, Patenting, Delivery pathways of biopharmaceuticals, Preclinical studies, Pharmacokinetics, and pharmacodynamics); Toxicity studies; Antibiotics, Therapeutic hormones, and enzymes; Recombinant blood products</p>	10 %
3.	<p><u>Industrial Biotechnology</u></p> <p>Introduction; Industrially important microbial genera; Industrially important enzymes; Microbial fermentation (types, parameter, kinetics); Fermentation products (Microbial, Animal cell and Plants), Fermentors / Bioreactors; Applications (Food, Feed, Textile, Pharmaceuticals, Paper, and Pulp); Recovery and purification of fermentation products; Biofuels</p>	10 %



School of
Postgraduate Studies

4.	<p><u>Environmental Biotechnology</u></p> <p>Introduction; Fundamentals of Biological Intervention; Genetic manipulation strategies in environmental biotechnology; Pollution indicators; Pollution control strategies; Biology of wastewater and its treatment; Sludge treatment; Contaminated land and bioremediation; Effluent treatment; Phytotechnology; Hyper-accumulation; Solid Waste treatment; Detoxification of hazardous chemicals; Biodegradation; Biotransformation; Biosorption</p>	10 %
5.	<p><u>Food Biotechnology</u></p> <p>Introduction; Microorganisms in food; Food biopreservation; Food Spoilage; Food Safety and Quality; Food borne diseases: prevention and cure; Food fermentation; Fermented and microbial foods/products; Probiotics; Prebiotics; Synbiotics; Bacteriocins; Genetically Modified Foods.</p>	10 %
6.	<p><u>Cell and Molecular Biology</u></p> <p>Cell theory; Cell structure; Cell organelles and Cytoskeleton; Cell signaling; Transport mechanisms; Cell cycle; Apoptosis; Central dogma of molecular biology; Prokaryotes and Eukaryotes; DNA Replication; Transcription; translation and post-transcriptional modification</p>	8%
7.	<p><u>Techniques in Biotechnology</u></p> <p>Recombinant DNA technology; Protein and nucleic acid gel electrophoresis; Blotting techniques (Western, Northern and Southern Blotting); Restriction endonucleases; Restriction mapping; Vectors and their types; Polymerase Chain reaction (PCR) and its type; Cloning strategies, Site-directed mutagenesis; Sequencing techniques; Immunohistochemistry; Immunocytochemistry; Microscopy (light, confocal and electron); Chromatographic techniques (TLC, Paper Chromatography, Gel filtration, ion exchange; affinity chromatography, HPLC, GC); ELISA</p>	08%
8.	<p><u>Microbiology</u> (Bacteriology, Virology, Mycology, Immunology)</p> <p>Taxonomy; Growth parameters/ Growth kinetics; Identification and characterization (microscopy, Gram's staining, molecular identification, biochemical characterization); Classification (prokaryotes, eukaryotes, archaea); Mode of nutrition; Significance of microbes; Immune responses;</p>	08%



School of
Postgraduate Studies

	Antigens and antibodies	
9.	<p><u>Genomics and Proteomics</u></p> <p>Organization and Structure of Genome; Gene mapping; Transcript mapping; Gene expression and regulation; RNA interference; Protein translocation mechanism; Protein-Protein and Protein-DNA interaction; Techniques in proteomics (MALDI-TOF, Crystallography, MS, LCMS/MS, ICAT, iTRAQ); Introduction to Metabolomics; Microarray</p>	06%
10.	<p><u>Biochemistry</u></p> <p>Introduction to biomolecules; Lipid; Proteins and their classification; Carbohydrates; Nucleic acids; Amino acids; Water, Minerals, Vitamins, Enzymes, Protein Structure</p>	05%
11.	<p><u>Genetics</u></p> <p>Mendelian Genetics; Gene interaction; Epistasis; Multiple alleles; Structure of chromosomes and genes; DNA as storage of genetic information; Chromosomal aberrations; Transposons; Sex determination; Linkage and crossing over</p>	05%
12.	<p><u>Bioinformatics</u></p> <p>Genesis of Bioinformatics; Applications of Bioinformatics; Gene identification; Multiple sequence alignment; Evolution and Phylogenetics; 3D structure prediction; Bioinformatics tool (BLAST, Docking, T-coffee)</p>	05%
13.	<p><u>Research Planning and Skills in Biotechnology</u></p> <p>Research methodology; Literature review; Abstract writing; Oral and Posters Presentation; Project writing; Scientific report writing</p>	05%
	Total	100%