

# B.Sc. BIOTECHNOLOGY

PROGRAMME OUTCOME	COURSE NAME	COURSE CODE	COURSE OUTCOME
<ul style="list-style-type: none"> <li>❖ An expert in Biotechnology subjects knowledge &amp; an expert in Biotechnology practical skills.</li> <li>❖ Efficient researcher using biotechnology practical skills.</li> <li>❖ Development of own entrepreneur skills in biotechnology industry.</li> <li>❖ Well versed in the field of various biotechnology fields (medical, microbial, agricultural, environmental, plant and animal).</li> <li>❖ To understand the steps involved in the production of bio pharmaceuticals in microbial and mammalian cell</li> </ul>	<b>1. Cell Biology Theory</b>	<b>BBT-101</b>	❖ Distinguish between prokaryotic and eukaryotic cell.
			❖ Explain different types of cell junctions.
			❖ Describe structure and function of different types of cell organelles.
			❖ Analyze the factors responsible for transforming normal cell into cancer cell.
			❖ Design experiments with appropriate controls.
			❖ Develop foundation for advanced courses as physiology, genetics and molecular biology.
	<b>2. Microbiology Theory</b>	<b>BBT-102</b>	❖ Explain the general characters between different groups of microorganisms like cyanobacteria.
			❖ Describe the techniques of sterilization
			❖ Explain the mechanism of host-pathogenic interaction
			❖ Define application of microorganisms in food industry
	<b>3. Biochemistry and Biophysics Theory</b>	<b>BBT-103</b>	❖ <b>Recognize</b> the contribution of Nobel laureates in field of Biochemistry.
			❖ <b>Inspect</b> pH of unknown solutions
			❖ <b>Describe</b> the structure, properties, and functions of

systems.

bio molecules as carbohydrates, proteins and lipids.

❖ **Analyze** the metabolism of bio molecules and **solve** the mystery of regulation of metabolic network.

❖ **Test** the presence and quantity of biomolecules in unknown solutions.

❖ **Develop** tests for measurement of glucose, cholesterol in blood

#### 4. Genetics Theory

**BBT-201**

❖ **Describe** and apply the principles of Mendelian genetics.

❖ **Explain** different types of blood groups.

❖ **Explain** linkage, recombination, and the mapping of genes on chromosomes.

❖ **Analyze** correlation between behaviour of sex chromosomes in meiosis and sex-linked inheritance patterns.

❖ **Design** experiments with appropriate controls.

❖ **Understand** how the behaviour of chromosomes during Meiosis can explain Mendel's Laws of Equal Segregation and Independent Assortment.

#### 5. Plant Physiology

**BBT-202**

❖ **Explain** the mechanism of water conduction and role of transpiration

❖ **Compare** the importance of macro and micro nutrients in plant

❖ **Classify** the pigments and pigment system associated with photosynthesis.

			❖ <b>Describe</b> the mechanism of photosynthesis and translocation.
			❖ <b>Define</b> the role of vernalisation, photoperiodism in plant physiology. Evaluate the process associated with seed germination and growth regulators in plants.
	<b>6. Instrumentation and Bio-analytical Techniques Theory</b>	<b>BBT-203</b>	❖ Explain Apprehend the functioning, maintenance and safety aspects of the basic apparatus used in a Biotechnology lab.
			❖ Employ the knowledge for the separation of proteins/peptides by selecting appropriate separation techniques.
			❖ Characterize certain functionalities of biomolecules by using spectroscopic techniques.
			❖ Understand the strengths, limitations and creative use of techniques for problem solving.
	<b>7. IMMUNOLOGY</b>	<b>BBT-301</b>	❖ <b>Differentiate</b> the different types of innate and acquired immunity
			❖ <b>Describe</b> the antigens, immunogenicity and compare with antibodies
			❖ <b>Classify</b> the Nature of immune response and knowledge about MHC with their significance.
			❖ <b>Define</b> the Vaccines and vaccination with Autoimmunity and autoimmune diseases.

	8. Genetic Engineering	BBT-302	❖ Understand the fundamental steps in a genetic engineering procedure
			❖ Acquire the knowledge of cloning and different types of vectors involved in RDT.
			❖ Describe the mechanism of construction and screening of genomic and cdna libraries
			❖ Discuss and evaluate about the application Recombinant DNA technology
	9. Herbal Technology Theory	BBT-304C	❖ <b>Describe</b> the role of herbs in curing various ailments.
			❖ <b>Interpret</b> tests of active principles in medicinal herbs.
			❖ <b>Analyze</b> results of tests for secondary metabolites.
			❖ <b>Define</b> future of pharmacognosy and phytochemistry.
	10. Human Physiology Theory	BBT-401	❖ <b>Illustrate</b> the Physiology of digestion and Hormonal control of digestive functions.
			❖ <b>Describe</b> the respiratory system in mammals.
			❖ <b>Expain</b> the physiology of heart and analyse the process leading to the clotting of blood, role of haemoglobin and lymphatic system.
			❖ <b>Describe</b> the physiology of cardiac and skeleton muscles.

