

School Of Biotechnology

Programme Objectives

Program: Integrated B.Tech - M.Tech./MBA Biotech. (5 years programme)

The main objective of five years programme Integrated. B.Tech+M.Tech./MBA in Biotech. is to introduce with the deep understanding about basic and applied education and research skills of biotechnology. The programme explains the fundamental of biological process including metabolism, reproduction, immune system, genetics, ecology and environment, biophysics, biochemistry, cellular and molecular biology. This programme also includes various skill development programme as elective courses including medical laboratory technology, nanotechnology, molecular medicine, regenerative medicine, molecular diagnostics, etc with hands on training programme. The students also demonstrate engagement in diverse area of biological sciences through involvement in research projects or internship activities in house institute or outside the campus. The mission of the programme is inculcating the budding biotechnologists with in depth subject knowledge and effective skills needed to be a successful professional in their fields.

Programme Objectives:

- To provide basic knowledge and laboratory skills of the subjects.
- To create and apply appropriate techniques, resources, and modern instruments for biochemical estimation, animal tissue culture and plant tissue culture experiments, environment insults measurements, genetics, bioinformatics, cellular, molecular and physiological activities of all living organisms with an understanding of the application and limitations.
- To introduce with the area of research as per the recent outbreaks or demand in the society.
- To train and enhance skills using biological principles and systems to create new products Knowledge about research to design.
- Apply reasoning informed by the contextual knowledge to assess biotechnological research, its importance for society, health, safety, legal and environmental issues and the consequent responsibilities relevant to the biodiversity conservation practice.

Program: M.Tech Biotechnology (2 years programme)

School of Biotechnology is running two years M.Tech Biotechnology program based on curriculum adopted by the department of Biotechnology (DBT). The main objective of this program is to impart the latest developments in areas of biotechnology and biochemical engineering for the development of skill sets required for technology development and implementation including present contemporary needs of the economy.

The emphasis of this program is primarily focused on promoting skill-based and outcome-based education.

Program objectives:

- To impart proficiency in advanced laboratory skills focused on process engineering principles.
- To design and interpret research experiments and acquire effective communication skills.
- To provide interdisciplinary research and educational opportunities to solve problems that will improve quality of life.
- To develop research acumen and vision for catering rising demands of the society
- To train the student for the development of technology-based platforms for translational products.

Program: M.Sc. Biotechnology (2 years programme)

Our school running DBT sponsored two years M. Sc. Biotechnology program. The main objective of M. Sc. Biotechnology program is to educate diversified group of students with deep background in biology, biochemistry, microbiology, immunology, animal, agriculture, bioinformatics, bioprocess technologies and other Biophysical sciences for careers in educational and research institutions, government and non-government pharmaceutical Industries. The program motivate students from multiple discipline to experience research in the field of Biotechnology that will assist to get career opportunities and job opportunities.

Program objectives:

- To impart the proficiency in basic and advanced laboratory skills.
- To engage students in different areas of life science based to get academics experiences and also provide a platform which allow them to conduct applied research.
- To provide interdisciplinary research and educational opportunities to solve problems that will improve quality of life.
- To achieve excellence in teaching theoretically as well as practically

Ph.D. Biotechnology

School of biotechnology is conducting entrances examination based Ph.D. program as per the UGC norms on the basis of both regular and working professional modes. In case of working profession mode, the school offers opportunity to those student who are working their research work in the other government or non-government institutes. The main objective of the programme is to generate interest in the pursuit of specific research goals in Biotechnology and the development of expansive knowledge leading to a doctorate degree in a value based environment. The School of Biotechnology covers a wide spectrum of research areas including animal biotechnology, plant biotechnology, microbial biotechnology, environmental biotechnology, biophysical and bioinformatics

cancer biology, drug and gene delivery, infectious biology, and bioprocess biotechnology etc.

