

ACADEMIC CURRICULA
UNDERGRADUATE/ INTEGRATED
POST GRADUATE DEGREE
PROGRAMMES

(With exit option of Diploma)

(Choice Based Flexible Credit System)

Regulations 2021

Volume – 1

(Updated on July 2025)



SRM
INSTITUTE OF SCIENCE & TECHNOLOGY
(Deemed to be University u/s 3 of UGC Act, 1956)

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(Deemed to be University u/s 3 of UGC Act, 1956)

Kattankulathur, Chengalpattu District 603203,

Tamil Nadu, India

11. B.Tech. in Biotechnology with Specialization in Genetic Engineering

11. (a) Mission of the Department

Mission Stmt – 1	<i>To adopt effective teaching methods to improve the learning process and impart knowledge of biology and technology.</i>
Mission Stmt – 2	<i>To provide hands-on training and technical skills to transform students into technocrats and facilitate research and higher education in the fields of biotechnology.</i>
Mission Stmt – 3	<i>To pursue and promote cutting-edge research in selected fields of biotechnology</i>

11. (b) Program Educational Objectives (PEO)

PEO – 1	<i>To acquire adequate knowledge and expertise in genetic engineering for higher education and research</i>
PEO – 2	<i>To identify, analyze, and learn strategies to solve genetic engineering problems</i>
PEO – 3	<i>To advance professionally as genetic engineers, who can contribute to betterment of society and be involved in life-long learning</i>

11. (c) Mission of the Department to Program Educational Objectives (PEO) Mapping

	Mission Stmt. - 1	Mission Stmt. - 2	Mission Stmt. - 3
PEO - 1	3	3	3
PEO - 2	2	3	3
PEO - 3	3	3	3

3 – High Correlation, 2 – Medium Correlation, 1 – Low Correlation

11. (d) Mapping Program Educational Objectives (PEO) to Program Outcomes (PO)

	Program Outcomes (PO)												Program Specific Outcomes (PSO)		
	1	2	3	4	5	6	7	8	9	10	11	12	PSO-1	PSO-2	PSO-3
	Engineering Knowledge	Problem Analysis	Design/development of solutions	Conduct investigations of complex problems	Modern Tool Usage	The engineer and society	Environment & Sustainability	Ethics	Individual & Team Work	Communication	Project Mgt. & Finance	Life Long Learning			
PEO - 1	3	3	3	3	3	2	3	3	3	3	3	3	3	3	3
PEO - 2	3	3	3	3	3	2	2	3	3	3	3	3	3	3	3
PEO - 3	3	3	3	3	3	2	3	3	3	3	3	3	3	3	3

3 – High Correlation, 2 – Medium Correlation, 1 – Low Correlation

PSO – Program Specific Outcomes (PSO)

PSO - 1	<i>Gain knowledge on different approaches utilized in genetic engineering</i>
PSO - 2	<i>Ability to solve clinical, industrial and agricultural problems in genetic Engineering</i>
PSO - 3	<i>Emerge as professionals who can develop new strategies in the genetic engineering research for the benefit of society</i>

11. (e) Program Structure: B.Tech. in Biotechnology with Specialization in Genetic Engineering

