Syllabus for Ph.D., Entrance Examination
Biotechnology
Faculty of Applied Science &Technology

Protein Biotechnology

Studying the structure, types, function, and everything related to proteins in detail. Electrophoresis and DNA Sequencing Genomics. This field will revolve around the study of types of genes present in different organisms, their mapping, and the Human Genome Project.

Biochemistry, Molecular & Cell Biology,

Genomics Biomolecules, Metabolism, Membrane transport, Structure and regulation of prokaryotes and eukaryotes genes, Transcription, Translation, Post-transcriptional and Translational modifications, Molecular interaction, Phylogenetic, Molecular markers, Genetic and physical mapping, Gene interaction; Population genetics, Genetic engineering; Cloning and expression vectors, rDNA technology, Gene cloning approaches, Whole genome sequencing & annotation, High throughput gene expression and Function elucidation technologies, PCR, Blotting techniques, Gene transfer technologies, Protein-protein interactions, Mass spectrophotometry, Signal transduction pathways and their elucidation, Primary and secondary metabolic pathways, Systems biology frameworks for metabolic engineering, Nanobiotechnology, Genomics and proteomics.

Microbial & Plant Biotechnology

Microbial taxonomy and diversity (bacteria, fungi, virus); Microbial nutrition, growth and control; Microbial metabolism; Microbial genetics; Microbial production and purification of fermented food and food products, recombinant proteins, industrial enzymes; Free and immobilized enzyme kinetics; Types of bioreactors; Bio separation techniques; Concept of plant cellular tot potency; Clonal propagation; Organogenesis and somatic embryogenesis, artificial seed, soma clonal variation, embryo culture, in vitro fertilization; Plant products of industrial importance; Plant-microbe interactions.

Medical Biotechnology

Infectious diseases: Microbial (viral, bacterial, fungal) , Life style diseases, Cell & developmental biology, Cancer biology, Immunotechnology, Antigen antibody interactions, Antibody engineering, vaccines and the associated manufacturing processes, molecular and immune diagnostics methods and their applications, Cell culture technologies, Regenerative

medicine & transplantation technology, Hypersensitivity and autoimmune diseases, tolerance, animal biotechnology, Animal cell preservation, Stem cells and healthcare, Clinical trials

Environmental Biotechnology

Biotransformation and biodegradation; Biofertilizers; Biosensors – living biosensors for the management and manipulation of microbial consortia; Role of biotechnology in energy production.

Bioinformatics/Statistics

Major Bioinformatics resources (NCBI, EBI, ExPASy); Sequence and structure databases and analysis, Sequence analysis, Phylogeny, Comparative genomics; Molecular modeling and simulations. Overview and functions of a computer system; Basics of database management system- Conceptual Schema, ER diagrams, normalisation and SQL. Basics of programming; Statistics: Descriptive statistics, Correlation and regression, Hypothesis Testing, Probability theory.

This field involves the application of Information Technology and Data Science in order to properly analyse various genetic molecules. This branch is also used for genetic analysis. Statistics and Probability Theory This is a bit of Mathematical field involving all the important theories of Statistics and Probability and their applications in the field of Biotechnology.