Programme Objectives:

- To engage committed students in areas not experienced in their previous academic lives through pre-Ph.D. program and to bring them to a baseline that will allow them to conduct translational research, from conceptual design through in vivo or in vitro methodology towards industrial purposes, or for public health and / or the environment.
- To impart the theoretical and hand on training knowledge so that students can design, conduct experiments, analyze and interpret data for investigating problems in Biotechnology and allied fields.
- To inculcate problem solving skills and critical thinking to a broad spectrum of problems in biotechnology, health sector, environmental and medicine related fields.
- To solve problems related to agriculture, health and environment and be able to create new job opportunities
- To encourage the research fellows to participate and share their research outcomes at different scientific platforms worldwide via participating in conference, workshops, seminar.

COURSE OBJECTIVES

COURSE OBJECTIVES

School of Biotechnology **Int. M.Tech 5 year Programme [10 Semesters]**

First Semester

SN	Course Code	Course Name	Course Objectives
1.	CY101	Engineering Chemistry	To bring adaptability to new developments in engineering chemistry and their applications
2.	MA103/ BT101	Mathematics /Life Science	To expose the basic concepts of mathematics that can be applied in solving biological problems/to expose the basic concepts of plant and animal cells for its explorations for commercial purpose
3.	CS101	Fundamentals of Computer Programming	To provide insights on coding of computer programming that can be used for biological use
4.	BT103	Introduction to Biotechnology	To introduce and strengthen the basic biotechnological processes for their utilization of living organisms for commercial use
5.	EN101	English Proficiency	To provide the students with an ability to build and enrich their communication skills
6.	SS101	Human values and Buddhist Ethics	To impart the knowledge on the role of Buddhism in spirituality and Life being
7.	BT105	Laboratory I: Basic Biotechnology	To provide basic knowledge on various biotechnological practices in the laboratory
8.	CY103	Laboratory II: Chemistry	To introduce the students on chemical calculations and preparations of various reagents, qualitative and quantitative analysis of chemical molecules
9.	CS181	Laboratory III: Computer Programming	To introduce the basic experiments on programming
		General Proficiency	

Second Semester

S.No.	Course Code	Course Name	Course Objectives
1.	PH101	Applied Physics	The objective of this course to understand the basic laws and explore the fundamental concepts of physics • To understand the concepts and significance of the various physical phenomena including optics, quantum theory etc.
2.	MA104	Mathematics II	The objective of this course to enable students to enhance mathematical skills and understand the fundamental concepts of pure and applied mathematics in biology.
3.	BT102	Biomolecules	The objective of this course to introduce with the nature and their cellular function of different biological biomolecule.
4.	EN102	Professional Communication	The objective of this course is to potentiate the verbal communication, writing skill and learning from the text.
5.	ES101	Environmental Studies	The objective of this course to introduce with basic fundamental of ecosystem, natural resources, and environment challenges & policies.

Third Semester

S.No.	Course Code	Course Name	Course Objectives
1.	BT201	Cell Biology and Genetics	The objective of this course to learn about the basics of cell and its inclusions. Students will learn about cell-cell communication and its functions. The students will be able to acquire knowledge about genetic inheritance and chromosomal variations.
2.	BT203	Fundamentals of Biochemistry	The objective of this course to acquaint with basic principles and function of the living cell. Student will learn more about the metabolism of different cellular components, energy production and cellular organization.
3.	BT205	Fundamentals of Microbiology	The objective of this course to impart knowledge of the basic principles of bacteriology, classification and microbial growth and reproduction.
4.	BT207	Introductory Bioinformatics	The objective of this course to trained in the application of computational programs used for database searching, protein and DNA sequence analysis, and prediction of protein function.
5.	MA203	Quantitative Technique in Biotechnology	The objective of this course to introduce with different mathematical application or formulations to quantitate the molecules.