Humanities & Social Sciences including Management Courses (H)							
Course Code	Course Title	Hours / Week				L	T
		L	T	P	C		
21LEH101T	Communicative English	2	1	0	3		
21LEH102T	Chinese						
21LEH103T	French						
21LEH104T	German						
21LEH105T	Japanese	2	1	0	3		
21LEH106T	Korean						
21LEH107T	Spanish						
21LEH108T	Russian						
21GNH101J	Philosophy of Engineering	1	0	2	2		
21PDH209T ¹	Social Engineering	2	0	0	2		
21GNH401TA	Behavioral psychology	2	1	0	3		
Total Credits					13		
Engineering Science Courses (S)							
Course Code	Course Title	Hours / Week				L	T
		L	T	P	C		
21CSS101J	Programming for Problem Solving	3	0	2	4		
21MES101L ¹	Basic Civil and Mechanical Workshop	0	0	4	2		
21MES102L ¹	Engineering Graphics and Design	0	0	4	2		
21EES101T	Electrical and Electronics Engineering	3	1	0	4		
21DCS201P ¹	Design Thinking and Methodology	1	2	0	3		
21CHS251T	Basic Chemical Engineering	3	0	0	3		
21CHS252J	Chemical Engineering Principles	3	0	2	4		
21CSS303T	Data Science	1	1	0	2		
Total Credits					24		
Non Credit Courses (M)							
Course Code	Course Title	Hours / Week				L	T
		L	T	P	C		
21PDM101L ¹	Professional Skills and Practices	0	0	2			
21PDM102L ¹	General Aptitude	0	0	2			
21PDM201L ¹	Verbal Reasoning	0	0	2			
21PDM202L ¹	Critical and Creative Thinking Skills	0	0	2			
21PDM301L ¹	Analytical and logical Thinking Skills	0	0	2			
21PDM302L ¹	Employability Skill and Practices	0	0	2			
21CYM101T ¹	Environmental Science	1	0	0	0		
21LEM101T ¹	Constitution of India	1	0	0	0		
21LEM102T ¹	Universal Human Values – Introduction	1	0	0	0		
21LEM201T ¹	Professional Ethics	1	0	0	0		
21LEM202T ¹	Universal Human Values-II: Understanding Harmony and Ethical Human Conduct	2	1	0	3		
21LEM301T ¹	Indian Art Form	1	0	0	0		
21LEM302T ¹	Indian Traditional knowledge	1	0	0	0		
21BTM191T ¹	Bioethics and IPR	1	0	0	0		
21GNM101L ¹	Physical and Mental health using Yoga						
21GNM102L ¹	National Service Scheme	0	0	2	0		
21GNM103L ¹	National Cadet Corps						
21GNM104L ¹	National Sports Organization						
Total Credits					03		
Project Work, Seminar, Internship in Industry / Higher Technical Institutions (P)							
Course Code	Course Title	Hours / Week				L	T
		L	T	P	C		
21GNP301L ¹	Community Connect	0	0	2	1		
21BTP302L ¹	Project	0	0	6			
21BTP303T ¹	MOOC	3	0	0	3		
21BTP401L	Major Project	0	0	30	15		
21BTP402L	Major Project	0	0	20	10		
21BTP403L	Internship#	0	0	10	5		
Total Credits					19		
Basic Science Courses (B)							
Course Code	Course Title	Hours / Week				L	T
		L	T	P	C		
21PYB101J	Physics: Electromagnetic Theory, Quantum Mechanics, Waves and Optics	3	1	2	5		
21CYB101J	Chemistry	3	1	2	5		
21MAB101T	Calculus and Linear Algebra	3	1	0	4		
21MAB102T	Advanced Calculus and Complex Analysis	3	1	0	4		
21MAB303T	Biostatistics for Biotechnologists	3	1	0	4		
21BTB105T	Cell Biology	2	0	0	2		
Total Credits					24		
Professional Core Courses (C)							
Course Code	Course Title	Hours / Week				L	T
		L	T	P	C		
21BTC101T	Biochemistry	3	0	0	3		
21BTC201L ¹	Biochemistry Laboratory	0	0	4	2		
21BTC202T	Microbiology	3	0	0	3		
21BTC203L ¹	Cell and Microbiology Laboratory	0	0	4	2		
21BTC204T	Bioprocess Principles	3	0	0	3		
21BTC205L ¹	Bioprocess Principles Laboratory	0	0	4	2		
21BTC206T	Genetics and Cytogenetics	3	0	0	3		
21BTC207T	Molecular Biology	3	0	0	3		
21BTC208L ¹	Molecular Biology Laboratory	0	0	4	2		
21BTC209T ²	Bioprocess Engineering	3	0	0	3		
21BTC210L ¹	Bioprocess Engineering Laboratory	0	0	4	2		
21CSC206T	Artificial Intelligence	3	0	0	3		
21BTC301J	Gene Manipulation and Genomics	3	0	2	4		
21BTC302J	Immunology	3	0	2	4		
21BTC303T	Protein Engineering	3	0	0	3		
21BTC304T	Animal Biotechnology	3	0	0	3		
21BTC305L ¹	Animal Biotechnology Laboratory	0	0	4	2		
21BTC306T	Plant Biotechnology	3	0	0	3		
21BTC401L ¹	Plant Biotechnology Laboratory	0	0	4	2		
21BTC402J	Bio Separation Technology	3	0	2	4		
Total Credits					56		
Open Elective Courses (O) (Any 3 Courses)							
Course Code	Course Title	Hours / Week				L	T
		L	T	P	C		
21GEO101T	Behavioral Biology	3	0	0	3		
21GEO102T	Microbes and Society	3	0	0	3		
21GEO103T	Biofertilizers- An Entrepreneurial Perspective	3	0	0	3		
21GEO104T	Computational Genomics	3	0	0	3		
21GEO105T	Biology for Everyday Life	3	0	0	3		
Total Credits					09		
Professional Elective Courses (E) (Any 5 Courses)							
Course Code	Course Title	Hours / Week				L	T
		L	T	P	C		
21BTE207T	Human Genetics	3	0	0	3		
21BTE315T	Metabolic Engineering of Microbes	3	0	0	3		
21BTE316T	Genetic Engineering for Crop Improvement	3	0	0	3		
21BTE317T	Molecular Biology of Infectious Diseases	3	0	0	3		
21BTE318T	Molecular Diagnostics	3	0	0	3		
21BTE420T	Gene Therapy	3	0	0	3		
21BTE421T	Functional Genomics	3	0	0	3		
21BTE422T	Genome Editing	3	0	0	3		
21BTE423T	Genes and Animal Development	3	0	0	3		
21BTE424T	Genetics of Cancer	3	0	0	3		
Total Credits					15		

