

BIOTECHNOLOGY HONOURS

COURSE OUTCOMES

COURSE: Biochemistry & Metabolism (BIOTECH1C01)

CO1: Students will learn in detail different aspects of Biochemistry: carbohydrates, proteins, fats, enzymes, glycolysis, TCA cycle, Beta oxidation of fatty acids. The course will help the students understand fundamental energetics of biochemical processes, their functionalities.

CO2: To train students on the basic techniques of biochemistry. The course gives hands on training on the practical experiments and techniques relating to metabolism in biochemistry.

COURSE: Genetics (BIOTECH1C03)

CO1; This course enlightens students about various laws of heredity, dominance, epistasis and also various sex linked inheritance, cytoplasmic inheritance, viral and bacterial structures, DNA packaging in eukaryotes, genome imprinting, Barr body, sex determination, dosage compensation, Hardy- Weinberg lay and population genetics

CO2: Skills of applying the genetic technologies in industries related to pharmaceuticals, biotechnology, and diagnostic clinics.

COURSE: Cell Biology (MICRO1GE01)

CO1: By understanding how cells work students get a detailed knowledge of the various mechanisms of cells and cell signaling on which living beings work.

CO2: It helps understand the cell as structural and functional unit of life.

COURSE: Molecular Biology (BIOTECH1C04)

CO1: To make students familiar about structure, function of macromolecules viz. DNA, RNA, Proteins and their biosynthesis as well as regulation. Students will demonstrate knowledge of the central dogma of biology and predict outcomes when the process malfunctions

CO2: Students will be practically skilled in isolation and analysis of nucleic acids

Course: General Microbiology (BIOTECH1C02)

CO1: Students learn about microbes and general techniques of microbiology. The students obtain an understanding on the concept of culturing microbes, sterilization techniques and estimating the number of microbes in a given sample.

CO2: The course throws light on types of microorganisms in and around humans.

Course: Bioinformatics (BIOTECH2SEC02)

CO1: The objective of this course is to introduce students with theory and practical experience of use of common computational tools and databases, which facilitate investigation of molecular biology and evolution-related concepts.

CO2: By the end of the course, students will have the necessary learning to radically advance our understanding of life and transform medicine

Course: Enzymology (BIOTECH2SEC01)

CO1: The major learning objective of the course is to understand the theories of enzyme kinetics, the mechanisms of enzyme catalysis, and the mechanisms of enzyme regulation in the cell. The course also provides an insight into the concepts of enzyme purification and immobilization.

CO2: It gives the students knowledge of the various applications of enzymes in various industries such as food, pharmaceuticals and medicine etc.

Course: Recombinant DNA Technology (BIOTECH2C07)

CO1: To illustrate creative use of modern tools and techniques for manipulation and analysis of genomic sequences and to expose students to application of recombinant DNA technology in biotechnological research.

CO2: To train students in strategizing research methodologies employing genetic engineering techniques.

Course: Bioprocess Technology (BIOTECH3DE01)

CO1: This course enables the student to understand the practical aspects of bioprocess engineering and the role of bioprocess engineer in industry.

CO2: Various methods of bioprocess technology and logistics of fermentation technology are taught.

Course: Immunology (BIOTECH2C05)

CO1: The subject provides a detailed knowledge of our immune system and how it works to fight against various diseases

CO2: The subject helps the students understand the concept of vaccinations, different types of vaccines and their importance.

Course: Environmental Biotechnology (BIOTECH2C08)

CO1: The major objective is to understand the current applications of biotechnology to environmental quality evaluation, monitoring and remediation of contaminated environments.

CO2: This course will offer the students a broad sense of understanding on how modern biotechnology is developed to achieve better environmental protection and sustainability through the use of microbes and microbial communities in pollution abatement to mitigation of climate change, bioenergy, biomaterial to enzyme discovery

Course: Bacteriology and Virology (BIOTECH2C09)

CO1: Students are taught about various bacterial & viral diseases, structure of different viruses and bacteria

CO3: Demonstrate knowledge of and apply a range of laboratory techniques for the isolation, characterization and laboratory diagnosis of bacteria and viruses, including *in vitro* growth, purification and detection of proteins and nucleic acids;

Course: Microbial Physiology (BIOTECH2C10)

CO1: The course discusses the important metabolic processes that occur in prokaryotes and eukaryotic microorganisms under different environmental conditions.

CO2: The regulation of metabolism through control of gene expression and enzyme activity is also covered. Finally, development of the laboratory skills for students will be targeted.

Course: Bioanalytical Tools (MICRO2GE02)

CO1: The students are given a deep knowledge into the concept of microscopy, spectroscopy, centrifugation, electrophoresis, biosensors, chromatography and nanotechnology.

CO2: The course enhances the practical skills of the students in various analytical techniques used in biotechnology.

Course: Plant Biotechnology (BIOTECH3C12)

CO1: The course aims at training students with the techniques associated with the *in vitro* propagation of plants and their maintenance.

CO2: This course explores the use of biotechnology to both generate genetic variation in plants and to understand how factors at the cellular level contribute to the expression of genotypes and hence to phenotypic variation.

Course: Animal Biotechnology (BIOTECH3C11)

CO1: To create awareness on advanced streams like Stem Cell Biology, Animal Cell Culture, Genomics and Proteomics, Drug Design, Genetic Engineering and Bioinformatics.

CO2: Evaluate and discuss public and ethical concerns over the use of **animal biotechnology**

Course: Ecology and Environment (BIOTECH3DSE03)

CO1: The course will enable the students to gather in-depth knowledge on the basic concepts of ecology.

CO2: Students can effectively apply basic principles of the natural and social sciences to current issues of natural resources and the environment.

Course: Food Biotechnology (BIOTECH3C14)

CO1: This course gives students a detailed idea about aspects of food preservation, fermentation techniques, fermented foods and beverages, probiotics, spoilage microbes & diseases associated with them.

CO2: Understand the basics of Food Quality, Quality Control, Quality Assurance and Food Safety.

Course: Advances in Microbiology (BIOTECH3DSE02)

CO1: In this course advanced microbial techniques are taught along with different genomes, metagenomics, type three secretion system, synthetic biology.

CO2: Graduates will be able to apply the scientific method to formulate questions and hypotheses, design experiments, employ appropriate methodology to solve problems in microbiology, and be able to analyze, interpret, and present scientific data in microbiology

Course: Medical Microbiology (BIOTECH3C13)

CO1: The content of rigorous course includes many etiological agents responsible for global infectious diseases.

CO2: It will also provide opportunities for a student to develop diagnostic skills in microbiology, including the practical application and interpretation of laboratory tests for the diagnosis of infectious diseases.

Course: Microbial Diagnostics (BIOTECH3DSE06)

CO1: Develop a working knowledge of techniques and procedures commonly used in the clinical microbiology laboratory

CO2: Use appropriate safety protocol and laboratory techniques for processing specimens

Course: Biochemical Engineering (BIOTECH3DSE01)

CO1: This course enables the student to understand the practical aspects of bioprocess engineering and the role of bioprocess engineer in industry.

CO2: Various methods of bioprocess technology and logistics of fermentation technology are taught.