Fourth Semester

SN	Course Code	Course Name	Course Objectives
1.	BT202	Molecular Dynamics & Bioenergetics	To educate the energy metabolism in cellular framework
2.	BT204	Enzymology	To introduce about mechanism of enzyme actions and its applications in industries
3.	BT206	Bioanalytical Techniques	To provide insights on various analytical tools used for elucidating structural and functional relationship of cell
4.	BT208	Immunobiology	To introduce basic techniques for identifying antigen antibody interactions, immunological response against tumor, blood transfusion and transplantation procedures
5.	BT212	Generic Elective Cell Physiology	To provide insights on the structures and purposes of basic components of prokaryotic and eukaryotic cells
5.	BT214	Skill Enhancement Course Medical LabTechnology	To provide the students with various technologies associated in medical diagnosis
6.	BT216	Laboratory II: Medical LabTechnology Lab	To impart the experimental knowledge on medical lab technologies
		General Proficiency	

Fifth Semester

S.N.	Course Code	Course Name	Course Objectives
1.	BT301	Molecular Biology	To impart detailed understanding of key events of molecular biology comprising of mechanism of DNA Replication, Transcription and Translation in Prokaryotes and Eukaryotes
2.	BT303	Biophysical Chemistry	To develop an understanding of the relation between structure, function and dynamics of biological macromolecules
3.	BT305	Developmental Biotechnology	To provide insights on the cellular behaviors that lead to morphological change during development.
4.	BT307	Food Biotechnology	To impart knowledge on theoretical and practical aspects of the different biotechnological processes underlying the Food transformation
5.	BT309	Environmental Biotechnology	To provide insights on biological processes related to environmental degradation and protection
6.	BT311/313	Generic Elective a) Developments in Therapeutics b) Microbiology Quality Control in Pharma and Food Industry	a) To provide the students with various latest developments in biotechnology practices that will be helpful in treatment of various diseases. b) To provide fundamental aspects of quality control and quality assurance practices adopted in food and pharma industries
7.	BT315	Laboratory I: Molecular Biology	To impart the experimental knowledge on molecular biology
8.	BT317	Laboratory II: Environmental Biotechnology	To impart the experimental knowledge on protection of environment
		General Proficiency	

Sixth Semester

S.N.	Course Code	Course Name	Course Objectives
1.	BT302	Genomics and Proteomics	To appraise the students to the vital concepts of technologies pertinent to Genes and Proteins
2.	BT304	Plant & Animal Biotechnology	To educate students about the application of classical plant metabolism and animal metabolism in biotechnology
3.	BT306	Vaccine Biotechnology	To provide insights on fundamental aspects of vaccine design and development
4.	BT308	Virology	To impart knowledge on molecular level about representative DNA and RNA viruses and the effects of virus infection on cell growth control and survival
5.	BT310/312/314	Generic Elective a) Material Science & Biomaterials b) Pharmaceutical Biotechnology c) Biofuel and Alcohol Technology	a) To provide the students with various latest developments in structure and function of biomaterials for commercial purpose b) To provide fundamental aspects of pharma practices used in biotechnology sector c) To provide latest developments in biofuel research and its applications
6.	BT316	Training Seminar/Educational Tour	To expose the students in biotechnology industry
7.	BT318	Laboratory I: Genomics and Proteomics	To impart the experimental knowledge on genome and protein's function
8.	BT320	Laboratory II: Plant & Animal Biotechnology	To impart the experimental knowledge on plant and animal physiology
		General Proficiency	

Seventh Semester

1	Semester VII	BT507	Microbiology	The objective of this course to impart the knowledge about the involvement of microorganism in human health, agricultural, food and industrial application.
2	Semester VII	BT509	Plant and Animal Cell Culture Technology	The objective of this course to develop basic and laboratory skill to grow plant or animal tissue culture. The students will learn about the hands-on experience and training in plant and animal tissue culture
3	Semester VII	BT517	Principles of Bioreaction Engineering	To educate students about the fundamental concepts for the application of biochemical engineering principles in biological system
4	Semester VII	MA415	Biostatistics	The objective of this course to understand the basic concepts of Biostatistics. The students will know about the basic principles of biostatistics and applications of Biostatistics in biological problems.
Discipline Specific Elective 1				
5	Semester VII	BT519	Nanobiotechnology	The objective of this course is to introduce with the fundamental knowledge of nano-material production, structure and its applications in biomedical sciences.
6	Semester VII	BT521	Molecular Medicine	The objective of this course to impart the recent updates in biomedical sciences at molecular level. The student will learn about the recent methodologies and approaches in diseases diagnosis and treatments.
Discipline Specific Elective 2				
7		BT523	Molecular Modeling & Drug Design	The objective of this course to train students with computational analysis to identify drug-targets using

				theoretical modeling and structure-based drug design.
8		BT525	Molecular Toxicology	The objective of this course is introduce with molecular toxicology of endbiotics or xenobiotics compounds. The students will also learn about the toxic responses of the drug in animal sciences.
9		BT527	Laboratory I: Cell Culture Technology	To provide hands-on training on plant and animal cell culture techniques
1		BT529	Laboratory II: Microbiology & Bioprocessing Technology	To develop an understanding about practical aspects of microbes in bioprocessing

