


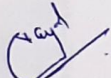
Name of the Faculty: Science and Technology

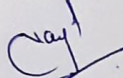
Name of the Program: BSc Biotechnology

Program Outcomes (POs):

PO-1	Disciplinary Knowledge: Understand the basic concepts, fundamental principles, theoretical formulations and experimental findings and the scientific theories related to Physics, Chemistry, Mathematics, Microbiology, Computer Science, Biotechnology, Information Technology and its other fields related to the program.
PO-2	Communication Skills: Develop various communication skills such as reading, listening and speaking skills to express ideas and views clearly and effectively.
PO-3	Critical Thinking: Propose novel ideas in explaining the scientific data, facts and figures related to science and technology.
PO-4	Analytical Reasoning and Problem Solving: Hypothesize, analyze, formulate and interpret the data systematically and solve theoretical and numerical problems in the diverse areas of science and technology.
PO-5	Sense of Inquiry: Curiously ask relevant questions for better understanding of fundamental concepts and principles, scientific theories and applications related to the study.
PO-6	Use of Modern Tools: Operate modern tools, equipments, instruments and laboratory techniques to perform the experiments and write the programs in different languages (software).
PO-7	Research Skills: Understand to design, collect, analyze, interpret and evaluate information/data that is relevant to science and technology.
PO-8	Application of Knowledge: Develop scientific outlook and apply the knowledge with respect to subject.
PO-9	Ethical Awareness: Imbibe ethical, moral and social values and exercise it in day to day life.
PO-10	Teamwork: Work collectively and participate to take initiative for various field-based situations related to science, technology and society at large.
PO-11	Environment and Sustainability: Create social awareness about environment and develop sustainability for betterment of future.
PO-12	Lifelong Learning: Ability of self-driven to explore, learn and gain knowledge and new skills to improve the quality of life and sense of self-worth by paying attention to the ideas and goals throughout the life.


Program
Coordinator


BOS Chairman


Principal

Name of the Faculty: Science and Technology

Name of the Program: BSc Biotechnology

Program Specific Outcomes (PSOs):

Students will be able to –

PSO-1	Identify, understand and analyze problems and propose valid solutions related to field of Biotechnology.
PSO-2	Critically evaluate biotechnological solutions on environment and societies keeping in mind the need for sustainable solutions.
PSO-3	Develop a research based ideology and technical skills to build career in Biotechnology.


**Program
Coordinator**


BQS Chairman


Principal

COURSE OUTCOMES OF B.Sc (Biotechnology)**F.Y.B.Sc (SEM-I)
COURSE OUTCOMES**

Course Code	Course Title	Learning Outcomes
UGBTC101	Basic concepts of Biology	Students will be able to – 1. Identify different plants & animals on the basis of their classification (1) 2. Recognize basic common structures of plants & animals (2) 3. Compare between vertebrates and invertebrates and classify vertebrates into various groups (3) 4. Describe common groups of bacteria and archaea in different ecosystems, and their role (2) 5. Explain the ultra-structure of prokaryotic and eukaryotic cells and know the function of various cell organelles present (2)
UGBTC102	Basics of Microbiology	Students will be able to - 1. Understand scientific vocabulary relevant to microbiology (2) 2. Enlist the major discoveries that gave rise to the field of microbiology and Biotechnology (1) 3. Explain the importance of sterilization, disinfection and biosafety (2) 4. Evaluate and assess the different types of bacteria on the basis of staining and microscopy techniques (5) 5. Employ cultivation techniques to grow and enumerate microorganisms (3)
UGBTAEC101	Environmental Sciences-I	Students will be able to - 1. Understand the importance of environmental studies (2) 2. Distinguish different types of Natural Resources and its importance (2) 3. Analyze different types of ecosystem on the basis of its structure and characteristics. (4) 4. Categorize Biogeographical classification of India and the Value of biodiversity (2) 5. Enlist different types of pollution, causes behind it and its impact on environment (2)
ACC-1	Self Development Program	Students will be able to - 1. Imbibe ethical, moral and social values and exercise it in day to day life. (3) 2. Connect to their inner self and understand their core values. (5) 3. Make appropriate choices on the basis of the particular situation. (3)

