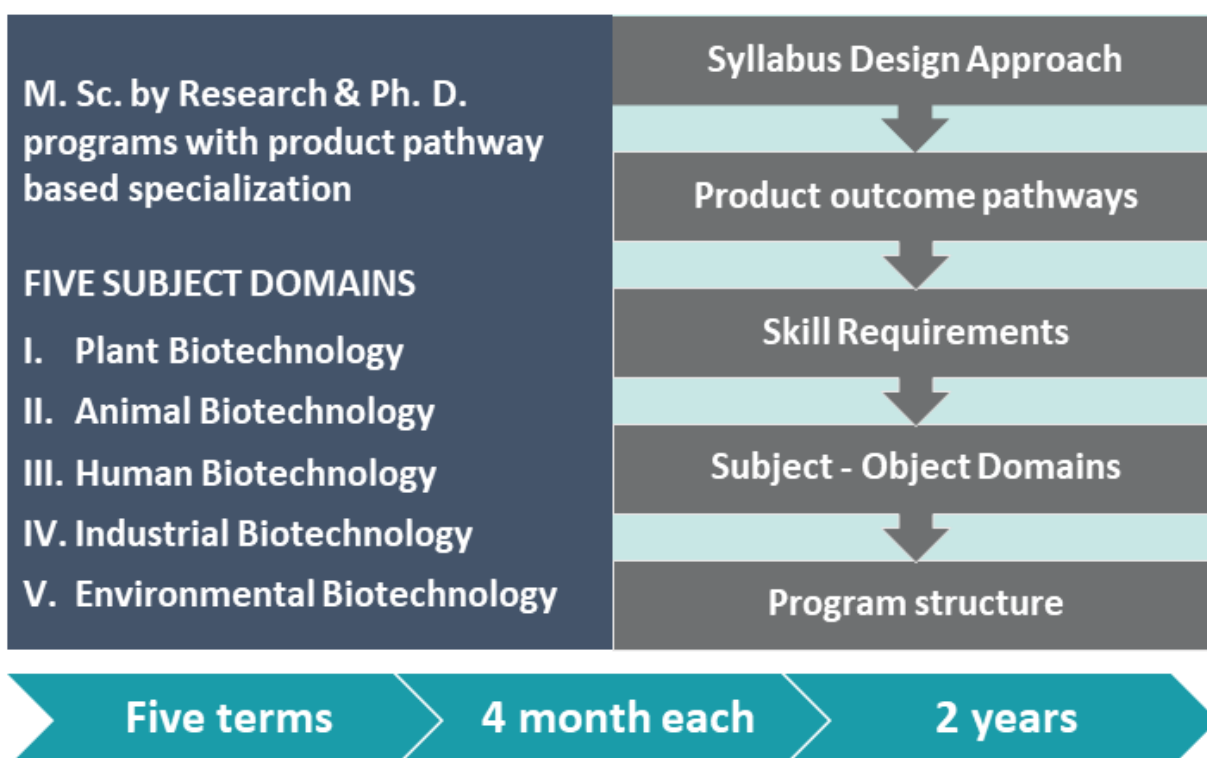




GBU Syllabus Design Approach



Gujarat Biotechnology University

Vision

“Gujarat Biotechnology University will be a world class research focused academic institution and a foundry of transformational knowledge which will train and prepare biotech scientists in cutting edge, product focused research to create and deliver a strong pipeline of innovative pr

Gujarat Biotechnology University Act

Gujarat Biotechnology University Act came into force through government gazette notification on 23rd October 2018. The Gujarat Biotechnology University with its provisions in the act will have a strong techno-administrative architecture with various authorities and officers of the University providing necessary directions for strategic changes including its education system, research system and linkages to industries and with top ranking institutions abroad, so that the university can meet the standards of global competence to become one of the top-ranking universities in the world.

The authorities of the University	The officers of the University
<ul style="list-style-type: none"> § The Chairman; § The Board of Governors; § The Academic Council; § The Advisory Council; § The Finance Committee; and § Such other authorities as may be specified by regulations to be the authorities of the University. 	<ul style="list-style-type: none"> § The Director General; § The Directors; § The Deans; § The Registrar; and § Such other persons associated with function of the University as may be specified by regulations, to be the officers of the University.

Key objectives of Gujarat Biotechnology University

- § To create schools, centers and institutions of excellence for imparting State of the art product focused, research based, education and skill in the field of biotechnology and allied sciences.
- § To create capabilities for developing world-class infrastructure, intellectual property base and skill sets for education, training, research, product development and technology commercialization in biotechnology and allied sciences.
- § To develop innovative methods for applied and translational research, teaching and skill at various levels of educational accomplishment so as to set high standards of practice-based education in biotechnology and allied sciences.
- § To address the societal challenges of the state and the nation and to develop linkages with institutions of national and global repute and to create templates and models of collaboration for interdisciplinary study and research to solve developmental problems using the tools and techniques of biotechnology and allied sciences.
- § To create a platform for developing industry linkages delivering research solutions to society by catalyzing translational opportunities.
- § To function as a leading resource center for knowledge and development in the areas of biotechnology and allied sciences

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Program

Gujarat Biotechnology University will have an M. Sc. by Research (Biotechnology) program, where from day one, student shall focus on product or process development. This program shall have five terms of 4 months each to allow the completion of program within 2 years similar to traditional MSc programs but the innovative curriculum shall have exclusive focus on practical training. Student will spend 50%, 75% and 100% of their time in the laboratories in third, fourth and fifth terms respectively.

