

PROGRAMME OUTCOMES OF MSC DEGREE IN BIOTECHNOLOGY

PO1: This program explores the molecular basis for the changes occurring in living cells. It uses the methods of chemistry, physics, molecular biology and immunology to study the structure and behaviour of the complex molecules found in biological material and the ways these molecules interact and communicate within and between cells and organs.

PO2: The program focuses on techniques used in industry for production of microbial products thus it enables develop an understanding of an applied aspect of microbes in industry.

PO3: To train the students in all the fundamentals of the subject of Biotechnology, progressively giving way to all essentials of the subject with good practical training and exposure to most modern concepts.

PO4: The curriculum carries multiple options in terms of electives for incorporating innovative ideas generated in this field.

PO5: To help the students to mold themselves as competent enough in an international pursuit of knowledge.

PO6: To provide ample opportunity for the students to gain sufficient practical knowledge in the subject with properly designed experiments.

PO7: Explore new areas of research in all the branches of biotechnology in addition to interdisciplinary fields.

PO8: The interdisciplinary nature of the subject is to be incorporated to have option for employment and higher studies.

PO9: To carry out professional responsibilities such as teaching and research in allied subjects.

PO10: To equip the students for seeking suitable careers in various disciplines of Life sciences.

PROGRAMME SPECIFIC OUTCOMES (PSO's) OF MSC DEGREE IN BIOTECHNOLOGY

Students who graduate with MSc. Biotechnology will,

PSO1: Have significant knowledge on various aspects of Biotechnology with special reference to microbes and their products.

PSO2: Expertise in laboratory techniques of basic microbiology, especially with regard to isolation, characterization of industrially important microbes.

PSO3: Understand the fundamental concepts in core (plant, animal, industrial biotechnology, molecular biology, genetic engineering and genetics) and allied (microbiology, immunology and physiology).

PSO4: Get exposure to various research fields and thrust area of the core and interdisciplinary subjects.

PSO5: Acquire technical skills especially in regard to industrially important metabolites and their production.

PSO6: Have ability to plan and execute experiments as well as to analyze & interpret data for any research.

COURSE OUTCOME OF MSC DEGREE IN BIOTECHNOLOGY

I SEMESTER

Title of paper: GENERAL BIOCHEMISTRY

Course code: BT020101

The student is exposed to:

- CO1: The biochemical composition of the cell.
- CO2: The structure and types of nutrient components.
- CO3: The major metabolic pathways and their significance.
- CO4: The coordination of metabolic pathways.

Title of paper: CELL BIOLOGY AND GENETICS

Course code: BT020102

- CO1: The student can understand how the cell is equipped with machineries to conduct activities as the basic structural and functional unit of life.
- CO2: The structural features of cell organelles/machineries.
- CO3: The functional mechanisms of cellular phenomena.
- CO4: The fundamental principles of heredity and deviations from mendelian behavior.
- CO5: The effect of mutations and mutational analysis. Principles of behavioural and population genetics.

Title of paper: INSTRUMENTATION AND BIOSTATISTICS

Course code: BT020103

The student gets awareness in:

- CO1: The techniques used in the visualization of cellular components and macromolecules.
- CO2: Analytical techniques used in detection and quantification of biological compounds and the separation techniques used in biology.
- CO3: The application of statistical principles in biological studies.
- CO4: The research methodology and documentation.

Title of paper: BIOPHYSICS AND BIOINFORMATICS

Course code: BT020204

An exposure is given to students in :

- CO1: The bioenergetics of cell and the basic architecture of macromolecules.
- CO2: The interaction between macromolecules.

CO3: The role of bioinformatics in biological data storage.

CO4: The applications of bioinformatics tools in analyzing biological data.

Title of paper: LABORATORY COURSE 1

Course code: BT020105

The students are able to understand:

CO1: The basic principles of preparation of solutions.

CO2: The detection, assay and purification of biological compounds.

CO3: Design experiments and analyse results.

CO4: Handling of required equipments. (Biochemistry, Cell biology & Genetics).

II SEMESTER

Title of paper: MICROBIOLOGY

Course code: BT020201

The students get an exposure in:

CO1: Microbial grouping and its taxonomical significance.

CO2: Cultivation and identification of microorganisms.

CO3: The Organization of Bacterial Cell

CO4: Maintenance and preservation of bacterial cultures.