		<p>4. Lead balanced life with proper time and stress management.</p> <p>5. Understand others with empathy.</p>
UGBTGE101	Fundamentals of Chemistry	<p>Students will be able to –</p> <ol style="list-style-type: none"> 1. To understand the basic concepts of chemistry like nomenclature and classification of compounds (2) 2. To understand chemical bonds and examples of various types of bonds present in biological components To impart hands-on skills in preparation of Buffers and Solutions (2) 3. To acquaint with types of Isomerism, conformation and configuration (2)
UGBTGE102	Biostatistics	<p>Student will be able to –</p> <ol style="list-style-type: none"> 1. To develop numerical ability to solve mathematical problems (2) 2. Understand the central concepts of statistical theory and their probabilistic foundation and demonstrate statistical reasoning skills correctly (2) 3. Apply basic statistical concepts commonly used in Health and Medical Sciences (3) 4. Understand the differences between standard deviation and standard error (2) 5. Acquire knowledge based on correlation analysis(3)

COURSE OUTCOMES OF B.Sc (Biotechnology)

F.Y.B.Sc (SEM-II)
COURSE OUTCOMES

Course Code	Course Title	Learning Outcomes
UGBTC201	Fundamentals of Biotechnology	Student will be able to – 1. Understand fundamental vocabulary and Concepts of Biotechnology (2) 2. Differentiate between Traditional Biotechnology and Modern Biotechnology (2) 3. State various branches and applications of Biotechnology (1) 4. Gain knowledge on Food Biotechnology (3) 5. Understand the concept of enzyme Biotechnology, Enzyme Immobilization and various applications (2)
UGBTC202	Biochemistry -1	Students will be able to – 1. Differentiate different Biomolecules and compare their importance (2) 2. Discriminate structural and functional characteristics of various Biomolecules (2) 3. Illustrate the structure and Characterization of Biomolecules (3) 4. Classify enzymes on the basis of enzyme kinetics and its mechanism of action (2) 5. Contrast enzymes on the basis of their inhibition (2)
UGBTAEC201	Environmental Sciences-2	Student will be able to – 1. Analyze the social issues associated with environment (4) 2. Enlist the different programs implemented for population, education and human rights. (2) 3. Restate the role of IT in health and environment studies (2) 4. Explain the concepts of liberalization, privatization and globalization. (2) 5. Identify environmental assets and causes of its depletion along with recommendations for its protection (3)
ACC-2	Self Development Program	Students will be able to – 1. Choose correct way of living (3) 2. Transform themselves to their better version (3) 3. Practice meditation and relaxation techniques to keep them calm in all situations (4)
UGBTGE201	Fundamentals of Computers	Students will be able to- 1. Demonstrate a basic understanding of computer hardware and software (2) 2. Tackle computer-based tasks more confidently (3) 3. Learn to use and configure essential office applications

		<p>including word processing, spreadsheets. (3)</p> <p>4. Develop a basic understanding of technologies and protocols used on the Internet (2)</p> <p>5. Analyze big data using different applications (4)</p> <p>6. Identify cyber crime threats and implement the knowledge of cyber security. (2)</p>
UGBTGE202	Fundamentals of Physics	<p>Students will be able to –</p> <p>1. Understand core knowledge in physics, including the major premises of atomic physics, nuclear physics, optics, radiation physics, fluid dynamics. (2)</p> <p>2. Describe the structure of the atom, draw Bohr structure (1)</p> <p>3. State the location, relative charge, and atomic mass (1)</p> <p>4. Distinguish between the different types of radioactive decays (2)</p> <p>5. Use new knowledge in recognizing risks of radiation in their living and working environment (3)</p> <p>6. State the Newton's law of mechanics and fluid dynamics. (1)</p>

