Biotechnology program Outcomes, Program Specific Outcomes and Course Outcomes

Biotechnology Program Outcomes

1. PO1 - Equip the students with the laboratory skills in biotechnology.
2. PO2 - Understanding of professional and ethical responsibility .
3. PO3 - Grasp of basic and advanced knowledge on various domains of biotechnology.
4. PO4 - Students develop global competencies in the area of basic and applied biological sciences.
5. PO5 - To enrich students knowledge and train them in various branches of biotechnology such as genetic, molecular biology, biochemistry, Immunology, fermentation technique, environmental biotechnology and tissue culture techniques.
6. PO6 - Awareness of contemporary issues that can be mitigated or supported through life science knowhow and biotechnology skills.
7. PO7 - Recognition of the need for and an ability to engage in life-long learning.
8. PO8 - Ability to work in team towards solving broad societal and national issues.

Program Specific Outcomes

1. PSO1 - To bestow the students with all the research skills required to work independently.

2. PSO2 - To develop scientific temperament and social responsibilities in the students.

3. PSO3 - To provide students with the concepts and research approaches for their higher career in the field of biotechnology and develop their scientific interest.

4. PSO4 - To impart in-depth practical oriented knowledge to students in various thrust areas of biotechnology.

5. PSO5 - As biotechnology is an interdisciplinary courses, empower the students to acquire technological knowhow by connecting disciplinary and interdisciplinary aspects of biotechnology.

B.Sc I YEAR (I SEM)

S. No.	Paper No.	Paper Name	Course Outcome
1.	I	Introduction to Biotechnology	CO1 - Understanding of the principles and practices of biotechnology. CO2 - Biotechnology is the use of an organism, or a component of an organism or other biological system, to make a product or process. CO3 - Understanding concepts biotechnology in Agriculture ,food industry, pharmaceutical industry, animal sciences and chemical industry.
2.	II	Biochemistry I	CO1 - Inculcate an understanding of the function of biological molecules through the study of their molecular structures and interaction with other biomolecules. CO2 - Inquisitiveness to find application of Biochemistry in medical and biological field settings. CO3 - Useful knowledge of the chemistry of formation of various bonds and structure. CO4 - Study about the 3D structure of a molecule and importance of studying the exact position of a particular group in a molecule. CO5 - Students will be acquainted with the knowledge of structure, function and interaction of protein, nucleic acid, carbohydrates and lipids.

B.Sc I (II SEM)

S.No.	Paper No.	Paper Name	Course Outcome
1.	**III**	**General Microbiology**	**CO1 - Ability** to explain core the oretical and practical principles of relevance to history, structure, function and diversity of microorganisms. CO2 - Identify and demonstrate how to control microbial growth. CO3 - Demonstrates and evaluate interaction between microbes, hosts and environment. CO4 - Understand microorganisms as a model system in life science studies and its importance in biotechnology. CO5 - Students learn different types of microorganism.
2.	**IV**	**Biochemistry II**	CO1 - The course will help the students to understand the abnormalities in the metabolism. CO2 - Students will learn about enzymes kinetics and types of inhibition as enzymes are important in catalyzing various reactions in the body. CO3 - Understanding of chemical and regulatory interrelationship between major cellular Synthetic and catabolic pathways. CO4 - Grain fundamental knowledge in biochemistry.

B.Sc II Year (III Sem)

S.No.	Paper No.	Paper Name	Course Outcomes
1.	VI	Immunology	CO1 - Ability to Conceptualize the basic mechanisms that regulate Immune responses and maintain tolerance. CO2 - Capability to provide an overview of the interaction between the immune system and pathogens. CO3 – Understand basic techniques for identifying antigen-antibody interaction. CO4 – Role of the immune system in both maintaining health and contributing to disease. CO5 – Understanding the reasons for immunization and aware of different vaccination.
2.	VII	Molecular Biology	CO1 – Understanding the basics of central dogma of molecular biology. CO2 – Understand the chemical and molecular processes that occur in and between the cells. CO3 – Determine the structural organization of genes and will gain the knowledge of organization of genomes. CO4 – Understanding the concept of genetic code its features.

B.Sc II YEAR (IV SEM)

S.No.	Paper No.	Paper Name	Course Outcomes
1.	VIII	Recombinant DNA Technology	CO1 – Deep knowledge towards the modern approaches for genetically modified organism. CO2 – Determine various techniques like bacterial transformation, DNA sequencing technique, restriction mapping and DNA fingerprinting in relation to their application in medical and pharmaceutical field. CO3 – Genetics engineering to impart deep knowledge among students regarding mechanism of action and the use of restriction enzymes, different probes for specific genes of interest.
2.	IX	Bioinfomatics	CO1 – Introduction to bioinformatics and its role in biotechnology. CO 2 – Different file formats uses in bioinformatics. CO3 – How to align sequence, types of alignment based on sequence length and number of sequence involved it. CO4 – Students will learn different biological databases present in bioinformatics. CO5 – Learn how to search, visualize protein using different visualization tool.

B.Sc III YEAR (V SEM)

S.No.	Paper No.	Paper Name	Course Outcomes
1.	XI	Animal Biotechnology	CO1 – Understand the basic concepts and terminology used in animal tissue culture. CO2 – Understand and evaluate cell cultures constraints and possibilities as an in vitro model. CO3 – Demonstrates knowledge of basic cell culture techniques. CO4 – Knowledge of how establish a cell lines and its maintenance. CO5 - Demonstrates knowledge on design and how to use the cell culture facilities.
2.	XII	Plant Biotechnology	CO1 - Understand the basic concepts and terminology used in plant tissue culture. CO2 – Understand the basic techniques to establish types of in vitro cultures by themselves due to hand on training in the subject. CO3 – Concept and calculations for media preparation very well learnt as the media used for different types of culture were prepared by the students. CO4 – The knowledge of tissue culture techniques is used for designing projects, practical performance, and preparation of glassware for practical.

B.Sc III YEAR (VI SEM)

S.No.	Paper No.	Paper Name	Course Outcomes
1.	XIII	Micribial Biotechnology	CO1 – Learn about the different types of fermentation processes, Fermenter design, different types of equipment used and microbiological processes. CO2 – Application of microorganisms in technological operation, substrate preparation and control of fermentative process and isolation of products. CO3 – Knowledge of equipment and design of sterilization cycle of large scale media in fermentation industry. CO4 – Give an account of design and operation of various bioreactors and downstream processes. CO5 - Give an account of important microbial/ enzymatic industrial processes.