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11. (f) Programme Articulation: B.Tech. in Biotechnology with Specialization in Genetic Engineering

Course Code	Course Name	Program Outcomes (PO)												PSO		
		1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
		Engineering Knowledge	Problem Analysis	Design/development of solutions	Conduct investigations of complex problems	Modern Tool Usage	The engineer and society	Environment & Sustainability	Ethics	Individual & Team Work	Communication	Project Mgt. & Finance	Life Long Learning	PSO-1	PSO-2	PSO-3
21BTB105T	Cell Biology	2	3	3	3	2	-	-	-	-	-	-	-	-	2.6	3
21BTC101T	Biochemistry	3	2.5	3	3	3	-	-	-	-	-	-	-	2	2.7	-
21BTC201L	Biochemistry Laboratory	3	3	3	3	-	-	-	-	-	-	-	-	-	3	3
21BTC202T	Microbiology	2.6	2	2.2	2	2	-	-	-	-	-	-	-	2.6	-	-
21BTC203L	Cell and Microbiology Laboratory	-	3	3	3	-	-	-	-	-	-	-	-	-	3	3
21BTC204T	Bioprocess Principles	2	2.5	1.5	1.8	2	-	-	-	-	-	-	-	2	2	1.5
21BTC205L	Bioprocess Principles Laboratory	2.2	2.5	1.5	1.8	2	-	-	-	-	-	-	-	2	2	1.5
21BTC206T	Genetics and Cytogenetics	2.6	2.4	2.5	2.2	-	-	-	-	-	-	-	-	2.6	-	-
21BTC207T	Molecular Biology	3	2.3	2	1	-	-	-	-	-	-	-	-	2.6	2.8	-
21BTC208L	Molecular Biology Laboratory	3	2.8	2.3	-	-	-	-	-	-	-	-	-	2.6	2.8	-
21BTC209T	Bioprocess Engineering	2.4	1.5	2.2	1.8	3	-	-	-	-	-	-	-	1.5	2	2
21BTC210L	Bioprocess Engineering Laboratory	2.6	2.8	1.5	-	3	-	-	-	-	-	-	-	2	2	-
21BTC301J	Gene Manipulation and Genomics	2.7	-	2.8	-	-	2.5	-	2	-	-	-	-	-	2	3
21BTC302J	Immunology	-	-	2	2.5	2.5	1	-	-	-	-	-	-	1.5	-	2.5
21BTC303T	Protein engineering	2	2	-	2	3	-	-	-	-	-	-	-	-	3	3
21BTC304T	Animal Biotechnology	3	3	2.7	2.5	-	-	-	-	-	-	-	-	3	3	3
21BTC305L	Animal Biotechnology Laboratory	-	2.5	3	2.7	2	-	-	-	-	-	-	-	2	3	3
21BTC306T	Plant Biotechnology	3	2	2.7	-	3	-	3	-	-	-	-	-	-	2.8	3
21BTC401L	Plant Biotechnology Laboratory	2.8	2.3	2.5	3	2	-	-	-	-	-	-	-	2.7	3	-
21BTC402J	Bio Separation Technology	1.5	2.4	1.6	-	-	-	-	-	-	-	-	-	1.5	2	1.4
21BTM191T	Bioethics and IPR	-	2.4	-	-	-	-	-	3	-	-	-	-	-	-	-
21BTE207T	Human Genetics	2	2	2	2.7	2	-	-	-	-	-	-	-	1.5	2	2
21BTE315T	Metabolic Engineering of Microbes	-	2	2.7	2	-	-	-	-	-	-	-	-	2	2.4	-
21BTE316T	Genetic Engineering for Crop Improvement	-	2	3	-	-	-	-	-	-	-	-	2	2	3	-