Eighth Semester

SN	Course Code	Course Name	Course Objectives
1.	BT502	Genetic engineering	To teach various approaches to conducting genetic engineering and their applications in biological research as well as in biotechnology industries
2.	BT504	Immunology	To provide insights about structural features of components of immune system as well as their function
	BT506	Bioprocess Engineering and Technology	To educate students about the fundamental concepts of bioprocess technology and its related applications
3.	BT508	Downstream processing in Biotechnology	To provide an overview of various aspects of recovery and processing of biological products
4.	BT510	Bioreactor Operations	To apprise about on biological reactions, elements of bioreactor design, and fundamentals of mass and energy balances in biological reactions
5.	BT512	Computational Biology	To provide students with theory and practical experience of essentials for drug design program
6.	BT511	Basics of Chemistry and Physics	To cover all essentials aspects of physico-chemical principles underlying biological processes.
7.	BT514	Laboratory I: Molecular Biology & Genetic Engineering	To provide students with the experimental knowledge of molecular biology and genetic engineering.
8.	BT516	Laboratory II: Immunology	To develop an understanding about practical aspects of components of immune system as well as their function
		General Proficiency	

Ninth Semester

SN	Course Code	Course Name	Course Objectives
1.	BT601	Bioprocess Equipment Design and Economics	To educate various aspects of equipment design and process economics for biomanufacturing industries
2.	BT603	Bioentrepreneurship	To teach students about concepts of entrepreneurship including identifying a winning business opportunity, gathering funding and launching a business, growing and nurturing the organization and harvesting the rewards.
	BT605	Instrumentation and Control	To provide fundamental aspects of process control and instrumentation
3.	BT607	Research Methodology and Scientific Communication Skills	To provide an overview of methodologies used to do research for understanding effective lab practices and scientific communication and appreciate scientific ethics
4.	BT609	Intellectual Property Rights, Biosafety and Bioethics	To provide basic knowledge on intellectual property rights and their implications in biological research and product development
5.	BT611	Project Proposal Preparation and Presentation	To educate students about organize ideas, material and objectives for their dissertation and to prepare the students to present their topic of research
6.	BT613	Laboratory I: Downstream Processing in Biotechnology	To provide students with hands on knowledge of primary unit operations involved in downstream processing.
7.	BT615	Dissertation I:	To prepare the students to adapt to the research environment and understand how projects are executed in a research laboratory
8.	BT627	Discipline Specific Elective	To provide students with an overview of the recently-

		System and Synthetic biotechnology	developed molecular tools that are used for the in vivo monitoring of cellular activities
		General Proficiency	

Tenth Semester

SN	Course Code	Course Name	Course Objectives
1.	BT602	Dissertation II	To provide hands-on-training in various disciplines of biotechnology
		General Proficiency	

M.TECH 2-YEAR PROGRAMME [4 SEMESTERS]

First semester

SN	Course Code	Course Name	Course Objectives
1.	BtMT501	Biochemistry	To provide insights into biochemical principles with specific emphasis on different metabolic pathways and various disease pathologies
2.	BtMT503	Cell and Molecular Biology	To learn fundamental aspects of biological phenomena in cellular and molecular context
	BtMT505	Introduction to Engineering Principles	To learn the essentials of material and energy balances, properties of materials and transport phenomena
3.	BtMT507	Microbiology	To provide insights on microbial diversity, morphology, physiology and nutrition, methods for control of microbes and host-microbe interactions
4.	BtMT509	Plant and Animal Cell Culture Technology	To apprise about the fundamental concepts of animal and plant cell system,
5.	MA415	Biostatistics	To give conceptual exposure of essential contents of mathematics and statistics for problem solving
6.	BtMT511	Basics of Chemistry and Physics	To cover all essentials aspects of physico-chemical principles underlying biological processes.
7.	BtMT513	Laboratory I: Biochemistry and Analytical Techniques	To introduce students to experiments in biochemistry and their analytical instruments
8.	BtMT515	Laboratory II: Microbiology	To provide practical skills in basic microbiological techniques
		General Proficiency	