CO5: General characteristics of Archaeobacteria and their phylogenetic overview

CO6: Overview of Bacterial Diversity: Morphology, Metabolism, Ecological Significance and Economic importance

Title of paper: IMMUNOLOGY

Course code: BT020202

CO1: The students have knowledge of:

CO2: The cells and organs associated with immune system.

CO3: The details of immune system functioning.

CO4: Analytical techniques based on immunological reactions.

CO5: The after effects of defects in immune system.

Title of paper: MOLECULAR BIOLOGY

Course code: BT020203

The student gets a comprehensive knowledge of :

CO1: The structural and functional organization of genome.

CO2: The molecular phenomena of DNA copying and transmission of informations.

CO3: The regulation of gene function and associated phenomena.

Title of paper: METABOLISM AND ENZYMOLOGY

Course code: BT020204

CO1: The characteristics of enzymes as biological catalysts, enzyme kinetics, enzyme classification.

CO2: The role of nucleic acids in synthesis of macromolecules, particularly proteins and enzymes.

CO3: The structure and physico chemical properties of carbohydrates from monosaccharide to polysaccharides.

CO4: The difference between the water soluble and fat soluble vitamins and their key role in the metabolism as coenzymes.

CO5: The rate of reactions and order of reactions, and inhibitions and their kinetics.

Title of paper: LABORATORY COURSE-II

Course code: BT020205

The student can learn:

CO1: The cultivation, observation and identification of microorganisms.

CO2: The design of immunological experiments.

CO3: The detection of compounds of interest in biological samples.

Title of paper: BIOPROCESS TECHNOLOGY

Course code: BT020301

The students are trained in:

CO1: Screening for microbial strains from different samples.

CO2: Types of Bioprocess and standard lab practices.

CO3: Bioreactor designing and control.

CO4: Industrial production conditions through fermentation

Title of paper: RECOMBINANT DNA TECHNOLOGY

Course code: BT020302

CO1: The student is exposed to the basic requirements to perform genetic engineering experiments.

CO2: The techniques involved in the preparation and introduction of r DNA to the host.

CO3: Applications of r DNA technology.

CO4: Regulations in carrying out r DNA experiments.

Title of paper: ENVIRONMENTAL BIOTECHNOLOGY

Course code: BT020303

The student is able to understand:

CO1: The role of biotechnology in environmental applications.

CO2: Degradation of recalcitrant compounds by biological agents.

CO3: Treatment technologies involved in the processing of solid and liquid waste.

CO4: Alternate green energy sources and green technologies.

Title of paper: ANIMAL AND PLANT BIOTECHNOLOGY

Course code: BT020304

Students get familiarized with the:

Fundamental requirements and design of lab to carry out plant and animal cell culture experiments.

CO2: The different approaches and techniques involved in creating recombinant plant and animals.

CO3: The applications and demerits of genetic modification in plants and animals.

Title of paper: LABORATORY COURSE III

Course code: BT020305

Students are trained in:

CO1: Characterizing waste water.

CO2: Bacteriological analysis of water and food.

CO3: Plant tissue culture techniques and other lab scale bioprocesses.

IV SEMESTER

Title of paper: Laboratory Course IV

Course code: BT020401

Students are trained in:

CO1: Isolation of genetic material, purification.

CO2: Different tools and techniques of gene manipulation

CO3: The techniques to clone genes.

CO4: Modification of genetic material, generation and introduction of r DNA, analysis of genome.

Title of paper: BIOTECHNOLOGY AND PHYSIOLOGY

Course code: BT840401

The students become familiar with:

CO1: The functional significance of organ systems.

CO2: Role of plant metabolic pathways and their steps.

CO3: Applications of biotechnology in human cell and organ culture.

Title of paper: MICROBIAL FOOD TECHNOLOGY

Course code: BT840402

The student is able to understand:

CO1: The role of microbial fermentation in food production and factors affecting it.

CO2: Role of biotechnology in food production and modification.

Title of paper: IPR,& BIOTECHNOLOGY

Course code: BT80403

The student will be able to understand:

CO1: Intellectual property and its different forms.

CO2: The National and international approaches to protect the IPR.

CO3: The guidelines for biosafety.

CO4: Genetic modification of food crops and animals and the ethical issues.