COURSE OUTCOMES OF B.Sc (Biotechnology)S.Y.B.Sc (SEM-III)
COURSE OUTCOMES

Course Code	Course Title	Learning Outcomes
UGBT301	Applied Chemistry-I	Students will be able to – 1. Discuss role of Organic Compounds in Biology and Synthesis of Organic Compounds. (2) 2. Discuss role of Green Chemistry and its application in Industry. (2)
UGBT302	Cell Biology	Students will be able to – 1. Develop an understanding of the various aspects of cell biology. (2) 2. Understanding the principles of cellular transport and its role in different processes in body. (2) 3. Understanding the structures of cell skeleton and its role. (2)
UGBT303	Immunology-I	Students will be able to – 1. Understand the significance of immune system. (2) 2. Understand various mechanisms of eliciting an immune response. (2) 3. Get an insight in effectors molecules and organs involved in eliciting immune response. (2) 4. Develop an understanding of vaccinology. (3)
UGBT304	Virology and Genetics	Students will be able to – 1. Understand the general structure, taxonomy, reproduction of bacterial, animal and plant viruses. (2) 2. Introducing viroids and prions structure and diseases (1) 3. Understanding different types of DNA mutations and repair systems. (2) 4. Study of different mechanisms of DNA exchange in bacteria and about jumping genes. (3)
UGBT305	Fermentation Technology	Students will be able to – 1. Develop an understanding of the various aspects of Fermentation technology. (2) 2. Develop skills associated with screening of Industrially important Microbial Strains. (3) 3. Understanding the principles of design of fermentor and fermentation process. (2) 4. Understanding the principles of various biological and chemical assays. (2)
UGBT306	Evolution and Ecology	Student will be able to – 1. understand the study of evolution as a science (2)

		<ul style="list-style-type: none"> 2. understand how the forms, functions, and life histories of organisms have evolved (2) 3. understand the interconnections among organisms and the environment (2) 4. recognize the major ecological patterns in nature and what causes them (4) 5. apply the scientific process to ecological problems (3) 6. make informed predictions on how organisms respond to environmental conditions and to biotic interactions (4)
UGBT307	Research Methodology , Scientific Writing and Communication Skill	<p>Student will be able to –</p> <ul style="list-style-type: none"> 1. Understand the principles of research methodology and its significance (2) 2. Understand the methods of data collection, interpretation and report writing (2) 3. Understand the importance of communication and its role in science (3)

COURSE OUTCOMES OF B.Sc (Biotechnology)**S.Y.B.Sc (SEM-IV)
COURSE OUTCOMES**

Course Code	Course Title	Learning Outcomes
UGBT401	Applied Chemistry-II	Student will be able to – 1. Gain knowledge of Natural Product Chemistry and related acquired skills. (3) 2. Gain an understanding of basic concepts in Polymer Chemistry and Nanomaterials. (2) 3. Explain the tools to derive the rate law for simple reaction mechanisms (2)
UGBT402	Biochemistry	Students will be able to – 1. Understand various pathways underlying metabolism of biomolecules such as carbohydrates, amino acids, lipids and nucleotides (2) 2. Understand various components involved in process of metabolism. (2) 3. Understand the deficiency diseases of the enzymes important for different pathways.(2)
UGBT403	Immunology-II	Student will be able to – 1. Describe the interactions between antigens and antibodies(2) 2. Understand significances of various methods of antigen/antibody detection and quantification. (2) 3. Understand the receptors involved in signal transductions to elicit an immune response. (2) 4. Understand the negative effects of overexpression of immune response. (2)
UGBT404	Medical Microbiology	Students will be able to – 1. List the factors playing a role in causing a disease. (1) 2. Discuss the various aspects of systemic infections including causative agents, symptoms and prophylaxis (2) 3. Gain the technical capability of handling, isolating and identifying various bacteria. (3)
UGBT405	Genetic engineering	Students will be able to- 1. Describe the components of recombinant DNA technology (2) 2. Understand techniques involved in genetic engineering. (2)
UGBT406	Bioinformatics and Biostatistics	Students will be able to – 1. Gain an understanding of the basic concepts of Bioinformatics and Biostatistics. (2) 2. Understand the tools used in Bioinformatics. (2)

		3. Apply the various Statistical Tools for Analysis of Biological Data. (3)
UGBT407	Entrepreneurship Development	Students will be able to – 1. Develop an understanding of the systematic process and to select and screen a Business Idea. (2) 2. Design strategies for successful implementation of ideas. (3)

COURSE OUTCOMES OF B.Sc (Biotechnology)