Second Semester

SN	Course Code	Course Name	Course Objectives
1.	BtMT502	Genetic engineering	To teach various approaches to conducting genetic engineering and their applications in biological research as well as in biotechnology industries
2.	BtMT504	Immunology	To provide insights about structural features of components of immune system as well as their function
	BtMT506	Bioprocess Engineering and Technology	To educate students about the fundamental concepts of bioprocess technology and its related applications
3.	BtMT508	Downstream processing in Biotechnology	To provide an overview of various aspects of recovery and processing of biological products
4.	BtMT510	Bioreactor Operations	To apprise about on biological reactions, elements of bioreactor design, and fundamentals of mass and energy balances in biological reactions
5.	BtMT512	Computational Biology	To provide students with theory and practical experience of essentials for drug design program
6.	BtMT511	Basics of Chemistry and Physics 2 8	To cover all essentials aspects of physico-chemical principles underlying biological processes.
7.	BtMT514	Laboratory I: Molecular Biology & Genetic Engineering	To provide students with the experimental knowledge of molecular biology and genetic engineering.
8.	BtMT516	Laboratory II: Immunology	To develop an understanding about practical aspects of components of immune system as well as their function
		General Proficiency	

Third Semester

SN	Course Code	Course Name	Course Objectives
1.	BtMT601	Bioprocess Equipment Design and Economics	To educate various aspects of equipment design and process economics for biomanufacturing industries
2.	BtMT603	Bioentrepreneurship	To teach students about concepts of entrepreneurship including identifying a winning business opportunity, gathering funding and launching a business, growing and nurturing the organization and harvesting the rewards.
	BtMT605	Instrumentation and Control	To provide fundamental aspects of process control and instrumentation
3.	BtMT607	Research Methodology and Scientific Communication Skills	To provide an overview of methodologies used to do research for understanding effective lab practices and scientific communication and appreciate scientific ethics
4.	BtMT609	Intellectual Property Rights, Biosafety and Bioethics	To provide basic knowledge on intellectual property rights and their implications in biological research and product development
5.	BtMT611	Project Proposal Preparation and Presentation	To educate students about organize ideas, material and objectives for their dissertation and to prepare the students to present their topic of research
6.	BtMT613	Laboratory I: Downstream Processing in Biotechnology	To provide students with hands on knowledge of primary unit operations involved in downstream processing.
7.	BtMT615	Dissertation I:	To prepare the students to adapt to the research environment and understand how projects are executed in a research laboratory
8.	BtMT641	Discipline Specific Elective Molecular Diagnostics	To educate students about various facets of molecular procedures that could be employed in early diagnosis and prognosis of human diseases

		General Proficiency	
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Fourth Semester

SN	Course Code	Course Name	Course Objectives
1.	BtMT602	Dissertation II	To provide hands-on-training in various disciplines of biotechnology
		General Proficiency	

