

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)

SRM INSTITUTE OF SCIENCE AND TECHNOLOGY

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

Kattankulathur, Chengalpattu District 603203,

Tamil Nadu, India

8. B.Tech. in Biotechnology

8. (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>

8. (b) Program Educational Objectives (PEO)

PEO – 1	<i>To develop graduates with enhanced technical acumen, aptitude, and professional skills in Biotechnology</i>
PEO – 2	<i>To develop the ability amongst the students to apply modern bioengineering techniques in industry and research.</i>
PEO – 3	<i>To prepare students for a successful career in research and development in Biotechnology</i>

8. (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

8. (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	2	3	2	2	2	2	3	2	2	2	3	3	3
PEO - 2	3	3	3	3	3	2	2	2	2	2	3	3	3	3	3
PEO - 3	3	3	3	3	3	2	2	2	3	2	3	3	3	3	3

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

PSO – Program Specific Outcomes (PSO)

PSO - 1	<i>Apply basic knowledge of biological processes to solve problems in the applied fields of biotechnology.</i>
PSO - 2	<i>Apply biotechnological skills to provide cost-effective and sustainable solutions in Industries</i>
PSO - 3	<i>Ability to integrate biological knowledge and concepts with the entrepreneurial perspectives of biotechnology.</i>

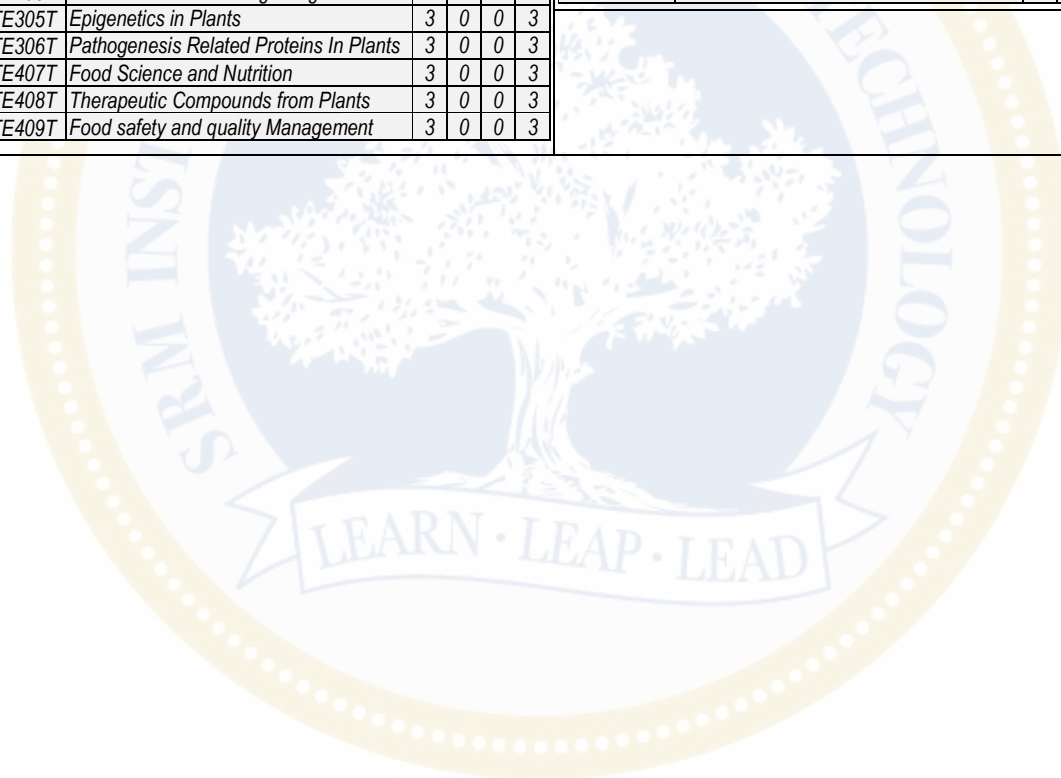
8. (e) Program Structure: B.Tech. in Biotechnology