21BTE317T	Molecular Biology of Infectious Diseases	-	2	2.3	2	-	-	-	-	-	-	-	-	2	2.4	-
21BTE318T	Molecular Diagnostics	2	2.6	-	2.4	2.4	-	-	-	-	-	-	2.5	-	2.6	2.4
21BTE420T	Gene Therapy	2.7	-	2	2.3	2	-	-	2.6	-	-	-	2	2	1	2
21BTE421T	Functional Genomics	2.2	2.6	-	2	2	-	-	-	-	-	-	-	2	2.8	2
21BTE422T	Genome Editing	2	2	2.3	2	2.3	2	2	3	-	-	-	-	2	3	-
21BTE423T	Genes and Animal Development	2.6	3	2	2	-	-	-	-	-	-	-	-	2	2.8	2
21BTE424T	Genetics of Cancer	-	-	2.5	2	2	-	2.7	2.5	2	-	2	2.7	-	-	2
21GNP301L	Community Connect	3	2	2	-	-	-	-	-	-	2	-	2	2	2	-
21BTP302L	Project	3	2	2	-	-	-	-	-	-	2	-	2	2	2	-
21BTP303T	MOOC	3	3	3	3	3	2	2	3	3	3	3	3	3	3	3
21BTP401L	Major Project	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
21BTP402L	Major Project	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
21BTP403L	Internship	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
Program Average		2.5	2.5	2.4	2.4	2.4	2.3	2.6	2.8	2.8	3.0	2.8	2.6	2.2	2.6	2.5

11. (g) Implementation Plan: B.Tech. in Biotechnology with Specialization in Genetic Engineering

Semester – I					
Course Code	Course Title	Hours / Week			
		L	T	P	C
21LEH101T	Communicative English	2	1	0	3
21MAB101T	Calculus and Linear Algebra	3	1	0	4
21PYB101J	Physics: Electromagnetic Theory, Quantum Mechanics, Waves and Optics	3	1	2	5
21MES102L ¹	Engineering Graphics and Design	0	0	4	2
21EES101T	Electrical and Electronics Engineering	3	1	0	4
21CYM101T ¹	Environmental Science*	1	0	0	0
21PDM101L ¹	Professional Skills and Practices	0	0	2	0
21LEM101T ¹	Constitution of India	1	0	0	0
Total Credits		18			

Semester – II					
Course Code	Course Title	Hours / Week			
		L	T	P	C
21LEH102T	Chinese	2	1	0	3
21LEH103T	French				
21LEH104T	German				
21LEH105T	Japanese				
21LEH106T	Korean				
21LEH107T	Spanish				
21LEH108T	Russian				
21GNH101J	Philosophy of Engineering	1	0	2	2
21MAB102T	Advanced Calculus and Complex Analysis	3	1	0	4
21CYB101J	Chemistry	3	1	2	5
21BTB105T	Cell Biology	2	0	0	2
21CSS101J	Programming for Problem Solving	3	0	2	4
21BTC101T	Biochemistry	3	0	0	3
21MES101L ¹	Basic Civil and Mechanical Workshop	0	0	4	2
21PDM102L ¹	General Aptitude	0	0	2	0
21GNM101L ¹	Physical and Mental Health using Yoga	0	0	2	0
21GNM102L ¹	National Service Scheme				
21GNM103L ¹	National Cadet Corps				
21GNM104L ¹	National Sports Organization				
Total Credits		25			