M.Sc Biotechnology 2 year Programme [4 Semesters]
First Semester

SN	Course Code	Course Name	Course Objectives
1.	BtMSc 501	Biochemistry	To educate biochemical principles with specific emphasis on different metabolic pathways and various disease pathologies
2.	BtMSc 503	Cell and Molecular Biology	To provide fundamental aspects of biological phenomena in cellular and molecular context
3.	BtMSc 505	Plant and Animal Biotechnology	To inculcate the principles, practices and application of animal biotechnology, plant tissue culture, plant and animal genomics, genetic transformation and molecular breeding of plants and animals
4.	BtMSc 507	Microbiology	To provide insights on microbial diversity, morphology, physiology and nutrition, methods for control of microbes and host-microbe interactions
5.	BtMSc 509	Genetics	To expose the concepts of population genetics, quantitative genetics encompassing complex traits, clinical genetics and genetics of evolution
6.	MA415	Biostatistics	To give conceptual exposure of essential contents of mathematics and statistics for problem solving
7.	BtMSc 511	Basics of Chemistry and Physics	To cover all essentials aspects of physico-chemical principles underlying biological processes.
8.	BtMSc 513	Laboratory I: Biochemistry and Analytical Techniques	To introduce students to experiments in biochemistry and their analytical instruments
9.	BtMSc 515	Laboratory II: Microbiology	To provide practical skills in basic microbiological techniques
10.	BtMSc 517	Laboratory III: Plant and Animal Biotechnology	To provide hands-on training in basic experiments of plant and animal biotechnology.
		General Proficiency	

Second Semester

S.No.	Course Code	Course Name	Course Objectives
1	BtMSc 502	Genetic Engineering/	The objectives of this course are to teach students with various approaches to conducting genetic engineering and their applications in biological research as well as in biotechnology industries. Genetic engineering is a technology that has been developed based on our fundamental understanding of the principles of molecular biology and this is reflected in the contents of this course.
2	BtMSc 504	Immunology	The objectives of this course are to learn about structural features of components of immune system as well as their function. The major emphasis of this course will be on development of immune system and mechanisms by which our body elicits immune response. This will be imperative for students as it will help them to predict about nature of immune response that develops against bacterial, viral or parasitic infection, and prove it by designing new experiments.
3	BtMSc 506	Bioinformatics	The objectives of this course are to provide theory and practical experience of the use of common computational tools and databases which facilitate investigation of molecular biology and evolution-related concepts.
4	BtMSc 508	Genomics and Proteomics	The objectives of this course is to provide introductory knowledge concerning genomics, proteomics and their applications.
5	BtMSc 510	Molecular Diagnostics	The objectives of this course are to sensitize students about recent advances in molecular biology and various facets of molecular medicine which has potential to profoundly alter many aspects of modern medicine including pre- or post-natal analysis of genetic diseases and identification of individuals predisposed to disease ranging from common cold to cancer.

6	BtMSc 512	Research Methodology and Scientific Communication Skills	The objectives of this course are to give background on history of science, emphasizing methodologies used to do research, use framework of these methodologies for understanding effective lab practices and scientific communication and appreciate scientific ethics.
7	BtMSc 514	Biological Imaging	The objectives of this course are to give fundamental knowledge of biological instrumentation and methodology.
8	BtMSc 516	Computational Biology	The objectives of this course are to build models for diverse types of experimental data and to use visual simulations in order to assess the complexity of <i>biological systems</i> .
9	BtMSc 518	Drug Discovery and Development	The objectives of this course is to introduce with basic understanding about drug development, optimization and comprehensive evaluation of biomolecules as potential drug targets.
10	BtMSc 520	Environmental Biotechnology	The course objective is an introduction to environmental biotechnology and emphasizes on the utilization of microbial processes in waste and water treatment, and bioremediation.
1.	BtMSc 522	Microbial Technology	The course objective of this course is to advance practical and basic knowledge of microbial-based translational research and biocontrol of diseases.
2.	BtMSc 524	Nanobiotechnology	The course objective of this course to provide basic fundamental of nano-biosciences and its applications in biomedical sciences.
3.	BtMSc 526	Protein Engineering	The objective of this course is to develop an understanding of protein structures related analysis, and industrial applications.
4.	BtMSc 528	Vaccines	The objective of this course is to introduce with basic information about vaccine production, new challenges, trials and approval of final end product before marketing.
5.	BtMSc 530	Seminar	The objective of this course is to develop the presentation skill, designing and analysis research project.
6.	BtMc 532	Laboratory I:	The objectives of this course are to provide

		Molecular Biology and Genetic Engineering	students with experimental knowledge of molecular biology and genetic engineering.
7.	BtMSc 534	Laboratory II: Immunology	The objectives of this laboratory course are to develop an understanding about practical aspects of components of immune system as well as their function. Basic as well as advanced methods will be taught to detect different antigen and antibody interactions, isolation of different lymphocyte cells etc. and how they can be used in respective research work.

