

BSc Biotechnology (Single Major)

Programme Outcomes (PO)

1. This program helps students to gain information based knowledge for in-depth analytical and critical thinking to identify, formulate and solve the issues related to Biotechnology .
2. The program promotes acquiring bio based technical skills and to maintain environmental integrity and safety.
3. Through the study materials in relevant biotechnology subjects students are able appreciate the subject and execute their knowledge in their professional roles in biotechnology in various industries, regulatory bodies and also as researchers educators and managers in various domains
4. The knowledge provided make students capable of for in-depth analytical and critical thinking; to identify, formulate and solve the issues related to Biotechnology
5. To provide a platform for education to motivate them for discovery-oriented research towards biotech product development with academic and research collaborations with the industries and research institutions which help to mould the students to become bio-entrepreneurs and human resources for biotech industries.

Course Title: CELL BIOLOGY (I Semester)-DSC

Course Outcomes (CO)

1. Students will be provided with the knowledge, to understand how living system works through transport systems and signalling.
2. Functions of cell and their structural organization will be provided for a deeper understanding of intracellular events.
3. Students will be able to learn the maintenance of structural integrity of cells along with cellular motility and movements
4. A deep understanding of eukaryotic chromosome structure and organization and their involvement in cell division will be provided
5. Critical ability to analyze the cell death and reproduction and identify the levels of checkpoints will be given to the students

Course Title: BIOCHEMISTRY (I Semester)-DSC

Course Outcomes (CO)

1. To provide an overview of the foundations of biochemistry and the chemical and cellular foundations of life with a balanced knowledge of bioenergetics .
2. Ability to distinguish different biomolecules and its significance in biological systems with emphasis on basic metabolic activities.
3. Understanding of structural and functional role of amino acids, polypeptides and proteins and their relevance in living systems.
4. The aim is to deepen the knowledge in basic lipid biochemistry to understand the properties of lipids contributing to cellular function .
5. The course teaches the students about basic structure and role of nucleic acid in living system, along with the significance of specific vitamins in the functioning of the human body and also delineating various hormones and their role in the communication provided .
6. To acquire fundamental knowledge on enzymes and their importance in biological reactions emphasising the role of enzymes in clinical diagnosis and industries.

Course Title: BASIC CONCEPTS IN CHEMISTRY I (I Semester)-DSC

Course Outcomes (CO)

1. Understand theories of bonding, shapes and structure in molecules
2. Learn the basics, significance and different types of qualitative and quantitative analysis in analytical chemistry.
3. Know the reactions, mechanisms, isomerism and conformational analysis in organic compounds.
4. Study the laws of thermodynamics, concept of entropy and details of electrochemistry.

Course Title: MICROBIOLOGY (II Semester)-DSC

Course Outcomes (CO)

1. Students will be able to understand the theory behind different types of microscopes and the importance of sterilization and the application of sterilants/disinfectants in medical and industrial domains.
2. Students will learn the different types of media that are used to grow different types of bacteria and also learn to preserve cultures for long-term use. Staining techniques will help them understand the importance of characterizing bacteria based on their cell wall components.
3. Students will appreciate the different shapes of bacteria and their arrangement and the pattern in which bacteria/ fungi grow by staining techniques.
4. The mode of action of various drugs and how exactly diagnostic laboratories process samples will be discussed along with horizontal gene transfer among microbial systems.
5. Outline of the basis on which viruses and fungi are classified and the life cycle they follow will provide students the underlying disease mechanisms .

Course Title: GENETICS (II Semester)-DSC

Course Outcomes (CO)

1. The evolution of genetics and the basic concepts in genetics will be introduced with classic examples.
2. Various factors that can alter the phenotypic ratios predicted by Mendel's principles will be discussed.
3. Deeper insight into different types of chromosome mutations, their definitions, features, phenotypic effects, and influence on evolution will be provided.
4. Utilising the knowledge of linkage and recombination for better understanding of genes and cross-overs.
5. Understanding of how genetic concepts affect broad societal issues including health and disease will be analysed

Course Title: BASIC CONCEPTS IN CHEMISTRY II (II Semester)-DSC

Course Outcomes (CO)

1. Know the chemistry of amino acids, carbohydrates and nucleic acids.
2. Learn the fundamentals of chromatography and solvent extraction techniques.
3. Understand the kinetics of chemical reactions, surface chemistry and colligative properties.
4. Study the carbonyls, amines and substitution reactions in organic chemistry.

Course Title: Environmental Biotechnology (III Semester Biotechnology)

Course Outcomes (COs):

1. Gain knowledge understanding of the environmental issues and describes existing and emerging technologies that are important in the area of environmental biotechnology.
2. Analyse the novel Methods for Environment protection using biofuels and apply the environment conservation practice.
3. Competence and skill development in the methods for environment protection.
4. Learn the importance and impact of biodiversity on human life, health and environment and evaluate the reasons for loss of biodiversity and its significant impacts on human health and the spread of disease.
5. Suggest biotechnological solutions to address environmental issues including pollution, mineral resource mining, renewable energy and water recycling.