T.Y.B.Sc (SEM-V)
COURSE OUTCOMES

Course Code	Course Title	Learning Outcomes
UGBT501	Cell Biology & Chemotherapeutic Agents	Students will be able to understand – 1. Differentiation between cell cycle in prokaryotes and eukaryotes.(2) 2. Mechanism which controls cell division(2) 3. Mechanism of differentiation of cells(2) 4. Molecular genetics of cancer and its control(2) 5. Mode of action of different chemotherapeutic agents.(3) 6. The concept of drug resistance and measures to prevent it.(3)
UGBT502	Bioinstrumentation	Students will be able to understand – 1. Principle and applications of different types of electrophoresis techniques. (3) 2. Principle and applications of different types of centrifugation techniques. (3) 3. Principle and applications of different types of spectrophotometric electrophoresis techniques. (3) 4. Principle and applications of different types of chromatographic techniques. (3) 5. Role of radioisotopes in different tracer techniques and its applications. (3)
UGBT503	Regulation, Genomes and Omics	Students will be able to understand – 1. Regulation of gene expression at DNA and RNA level. (2) 2. Concept of epigenetic control in gene expression and its effect. (2) 3. The concept of physical and chemical methods of transferring genes in to plants and animals. (3) 4. Human genome mapping and its implications. (3) 5. The importance of CRISPER/CAS system and Gene therapy. (3) 6. History and Components of ‘Omics’. (2) 7. The analysis of Genomics, Epigenomics, Transcriptomics, Proteomics and Metabolomics. (4)
UGBT504	Marine Biotechnology	Students will be able to understand –

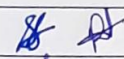


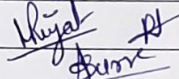
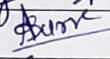




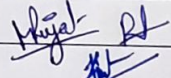


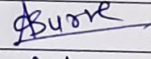



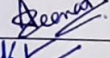


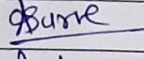



		<ol style="list-style-type: none"> 1. The concepts related to marine biotechnology and its application. (1) 2. The microbes in marine aquatic environment, their role and its interaction with ecosystem. (2) 3. Pharmaceutical compounds from marine ecosystem and its potential application (3) 4. Marine microbial enzymes and its application (3) 5. Clinical trial and challenges associated with marine products (4) 6. Emphasize on marine functional foods and nutraceuticals (2) 7. Different types of marine bioresources (2) 8. The concept of cosmeceuticals and its application (3)
UGBTAC505	Biosafety and Intellectual Property Rights	<p>Students will be able to understand –</p> <ol style="list-style-type: none"> 1. Risk associated with various lab procedures, protocols, apparatus etc. (1) 2. Biosafety issues in context with Biotechnology. (2) 3. Types of pharma products (1) 4. Regulatory procedures associated with testing of contaminants in food and pharma products. (2) 5. Different types of intellectual property rights and when to exercise them. (1) 6. Basics of patent drafting procedure and parts of patent application. (2) 7. What is infringement of patent (2)


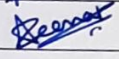
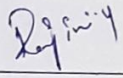

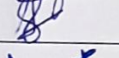
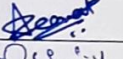

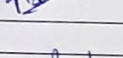
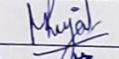
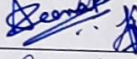
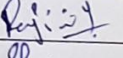
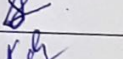
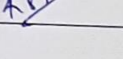
COURSE OUTCOMES OF B.Sc (Biotechnology)**T.Y.B.Sc (SEM-VI)
COURSE OUTCOMES**

Course Code	Course Title	Learning Outcomes
UGBT601	Biochemistry	Students will be able to understand – 1. Concept of protein denaturation and protein folding.(2) 2. Complementary interactions between proteins and legends(2) 3. Biosynthesis pathways of carbohydrates and lipids and its importance (2) 4. Role of different hormones in body and their mechanism of action. (2) 5. Functions and disorders associated with different vitamins and minerals (4)
UGBT602	Industrial Microbiology	Students will be able to understand – 1. Normal flora of milk and factors affecting quality of milk, milk products (2) 2. The concept of milk preservation through pasteurization (3) 3. The concept and methods under downstream processing and its implications (2) 4. Fermentation processes using scale up and scale down approaches (3) 5. Industrial production of commercially important products (3) 6. The concepts of GMP, GLP, QA and QC and its significance (2)
UGBT603	Basic Pharmacology and Toxicology	Students will be able to understand – 1. Mechanism of drug action, drug receptors and biological responses. (2) 2. Concept of drug antagonism, potency and intrinsic activity. (2) 3. Various factors affecting the rate of drug absorption. (2) 4. Influence of various factors during drug distribution. (2) 5. Concept of drug metabolism and excretion. (2) 6. The concepts of basic and regulatory toxicology. (2)
UGBT604	Environmental Biotechnology	Students will be able to understand – 1. Different sources of pollution and its environmental effects. (2) 2. Difference between conventional and alternative energy resources and their sources. (2) 3. Technologies and procedures used to harness energy from various non- conventional energy resources. (3)

