

Program outcome

BSc Biotechnology

Biotechnology includes diverse subjects apart from biology making it interdisciplinary. Depending on its applications, biotechnology overlaps fields like bioengineering and others. The advent of biotechnology has expanded into diverse sciences like immunology, virology and other subjects like health, agriculture, cell biology, plant physiology, seed technology, etc.

Learning Outcomes:

1. Career orientation: Program prepares students for biotech careers by encompassing a broad range of subjects
2. Problem solving skills: Enable students to coordinate gained knowledge with its applications in real time situations
3. Critical thinking: Skills prepare students to take on various designs and challenges
4. Ethics: Gain an understanding of professional and ethical responsibility

Program specific outcome

BSc Biotechnology

The aim of the program is to prepare specialists with high quality and up-to-date training in a highly interdisciplinary field of Biotechnology. Basic objectives include the following

1. Learn working and analytical methods in fields of molecular biology, microbiology, biochemistry, recombinant DNA technology and fermentation technology.
2. Perform scientific and technological experiments
3. Asses the results of experiments, identify problems and propose solutions
4. Learn to develop new strategies by considering current research finding

Course outcomes

BT1B01. CELL BIOLOGY

Course outcome

1. Learn the structures and purposes of basic components of prokaryotic and eukaryotic cells, especially macromolecules, membranes, and organelles
2. Learn underlying principles of mitotic and meiotic division
3. Describe cell cycle regulation and apoptosis

BT1C03. ENVIRONMENTAL BIOTECHNOLOGY (COMPLEMENTARY COURSE)

Course outcome

1. Study ecological concepts and ecosystem, biotic and abiotic environmental factors
2. Learn with renewable and non renewable sources of energy
3. Describe biogeochemical cycles and significance
4. Learn about human influences on ecosystem like pollution, ozone depletion , ozone warming etc

BT1C04 (P) PRACTICALS

Course outcome

1. Learn the aseptic techniques to practise in laboratory
2. Learn to prepare and sterilize media
3. Isolate and count microorganisms from different sources
4. Learn screening of microorganisms through staining

BT2B02. GENERAL MICROBIOLOGY

Course outcomes

1. Learn history and classes of microorganisms
2. Study types of media, sterilization and pure culture techniques
3. Studies on growth and reproduction of virus, fungi, bacteria
4. Detail microbial metabolism and microbial diseases

BT2CO7. ENVIRONMENTAL BIOTECHNOLOGY (COMPLEMENTARY COURSE)

Course outcomes

1. Learn Key concepts of water pollution and waste water processes
2. Describe reactors for waste water treatment
3. Learn Principles and applications of water purification methods

BT2CO8 (P) PRACTICALS

Course outcomes

1. Learn about aerobic treatment methods
2. Learn to analyse water quality

BT2CO8 (P) PRACTICALS

Course outcomes

1. Learn about aerobic treatment methods
2. Learn to analyse water quality
3. Learn to perform biochemical tests for differentiating microorganisms

BT3BO3. BIOCHEMISTRY

Course outcome

1. Familiarize with biomolecules – lipids, carbohydrates, amino acids, proteins and nucleic acids
2. Describe Vitamins and hormones- types and functions
3. Learn different separation techniques used for biomolecules

BT3BO4 (P) PRACTICALS INBIOCHEMISTRY

Course outcome

1. Learn to calculate molarity, normality and to prepare buffers
2. Learn to estimate various biomolecules quantitatively
3. Learn the procedure of paper and thin layer chromatography
4. Learn to determine activity of amylase

BT3CO11. ENVIRONMENTAL BIOTECHNOLOGY (COMPLEMENTARY COURSE)

Course outcome

1. Focuses on solid pollution and air pollution monitoring
2. Learn about Xenobiotic degradation
3. Describe composting techniques including vermicomposting
4. Study medical solid waste management
5. Students learn bioremediation , bioaugmentation, biosparging and bioventing

BT3CO12 (P) PRACTICALS

Course outcome

1. Learn the method of vermicomposting
2. Study the growth phases of bacteria
3. Isolate and screen xenobiotic degrading microorganisms

BT4BO5 GENETICS

Course outcomes

1. Learn fundamentals of Mendel's rules of inheritance and understand range of gene interactions
2. Study of chromosomal basis of heredity including chromosomal morphology, number and organization
3. Learn human inherited disorders and genetic application in human health and diseases
4. Understand the basics of quantitative and population genetics

BT4B 06(P) PRACTICALS

Course outcomes

1. Identify mitotic and meiotic stages
2. Identify Barr bodies and salivary gland chromosomes
3. Isolate auxotrophs
4. Understand the process of conjugation
5. Develop skill for solving problems related to linkage, mendelian inheritance and pedigree analysis

BT4C15. ENVIRONMENTAL BIOTECHNOLOGY (COMPLEMENTARY COURSE)