Third Semester

1.	BtMSc 601	Bioprocess Engineering & Technology	The objectives of this course are to educate students about the fundamental concepts of bioprocess technology and its related applications, thus preparing them to meet the challenges of the new and emerging areas of biotechnology industry
2.	BtMSc 603	Emerging Technologies	This course is broad-based in nature encompassing several new technologies that current experimental researchers are employing to probe complex system biology questions in life-sciences. The objectives of this course are to teach basics of the new principles to students so as to appreciate current-day research tool-kit better.
3.	BtMSc 605	Critical Analysis of Classical Papers	The objectives of this course are to familiarize students with classic literature to make them appreciate how groundbreaking discoveries were made without, necessarily, use of high-end technologies.
4.	BtMSc 607	Bioentrepreneurship	Research and business belong together and both are needed. In a rapidly developing life science industry, there is an urgent need for people who combine business knowledge with the understanding of science & technology. Bio-entrepreneurship, an interdisciplinary course, revolves around the central theme of how to manage and develop life science companies and projects. The objectives of this course are to teach students about concepts of entrepreneurship including identifying a winning business opportunity, gathering funding and launching a business, growing and nurturing the organization and harvesting the rewards.
5.	BtMSc 609	Intellectual Property Rights, Biosafety and Bioethics	The objectives of this course are: • To provide basic knowledge on intellectual property rights and their implications in biological research and product development; • To become familiar with

			India's IPR Policy; • To learn biosafety and risk assessment of products derived from biotechnology and regulation of such products; • To become familiar with ethical issues in biological research. This course will focus on consequences of biomedical research technologies such as cloning of whole organisms, genetic modifications, DNA testing.
6.	BtMSc 611	Project Proposal Preparation & Presentation	The purpose of this course is to help students organize ideas, material and objectives for their dissertation and to begin development of communication skills and to prepare the students to present their topic of research and explain its importance to their fellow classmates and teachers.
7.	BtMSc 615	Laboratory VI: Bioprocess Engineering & Technology	The objectives of this laboratory course are to provide hands-on training to students in upstream and downstream unit operations.
8.	BtMSc 617	Laboratory VII: Bioinformatics	The aim of this course is to provide practical training in bioinformatic methods including accessing major public sequence databases, use of different computational tools to find sequences, analysis of protein and nucleic acid sequences by various software packages.
9.	BtMSc 613	Seminar	The objective of this course is to develop the presentation skill, designing project and enhance the critical thinking about the research topic.
10.	BtMSc 615	Laboratory I: Bioprocess Engineering and Technology	The objectives of this course are to provide technical training in microbial utilization for industrial based production of metabolites/or products.
11.	BtMSc 619	Dissertation I	The objectives of this courses are to develop independent research skill, project designing and writing research paper/ review skill.

Semester IV

S.No.	Semester	Course Code	Course Name	Course Objectives
1.	Semester IV	BtMSc 602	Dissertation II	The objectives of this course are to prepare the students to adapt to the research environment and understand how projects are executed in a research laboratory. It will also enable students to learn practical aspects of research and train students in the art of analysis and thesis writing.

Ph.D Biotechnology

SN	Course Code	Course Name	Course Objectives
1.	AS 601	Research Methodology	To trend the research students in the analytical tools required during the Ph.D. Course
2.	RE 001	Research and Publication Ethics	To provide knowledge about scientific writing and their ethics
3.	BT801	Journal Club	To inculcate the presentation skills by presenting various research papers and understanding the tools and techniques
4.	BT802	Advances in Research Techniques	To provide insights on advancements on various research techniques and their result interpretation
5.	BT 804	Advances in Animal Biotechnology	To expose the concepts of utilization of animals' cells and understanding of their metabolisms for commercial use
6.	BT805	Advanced Microbial Biotechnology	To provide insights on microbial physiologies and metabolism to harness their potential for industrial use
7.	BT809	Structural Biology	To provide insights on analytical techniques for structural elucidation of various biomolecules