Humanities & Social Sciences including Management Courses (H)					
Course Code	Course Title	Hours / Week			
		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	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					
Project Work, Seminar, Internship in Industry / Higher Technical Institutions (P)					
Course Code	Course Title	Hours / Week			
		L	T	P	C
21GNP301L ¹	Community Connect	0	0	2	1
21BTP302L ¹	Project	0	0	6	3
21BTP303T ¹	MOOC	3	0	0	
21BTP401L	Major Project	0	0	30	
21BTP402L	Major Project	0	0	20	10
21BTP403L	Internship#	0	0	10	5
Total Credits 19					
Open Elective Courses (O) (Any 3 Courses)					
Course Code	Course Title	Hours / Week			
		L	T	P	C
21BTO101T	Human Health and Diseases	3	0	0	3
21BTO105T	Animal Models for Biomedical Research	3	0	0	3
21BTO106T	Waste to Wealth to Wheels	3	0	0	3
21BTO107T	Fundamental Neurobiology	3	0	0	3
Total Credits 09					

Basic Science Courses (B)					
Course Code	Course Title	Hours / Week			
		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	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					
Non Credit Courses (M)					
Course Code	Course Title	Hours / Week			
		L	T	P	C
21PDM101L ¹	Professional Skills and Practices	0	0	2	0
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	
21LEM101T ¹	Constitution of India	1	0	0	
21LEM102T ¹	Universal Human Values – Introduction	1	0	0	
21LEM201T ¹	Professional Ethics	1	0	0	
21LEM202T ¹	Universal Human Values-II: Understanding Harmony and Ethical Human Conduct	2	1	0	
21LEM301T ¹	Indian Art Form	1	0	0	
21LEM302T ¹	Indian Traditional Knowledge	1	0	0	
21BTM191T ¹	Bioethics and IPR	1	0	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 03					

Professional Elective Courses (E) (Any 5 Courses)						
Course Code	Course Title	Hours / Week			C	
		L	T	P		
Sub-stream: Medical Biotechnology						
21BTE201T	Developmental Biology	3	0	0	3	
21BTE301T	Diseases Models and Mechanism	3	0	0	3	
21BTE302T	Metabolic Disorders	3	0	0	3	
21BTE401T	Cellular and Molecular Neuroscience	3	0	0	3	
21BTE402T	Cancer Biology and Therapeutics	3	0	0	3	
21BTE403T	Physiology of Stress and its Management	3	0	0	3	
Sub-stream: Pharmaceutical Biotechnology						
21BTE202T	Pharmaceutical Biotechnology	3	0	0	3	
21BTE303T	Computational Molecular Biology	3	0	0	3	
21BTE304T	Computer aided Drug Designing	3	0	0	3	
21BTE404T	Marine Biotechnology	3	0	0	3	
21BTE405T	Vaccine Biotechnology	3	0	0	3	
21BTE406T	Molecular Basis of Drug action	3	0	0	3	
Sub-stream: Plant and Food Biotechnology						
21BTE203T	Plant Hormones and Signaling	3	0	0	3	
21BTE305T	Epigenetics in Plants	3	0	0	3	
21BTE306T	Pathogenesis Related Proteins In Plants	3	0	0	3	
21BTE407T	Food Science and Nutrition	3	0	0	3	
21BTE408T	Therapeutic Compounds from Plants	3	0	0	3	
21BTE409T	Food safety and quality Management	3	0	0	3	

Professional Elective Courses (E)						
Course Code	Course Title	Hours / Week			C	
		L	T	P		
Sub-stream: Bioprocess Technology						
21BTE204T	Enzyme Engineering and Technology	3	0	0	3	
21BTE307T	Membrane Separation Technology	3	0	0	3	
21BTE308T	Industrial Fermentation Engineering	3	0	0	3	
21BTE410T	Bioreactor Design	3	0	0	3	
21BTE411T	Bioprocess Modelling and Simulation	3	0	0	3	
21BTE412T	Bioprocess Plant Design	3	0	0	3	
Sub-stream: Environmental Biotechnology						
21BTE205T	Environmental Biotechnology	3	0	0	3	
21BTE309T	Industrial Waste Management	3	0	0	3	
21BTE310T	Bioenergy	3	0	0	3	
21BTE413T	Metabolic Engineering of Microorganism for Environment and Energy	3	0	0	3	
21BTE414T	Microbial degradation and Bioremediation Technology	3	0	0	3	
21BTE415T	Environmental Biosensors	3	0	0	3	
Total Credits					15	