Course outcomes

1. Learn about bioplastics, biofertilizers and biopesticides
2. Detail applications of bioresources like methane production, fuel alcohol, biodiesel and biopower
3. Familiarise with Single cell proteins and GM organisms
4. Learn bioleaching of gold, copper and uranium

BT4C16 (P) PRACTICALS

Course outcome

1. Understand bioremediation
2. Learn production of value added products from digested lignocellulose
3. Learn the technique of production of biogas
4. Identify extracellular enzyme producing microorganisms

BT5B07. MOLECULAR BIOLOGY

Course outcome

1. Students gain an understanding of molecular mechanism of the process of replication, transcription and translation of the genetic material.
2. Study mutations, DNA repair and gene regulation
3. Learn the structure and complexity of genome

BT5B 10(P) PRACTICALS IN MOLECULARBIOLOGY

Course outcomes

1. Learn to isolate genomic DNA from different sources and to determine the purity
2. Learn to measure cell size using micrometry
3. Understand the method of induction of lac operon as well as transformation

BT5B08. IMMUNOLOGY AND IMMUNOTECHNOLOGY

Course outcome

1. Describe immune system – types, cells and organs
2. Detail properties of Antigens and structure of antibodies
3. Student understand various Ag Ab reactions
4. Familiarise with hypersensitivity and autoimmune diseases
5. Students gain an understanding of monoclonal antibody and tumour immunology

BT5B11 (P) PRACTICAL'S IN IMMUNOLOGY AND IMMUNOTECHNOLOGY

Course outcome

1. Identify blood group
2. Identify blood cells
3. Learn different methods of antigen-antibody interaction

BT5B09. BIOPROCESS TECHNOLOGY

Course outcome

1. Learn isolation, screening, improvement and preservation of industrially important microorganisms.
2. Students learn design of bioreactors
3. Describe basic fermentation process and optimum parameters for fermentation

BT6B12 (P) PRACTICALS IN BIOPROCESS TECHNOLOGY

Course outcome

1. Isolate and screen antibiotic producing microbes
2. Learn to estimate alcohol by distillation
3. Learn technique of enzyme immobilization
4. Understand different fermentation technique like solid state and submerged fermentation

BT5D01. INTRODUCTION TO BIOTECHNOLOGY

(Open Course –Elective from other department students)

Course outcome

1. Learn about history and uses of biotechnology
2. Study biotechnology applications in food including fermentation, Single cell protein and mushrooms
3. Understand applications in agriculture specifically GM plants
4. Students will familiarize with application in medicine like paternity testing and DNA finger printing

BT6B13. PLANT BIOTECHNOLOGY

Course outcome

1. Learn basic techniques of tissue culture, types of cultures and *in vitro* morphogenesis
2. Familiarize with plant secondary metabolites and significance
3. Learn genetic manipulation with special focus on agrobacterium mediated gene delivery
4. Learn about transgenic plants and applications of genetically modified plants
5. Understand applications in horticulture, agriculture, pharmacology

BT6B16 (P) PRACTICALS

Course outcome

1. Learn preparation and sterilization of plant tissue culture media
2. Learn the method of callus induction
3. Understand production of artificial seeds
4. Isolate protoplasts

BT6B14. ANIMAL BIOTECHNOLOGY

Course outcomes

1. Learn animal cell culture conditions, basic requirements and components of media
2. Describe primary cell culture and cell lines
3. Learn Cytotoxicity assays and cell proliferation assays
4. Familiarize with Biohazards, biosafety and stem cells
5. Learn significance of transgenic animals in poultry and livestock

BT6B15. RECOMBINANT DNA TECHNOLOGY AND BIOINFORMATICS

Course outcomes

1. Understand the importance of plasmids and other vectors to genetic engineering and to learn different vectors employed in gene transfer techniques
2. Describe how a chimeric genome is constructed, role of restriction endonucleases, and screening
3. Understand gene transfer methods like particle gun approach, liposome mediated, PEG mediated and agrobacterium based transfer method
4. Learn transgenic plants, animal and GM foods
5. Gain knowledge on molecular mapping of genome and molecular markers like RFLP, RAPD and AFLP
6. Understand the basic concept of bioinformatics including databases and database searches

BT6B17. MEDICAL BIOTECHNOLOGY

(Elective for same department / Subject/ student)

Course outcome

1. Learn sterilization and disinfection methods
2. Describe antigen antibody reactions and complement system
3. Learn properties of bacteria, viruses
4. Familiarize with diseases caused by bacteria and viruses

INTELLECTUAL PROPERTY RIGHTS- LANGUAGE REDUCED PATTERN – CLUSTER 4

Course outcome

1. Learn about IPR and IPR in India
2. Understand basics of patent system, copy right, trademark, industrial design and geographical indications
4. Learn the concept of IPR in biotechnology