A. Five subject domains are identified for M. Sc. by Research programs

- I. Plant Biotechnology
- II. Animal Biotechnology
- III. Human Biotechnology
- IV. Industrial Biotechnology
- V. Environmental Biotechnology

Courses are designed in such a way that the students will have ample opportunities to pursue and acquire skill sets for the development of a particular category of Biotechnology Product. Expectation is that the by completion of the program, the students have completed one iteration of product development cycle excluding trials/regulatory work.

B. Ph. D. Programs

Ph. D. Programs shall start from the first year onwards at Gujarat Biotechnology University where enrolled students shall have opportunity for pursuing their translational research problems in the area of their field of interest by joining Ph. D. Program.

Subject/ Object based learning

An interdisciplinary hybrid learning approach where students will learn how to apply object or tools from biotechnology domain such as Biochips, Gene Editing, Synthetic Biology, Genomics, Proteomics, Bioinformatics, Cell and Molecular Biotechnology to solve problems for living subjects such as Human, Microbes, Animals and Plants.

Subjects	Objects / Tools of Biotechnology	
Plant Animal Microbes Human Industrial Environment	§ Molecular biology	§ Plant Diagnostics
	§ Genetic engineering	§ Biosensor & Chip Design
	§ Genomics	§ Plant Tissue Culture
	§ Proteomics	§ Animal Nutrition
	§ Bioinformatics	§ Biotherapeutics
	§ Bioethics, safety, IPR regulation	§ Gene Editing & Synthetic Biology
	§ Bioprocess Design	§ Bioremediation
	§ Bioengineered Systems Design	§ Transgenics
	§ Vaccines	§ Artificial Reproductive Technologies

The student taking this course, will be acquainted with the concepts of products / innovation / research outcomes and will lead not just to a skilled manpower / scientist in biotechnology domain but will also result in a product pipeline to support biotechnology innovations and product development, eventually giving a boost to development of industry, employment, production and in turn creation of a right ecosystem.

The syllabus will be custom designed considering the product development pathways for each subject domain. For example, those choosing Transgenic Plant variety will take courses relevant for the same while those choosing biochips for diagnostic will take courses relevant for that. Syllabus will be common to all students in first term and students will choose specific streams in Term 2.

Student Developmental Paths

Syllabus has been designed on the basis of possible developmental paths visualized for students, considering the following options...

- § Student may join PhD which may be followed by Post-Doctoral program
- § Student may join the research division of an industry,
- § Student may have his/her own start-up with the process or product he/she has developed.

Project Basket

To begin with a basket of projects will be created for the students focusing on the development of a range of products which will keep evolving with time in concurrence with the needs of the society and nation. We expect that there will be changes in ideas and ambition of the students during the progress of the program / project and this will be factored in. Business development may not be a part of the syllabus; however,

interested students will be encouraged to seek mentorship from business development unit to further their ambitions.

Stream	Plant Biotechnology	Animal Biotechnology
A. Core Subjects	Molecular biology	Molecular biology
	Genetic engineering	Genetic engineering
	Genomics	Genomics
	Proteomics	Proteomics
	Bioinformatics	Bioinformatics
	Bioethics, safety, IPR regulation	Bioethics, safety, IPR regulation
	Analytical instrumentation	Analytical instrumentation
B. Sub-core	Plant Physiology, Growth & Development	Animal Physiology
	Pathway Analysis & Engineering	Clinical Biochemistry & Immunology
	Genetics & Molecular Breeding	Molecular Pathology
		Genetics & Molecular Breeding
C. Product Pathway Based Specializations	Bioprocess Design	Bioengineered Systems Design
	Metabolomics	Biomaterials & Biopolymers
	Photobioreactor Operations	Cell culture & differentiation
	Upstream & Downstream Processing	Stem cell & regenerative biology
	Plant Diagnostics	Biosensor & Chip Design
	Assay design & development	Biofluidic & optics
	Biosensor & chip design	Biosensors & chip design
	Nanobiotechnology	Nanobiotechnology
	Plant Tissue Culture	Animal Nutrition
	Plant Cell & Tissue culture	Nutritional Biochemistry
	Photobioreactor Operations	Rumen Physiology
		Metagenomics
	Transgenics	Artificial Reproductive Technologies
	Plant Cell & Tissue culture	Embryology & developmental biology
	Genomic selection	Reproductive biology
	Gene Editing	
	Selection & validation of transgenics	
		Transgenics
		Gene Editing
	Embryology & developmental biology	
	Selection & validation of transgenics	
	Vaccines	