			❖ <b>Define</b> the chemical nature, mechanism of hormones and conditions associated with the abnormality in hormonal secretion.
	<b>11. GNEOMICS AND PROTEOMIC S</b>	<b>BBT-402</b>	❖ <b>Describe</b> methods of whole genome sequencing.
			❖ <b>Expain</b> the use of genomics in biomedicine and agriculture.
			❖ <b>Define</b> the protein expression profiling and protein chips.
			❖ <b>Analyze</b> the nucleic acid and protein sequence data.
	<b>12. IPR, Bio-safety and Bioethics Theory</b>	<b>BBT-403</b>	❖ <b>Describe</b> different types of IPRs.
			❖ <b>Explain</b> Scope and salient features of patent, Trade Marks, Geographical Indications.
			❖ <b>Define</b> biosafety and bioethics.
	<b>13. Plant Diversity and Human Welfare Theory</b>	<b>BBT-404B</b>	❖ <b>Define</b> various terms used in Plant Biodiversity and their conservation.
			❖ <b>Identify</b> the plants as per their commercial importance.
			❖ <b>Explain</b> the botanical name, family and plant parts used for human welfare.
			❖ <b>Demonstrate</b> the process of In situ and ex situ conservation.
			❖ <b>Discuss</b> about the values and uses of Biodiversity.
	<b>14. Introduction to Bioinformatics Theory</b>	<b>BBT-501A</b>	❖ <b>Define</b> various terms used in the study of Bioinformatics.
			❖ <b>Understand</b> the applications of Bioinformatics in

			Drug discovery and Drug design.
			❖ <b>Explain</b> the methods used in biological sequence and molecular phylogeny.
			❖ <b>Demonstrate</b> the process of biological sequence and molecular phylogeny.
			❖ <b>Discuss</b> about the applications of Bioinformatics in microbial world and crop improvement.
	<b>15. ANIMAL BIOTECHNOLOGY</b>	<b>BBT-502B</b>	❖ <b>Describe</b> existing and emerging technologies that are important in the area of animal biotechnology.
			❖ <b>Describe</b> methods for invitro culture of animal cells.
			❖ <b>Implement</b> new tools for improving human health and animal health and welfare and increasing livestock productivity.
			❖ <b>Evaluate and discuss</b> public and ethical concerns over the use of animal biotechnology.
	<b>16. Plant Biotechnology Theory</b>	<b>BBT-503A</b>	❖ <b>Definition</b> of Biotechnology and different branches of Biotechnology.
			❖ <b>Discussion</b> of scope, history and achievement of Biotechnology.
			❖ <b>Applications</b> of PCR, Role of enzymes involved in Genetic Engineering.
			❖ <b>Distinguish</b> between vectors and the applications.
			❖ <b>Create</b> cDNA library and Genomic library.
			❖ <b>Assess</b> the use of molecular markers in Plants.
	<b>17. Food Chemistry Theory</b>	<b>BBT-504A</b>	❖ <b>Discuss</b> common adulterants of food products.
			❖ <b>Discuss</b> processing of food.
			❖ <b>Distinguish</b> between different types of food.

			❖ <b>Classify</b> food preservatives.
			❖ <b>Create</b> methods for food packaging.
			❖ <b>Assess</b> the methods to prevent food poisoning.
	<b>18. Basics of Forensic Science Theory</b>	<b>BBT-601A</b>	❖ <b>Organize</b> forensic science Laboratory.
			❖ <b>Classify</b> injuries and their legal aspects.
			❖ <b>Identify</b> cause and <b>assess</b> various types of deaths.
			❖ <b>Explain</b> characteristics of handwritings.
			❖ <b>Demonstrate</b> the method of DNA fingerprinting.
			❖ <b>Discuss</b> about the storage and nutritional value of mushrooms.
	<b>19. INDUSTRIAL FERMENTATION</b>	<b>BBT-602B</b>	❖ <b>Understand</b> industrial aspects of microbiology.
			❖ <b>Explain</b> growth pattern of microbes in different industrial systems.
			❖ <b>Explain</b> process control, upstream and downstream process.
			❖ <b>Describe</b> microbial production of various industrial products such as alcohol, exopolysaccharides, enzymes, etc.
	<b>20. Toxicology Theory</b>	<b>BBT-603A</b>	❖ <b>Explain</b> principles of toxicology.
			❖ <b>Explain</b> chemical properties of different groups of compounds and their effects leading to pollution and toxicology.
			❖ <b>Describe</b> mechanism of metal toxicity.
	<b>21. Medical Microbiology Theory</b>	<b>BBT-604B</b>	❖ <b>Demonstrate</b> the ability to design diagnostic procedure from symptoms of disease. analyze the experimental results

			❖ <b>Distinguish</b> among viral, bacterial fungal and protozoan infections.
			❖ <b>Apply</b> a range of diagnostic technologies and methodologies relevant to the fields of Clinical Microbiology.
			❖ <b>Explain</b> the preventive measures and suggest clinical cure of diseases.