

M. Sc. Programme

The students learn and acquire knowledge on the following aspects:	1 st Semester	2 nd Semester	3 rd Semester	4 th Semester
	Biochemistry: - The structural and functional aspects of biomolecules. - The regulatory mechanism of metabolic pathways.	Microbiology: - The differences between prokaryotic and eukaryotic cellular organization, the physiology and metabolism of bacterial growth. - The concepts of bacterial genetics and recombination and its application in genetic engineering.	Genetic Engineering: Tools to create DNA constructs. Application of theoretical knowledge of genetic engineering for development of new recombinant DNA molecules.	Evolution and Environmental Biotechnology: The global and regional threats to the environment. Role of biotechnology in analysis and treatment of pollutants. Concept of EMP, ELA and environmental laws. Concept of GIS and RS.
	Cell Biology & Genetics: - The structure and function of cellular organelles along with cellular transport, protein trafficking, cell signaling, cancer pathways. - Basics of Cytogenetics.	Immunobiology and Immunobiotechnology: The cellular and molecular basis of the immune system, antigen antibody reaction, antibody structure and function and autoimmunity.	Bioprocess Engineering Immunobiology and Immunobiotechnology: - The design of Fermenter/bioreactors. - The application of bioprocess engineering in different industries for the benefit of mankind.	Research aptitude, Scientific communication and Bio-entrepreneurship: Various domains of life forms and their origin. The theory and practices in Genetics. The theory and practices of fixobiology. Various forms of ecosystem, plant physiology, planet science and microbes.
	Instrumentation & Analytical Techniques : The instrumentation, working principles and applications of analytical tools and techniques.	Molecular Biology: - The basic structure of RNA and DNA. - Various Molecular biology processes like replication, transcription, translation. - The transcript and translate level expression and signaling pathways that control gene activity.	Plant Biotechnology: The methods for developing transgenic plants and molecular approaches used for plant breeding and trait selection.	Dissertation/Project Work: - The creation of research plans/ideas with the help of relevant literature and execution. - The analysis of research data.
	Biostatistics and Computational Biology: - The basics of probability, statistical Quality Control, Correlation and regression analysis. - Analysis of protein structure and its application in drug designing.	Animal Biotechnology: The concept & types of Animal Cell Culture and the scope of molecular biology techniques.	Biotechniques: - The instrumentation used in Biotechnology. - The theory and practices in Microbiology, cell culture, immunology.	

The practical courses impart Hands-on Training to the students where they learn to handle different equipment and acquire practical knowledge on different aspects of course curriculum.

Ph. D. Programme

PAPER I	PAPER II	PAPER III	PAPER IV
RESEARCH METHODOLOGY AND PUBLICATION ETHICS - Research methodology: meaning, objectives, research design and hypothesis. - Sampling, data collection and statistical analysis. - Interpretation and presentation of data. - Research ethics: principles, informed consent, ethical committees. - Publication ethics: plagiarism, authorship, peer review, open access. - Scientific writing, referencing and indexing.	TOOLS AND TECHNIQUES IN BIOTECHNOLOGY - Spectroscopic and imaging techniques. - Molecular biology and recombinant DNA techniques. - Chromatography, electrophoresis and centrifugation. - Microbiology and immunotechniques. - Bioinformatics tools and databases. - Sequence alignment, gene prediction and protein structure analysis.	REVIEW WRITING AND SCIENTIFIC PRESENTATION - Comprehensive literature review. - Critical analysis and synthesis of research. - Scientific writing and referencing. - Preparation of review document. - Oral presentation before examiner.	RESEARCH SEMINAR - Seminar-I on proposed research area. - Seminar-II on recent advances in the subject. - Scientific communication and presentation skills. - Discussion and evaluation by the committee.