Semester – III					
Course Code	Course Title	Hours / Week			
		L	T	P	C
21CHS251T	Basic Chemical Engineering	3	0	0	3
21PDH209T ¹	Social Engineering	2	0	0	2
21BTC201L ¹	Biochemistry Laboratory	0	0	4	2
21BTC202T	Microbiology	3	0	0	3
21BTC203L ¹	Cell and Microbiology Laboratory	0	0	4	2
21BTC204T	Bioprocess Principles	3	0	0	3
21BTC205L ¹	Bioprocess Principles Laboratory	0	0	4	2
21BTC206T	Genetics and Cytogenetics	3	0	0	3
21LEM201T ¹	Professional Ethics	1	0	0	0
21PDM201L ¹	Verbal Reasoning	0	0	2	0
21LEM202T ¹	Universal Human Values-II: Understanding Harmony and Ethical Human Conduct	2	1	0	3
Total Credits		23			

Semester – IV					
Course Code	Course Title	Hours / Week			
		L	T	P	C
21CHS252J	Chemical Engineering Principles	3	0	2	4
21CSC206T	Artificial Intelligence	3	0	0	3
21BTC207T	Molecular Biology	3	0	0	3
21BTC208L ¹	Molecular Biology Laboratory	0	0	4	2
21BTC209T ²	Bioprocess Engineering	3	0	0	3
21BTC210L ¹	Bioprocess Engineering Laboratory	0	0	4	2
E	Professional Elective – I				3
21DCS201P ¹	Design Thinking and Methodology	1	2	0	3
21PDM202L ¹	Critical and Creative Thinking Skills	0	0	2	0
Total Credits		23			

Semester – V					
Course Code	Course Title	Hours / Week			
		L	T	P	C
21MAB303T	Biostatistics for Biotechnologists	3	1	0	4
21BTC301J	Gene Manipulation and Genomics	3	0	2	4
21BTC302J	Immunology	3	0	2	4
21BTC303T	Protein Engineering	3	0	0	3
E	Professional Elective – II				3
O	Open Elective – I				3
21GNP301L ¹	Community Connect	0	0	2	1
21PDM301L ¹	Analytical and Logical Thinking Skills	0	0	2	0
21LEM301T ¹	Indian Art Form	1	0	0	0
Total Credits		22			

Semester – VI					
Course Code	Course Title	Hours / Week			
		L	T	P	C
21CSS303T	Data Science	1	1	0	2
21BTC304T	Animal Biotechnology	3	0	0	3
21BTC305L ¹	Animal Biotechnology Laboratory	0	0	4	2
21BTC306T	Plant Biotechnology	3	0	0	3
E	Professional Elective – III				3
O	Open Elective – II				3
21BTP302L ¹	Project	0	0	6	3
21BTP303T ¹	MOOC	3	0	0	0
21LEM302T ¹	Indian Traditional Knowledge	1	0	0	0
21PDM302L ¹	Employability Skills and Practices	0	0	2	0
Total Credits		19			

Semester – VII					
Course Code	Course Title	Hours / Week			
		L	T	P	C
21BTC401L ¹	Plant Biotechnology Laboratory	0	0	4	2
21BTC402J	Bio Separation Technology	3	0	2	4
E	Professional Elective – IV				3
E	Professional Elective – V				3
O	Open Elective – III				3
21GNH401TA	Behavioral Psychology	2	1	0	3
21BTM191T ¹	Bioethics and IPR	1	0	0	0
Total Credits		18			

Semester – VIII					
Course Code	Course Title	Hours / Week			
		L	T	P	C
21BTP401L	Major Project	0	0	30	15
21BTP402L	Major Project	0	0	20	10
21BTP403L	Internship#	0	0	10	5
Total Credits		15			

#Students have to register either 21BTP401L or 21BTP402L and 21BTP403L both in eighth semester