Course Title: MOLECULAR BIOLOGY (III Semester)-DSC

Course Outcomes (CO)

1. Students will develop a basic knowledge about the structure of DNA and RNA and their function as a biomolecule
2. Students will have an idea about the pattern of arrangement of genes in the genome of both prokaryotes and eukaryotes
3. A deeper understanding about DNA replication mechanism will be provided
4. Students will develop an analytical skill about the process of transcription
5. Students will have an understanding and develop an analytical skill about the process of protein synthesis in a cell
6. Students will get familiarise with the concept of operons and will get the knowledge of mutation and different cellular methods to repair the mutation

Course Title: ANALYTICAL TECHNIQUES (III Semester)-DSC

Course Outcomes (CO)

1. To provide an overview and perception of the techniques used in biomolecule purification from biological system.
2. To impart knowledge and skills on different separation and recovery techniques of biomolecules leading to purification and processing techniques
3. To understand radio activity, nuclear processes, and the application of radioisotopes in general science to use them in the analysis and design of nuclear and related systems for biological applications
4. To learn techniques to separate the various substances that make up a mixture with the applications range from a simple verification of the purity of a given compound to the quantitative determination of the components of a mixture.
5. The course teaches the students to deal with the different biochemical techniques to gain knowledge of their structure, molecular weight and reaction specificity qualitatively and quantitatively.
6. To acquire fundamental knowledge on enzymes and their importance in biological reactions emphasising the role of enzymes in clinical diagnosis and industries.

Course Title: Genetic Engineering (IV Semester Biotechnology)

Course Outcomes (COs):

1. Students will get introduced to recombinant DNA technology and gene cloning
2. Students will learn about different methods of isolating DNA and RNA from different sources for analytical experiments
3. Students will be updated about different enzymes and tools used for genetic modification of genes
4. Students will be informed about different types of vectors that can be used for gene cloning and they will be able to decide the relevance of each type of vector
5. Students will get familiarise with different methods that can be used for gene transfer
6. Students will learn about different analytical techniques used in genetic engineering and expected to develop an analytical approach towards problems based on these techniques
7. Students will gain the knowledge about expressing a foreign gene in an organism by genetic engineering techniques.
8. This unit will help them understanding all the aforementioned units as a practical example.

Course Title: Industrial Biotechnology (IV Semester Biotechnology)

Course Outcomes (COs):

1. Understand the basics of fermentation process and also able to describe the fermentor through analyzing the materials and methods for the working of a fermentor
2. Students gain knowledge in deep about process and product optimization, also be able to produce, analyse and interpret data from fermentation
3. Students are able to learn the
4. steps and operations involved in microbial primary metabolites production
5. Students are familiarize with
6. industrially relevant microbial strains and processes for production of enzyme, biopolymer and food products
7. Students are able to connect with
8. secondary metabolites production, also the use of recombinant technology in pharmaceutically important microbial bioproducts production

Course Title: Food Biotechnology (IV Semester Biotechnology)

Course Outcomes (COs):

1. Understand basic concepts of food sciences and properties of foods
2. Understand the chemical and enzymatic factors affecting properties of food.
3. Understand the role of microbes in production
4. Understand different analytical techniques employed across various categories of foods.
5. Describe the effect of food constituents on food quality
6. Grasp the fundamentals of food processing and preservation
7. Understand some emerging concepts in food technology

Course Title:

Biotechnology - New era of Bio revolutions (I Semester Biotechnology) - OE

Course Outcomes (CO)

1. To familiarise the interdisciplinary nature of Biotechnology
2. An insight to the biotechnological boons to mankind
3. Demonstration of nature s inspiration to technological intervention
4. Insight to Novel areas of Biotechnological development
5. Introduction of relevance of business ideas and intellectual property rights

Course Title here:

Fundamentals of Biotechnology (II Semester Biotechnology) - OE

Course Outcomes (CO)

1. Gives an ideal of overall response to Biotechnology
2. Equip students with the Significance of rDNA tools and its applications in diagnosis and related Areas
3. Provides an insight to the Role of microbial systems in Biotechnology and its significance
4. Précised Biotechnological contributions to Food industry a brief outline
5. Applications of Biotechnology in health sector
6. Relevance of Biotechnology in environment protection

Course Title here:

Biotechnology for Human Welfare (III Semester Biotechnology) - OE

Course Outcomes (CO)

1. Contribution of Industrial Biotechnology to day to day life will be discussed with specific examples
2. Biodegradation of pollutants / waste materials through living systems and its significance to environment
3. Investigatory rDNA tools and techniques in forensic science and related areas
4. Significance of genetic engineering in diagnostics and treatment will be discussed