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	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 Molecular Biology 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	-	-	-	-	-	-	-	-
21BTE201T	Developmental Biology	2	2.6	3	-	-	-	-	-	-	-	-	-	-	2.8	-	2.4
21BTE301T	Diseases Models and Mechanism	2.5	2.6	2.2	3	-	-	-	-	-	-	-	-	-	2.6	-	3
21BTE302T	Metabolic Disorders	-	2.4	2.3	2.3	-	-	-	-	-	-	-	-	-	2.6	-	3
21BTE401T	Cellular and Molecular Neuroscience	2.6	2.4	2.7	-	3	-	-	-	-	-	-	-	-	3	-	2.6
21BTE402T	Cancer Biology and Therapeutics	-	2	2	3	2	-	3	2	-	-	-	-	-	-	2	2
21BTE403T	Physiology of Stress and its Management	2.6	2.4	2	2.2	-	-	-	-	-	-	-	-	-	2.6	-	2.6
21BTE202T	Pharmaceutical Biotechnology	-	3	3	2	2.5	-	2	2	-	-	-	-	-	2	2.3	2
21BTE303T	Computational Molecular Biology	2.2	2	-	2	3	-	-	-	-	-	-	-	-	-	2	3
21BTE304T	Computer aided Drug Designing	-	3	3	2.5	3	2	-	-	-	-	-	-	-	-	3	2.6
21BTE404T	Marine Biotechnology	-	2	2	2.8	2	-	-	-	-	-	-	-	-	2	2	2
21BTE405T	Vaccine Biotechnology	3	3	3	3	-	-	-	2	-	-	-	2	3	3	3	

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
21BTP403L	Internship	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
Program Average		2.6	2.5	2.5	2.4	2.5	2.2	2.5	2.4	3.0	2.8	3.0	2.6	2.4	2.5	2.5