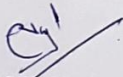
		<p>4. Biological (aerobic and anaerobic) methods to treat effluent and wastewater. (3)</p> <p>5. Biological agents and sensors used to detect pollutants in environment. (3)</p> <p>6. Concept of bioremediation. (3)</p>
UGBTAC605	Agri-Biotechnology	<p>Students will be able to understand –</p> <p>1. The concept of precision agriculture and agriculture systems (1)</p> <p>2. The concept of greenhouse technology and its function (2)</p> <p>3. Plant stress biology in relation to biotic and abiotic factors (2)</p> <p>4. Concept of genetic markers in plant breeding. (3)</p> <p>5. Plant DNA barcoding and recent advances. (3)</p> <p>6. Monoculture, Co culture inoculant and Polymicrobial inoculant formulations. (3)</p>

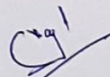
Numbers in brackets () indicates cognitive levels of revised Blooms taxonomy as follow:
(1):Remembering, (2):Understanding, (3):Applying, (4):Analyzing, (5):Evaluating, (6):Creating

Sr.No.	Course Code	Name of the Course Coordinator	Signature
SEM-I			
1.	UGBTC101	Ms. Sangeeta Subin, Dr. Rajini Kumari	
2.	UGBTC102	Ms. Kshama Kamath	
3.	UGBTAEC101	Ms. Zeenath Mohamed Mustafa	
4.	ACC-1	Ms. Manminder Riyat, Dr. Rajini Kumari	
5.	UGBTGE101	Mr. Amit Surve	
6.	UGBTGE102	Ms. Tanuja Rajput	
SEM-II			
1.	UGBTC201	Dr. Rajini Kumari Yaddula	
2.	UGBTC202	Ms. Manminder Riyat	
3.	UGBTAEC201	Ms. Sangeeta Subin	
4.	ACC-2	Ms. Manminder Riyat, Dr. Rajini Kumari	
5.	UGBTGE201	Ms. Tanuja Rajput	
6.	UGBTGE202	Ms. Kshama Kamath	
SEM-III			
1.	UGBT301	Mr. Amit Surve	
2.	UGBT302	Ms. Manminder Riyat	
3.	UGBT303	Ms. Sangeeta Subin	
4.	UGBT304	Ms. Kshama Kamath	
5.	UGBT305	Ms. Zeenath Mohamed Mustafa	
6.	UGBT306	Ms. Tanuja Rajput	
7.	UGBT307	Ms. Rajini Kumari	
SEM-IV			
1.	UGBT401	Mr. Amit Surve	
2.	UGBT402	Ms. Manminder Riyat	
3.	UGBT403	Ms. Sangeeta Subin	
4.	UGBT404	Ms. Kshama Kamath	

5.	UGBT405	Ms. Tanuja Rajput	
6.	UGBT406	Ms. Zeenath Mohamed Mustafa	
7.	UGBT407	Dr. Rajini Kumari Yaddula	
SEM-V			
1.	UGBT501	Ms. Manminder Riyat	
2.	UGBT502	Ms. Sangeeta Subin	
3.	UGBT503	Ms. Zeenath Mohamed Mustafa	
4.	UGBT504	Ms. Rajini Kumari	
5.	UGBT505	Ms. Kshama Kamath	
SEM-VI			
1.	UGBT601	Ms. Manminder Riyat	
2.	UGBT602	Ms. Zeenath Mohamed Mustafa, Ms. Tanuja Rajput	
3.	UGBT603	Ms. Rajini Kumari	
4.	UGBT604	Ms. Sangeeta Subin	
5.	UGBT605	Ms. Kshama Kamath	


**Program
Coordinator**


BOS Chairman


Principal