8. (g) Implementation Plan: B.Tech. in Biotechnology

Semester – I						Semester – II					
Course Code	Course Title	Hours / Week				Course Code	Course Title	Hours / Week			
		L	T	P	C			L	T	P	C
21LEH101T	Communicative English	2	1	0	3	21LEH102T	Chinese	2	1	0	3
21MAB101T	Calculus and Linear Algebra	3	1	0	4	21LEH103T	French				
21PYB101J	Physics: Electromagnetic Theory, Quantum Mechanics, Waves and Optics	3	1	2	5	21LEH104T	German				
1MES102L ¹	Engineering Graphics and Design	0	0	4	2	21LEH105T	Japanese				
21EES101T	Electrical and Electronics Engineering	3	1	0	4	21LEH106T	Korean				
21CYM101T ¹	Environmental Science*	1	0	0	0	21LEH107T	Spanish				
21PDM101L ¹	Professional Skills and Practices	0	0	2	0	21LEH108T	Russian	1	0	2	2
21LEM101T ¹	Constitution of India	1	0	0	0	21GNH101J	Philosophy of Engineering				
Total Credits 18						21MAB102T	Advanced Calculus and Complex Analysis	3	1	0	4
Semester – III						21CYB101J	Chemistry	3	1	2	5
Course Code	Course Title	Hours / Week				21BTB105T	Cell Biology	2	0	0	2
		L	T	P	C	21CSS101J	Programming for Problem Solving	3	0	2	4
21CHS251T	Basic Chemical Engineering	3	0	0	3	21BTC101T	Biochemistry	3	0	0	3
21PDH209T ¹	Social Engineering	2	0	0	2	21MES101L ¹	Basic Civil and Mechanical Workshop	0	0	4	2
21BTC201L ¹	Biochemistry Laboratory	0	0	4	2	21PDM102L ¹	General Aptitude*	0	0	2	0
21BTC202T	Microbiology	3	0	0	3	21GNM101L ¹	Physical and Mental Health using Yoga	0	0	2	0
21BTC203L ¹	Cell and Microbiology Laboratory	0	0	4	2	21GNM102L ¹	National Service Scheme				
21BTC204T	Bioprocess Principles	3	0	0	3	21GNM103L ¹	National Cadet Corps				
21BTC205L ¹	Bioprocess Principles Laboratory	0	0	4	2	21GNM104L ¹	National Sports Organization				
21BTC206T	Genetics and Cytogenetics	3	0	0	3	Total Credits 25					
21LEM201T ¹	Professional Ethics	1	0	0	0	Semester – IV					
21PDM201L ¹	Verbal Reasoning	0	0	2	0	Course Code	Course Title	Hours / Week			
21LEM202T ¹	Universal Human Values-II: Understanding Harmony and Ethical Human Conduct	2	1	0	3			L	T	P	C
Total Credits 23						21CHS252J	Chemical Engineering Principles	3	0	2	4
Semester – V						21CSC206T	Artificial Intelligence	3	0	0	3
Course Code	Course Title	Hours / Week				21BTC207T	Molecular Biology	3	0	0	3
		L	T	P	C	21BTC208L ¹	Molecular Biology Laboratory	0	0	4	2
21MAB303T	Biostatistics for Biotechnologists	3	1	0	4	21BTC209T ²	Bioprocess Engineering	3	0	0	3
21BTC301J	Gene Manipulation and Genomics	3	0	2	4	21BTC210L ¹	Bioprocess Engineering Laboratory	0	0	4	2
21BTC302J	Immunology	3	0	2	4	E	Professional Elective – I				3
21BTC303T	Protein Engineering	3	0	0	3	21DCS201P ¹	Design Thinking and Methodology	1	2	0	3
E	Professional Elective – II				3	21PDM202L ¹	Critical and Creative Thinking Skills	0	0	2	0
O	Open Elective – I				3	Total Credits 23					
21GNP301L ¹	Community Connect	0	0	2	1	Semester – VI					
21PDM301L ¹	Analytical and Logical Thinking Skills	0	0	2	0	Course Code	Course Title	Hours / Week			
21LEM301T ¹	Indian Art Form	1	0	0	0			L	T	P	C
Total Credits 22						21CSS303T	Data Science	1	1	0	2
Semester – VII						21BTC304T	Animal Biotechnology	3	0	0	3
Course Code	Course Title	Hours / Week				21BTC305L ¹	Animal Biotechnology Laboratory	0	0	4	2
		L	T	P	C	21BTC306T	Plant Biotechnology	3	0	0	3
21BTC401L ¹	Plant Biotechnology Laboratory	0	0	4	2	E	Professional Elective – III				3
21BTC402J	Bio Separation Technology	3	0	2	4	O	Open Elective – II				3
E	Professional Elective – IV				3	21BTP302L ¹	Project	0	0	6	3
E	Professional Elective – V				3	21BTP303T ¹	MOOC	3	0	0	
O	Open Elective – III				3	21LEM302T ¹	Indian Traditional Knowledge	1	0	0	0
21GNH401TA	Behavioral Psychology	2	1	0	3	21PDM302L ¹	Employability Skills and Practices	0	0	2	0
21BTM191T ¹	Bioethics and IPR	1	0	0	0	Total Credits 19					
Total Credits 18						Semester - VIII					
Course Code	Course Title	Hours / Week				Course Code	Course Title	Hours / Week			
		L	T	P	C			L	T	P	C
21BTP401L	Major Project	0	0	30	15	21BTP401L	Major Project	0	0	30	15
21BTP402L	Major Project	0	0	20	10	21BTP402L	Major Project	0	0	20	10
21BTP403L	Internship#	0	0	10	5	21BTP403L	Internship#	0	0	10	5
Total Credits 15						Total Credits 15					

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