

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

9. B.Tech. in Biotechnology (Computational Biology)

9. (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>

9. (b) Program Educational Objectives (PEO)

PEO – 1	<i>To augment the inter-disciplinary thinking skills and develop skilled professionals in Computational Biology.</i>
PEO – 2	<i>To apply modern algorithms and solve complex biological problems by developing Bioinformatics methods and applications.</i>
PEO – 3	<i>To prepare students as advanced professionals in Computational Biology who can demonstrate its wider applications in human health, agriculture and industrial biotechnology research.</i>

9. (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

9. (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			
	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
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>Acquire inter disciplinary knowledge in biotechnology and computational biology</i>
PSO - 2	<i>Utilize the methods in computer sciences to develop bioinformatics applications for biological problem solving</i>
PSO - 3	<i>Promote highly skilled computational biologists and apply it for wider applications in the sciences and medicine</i>

9. (e) Program Structure: B.Tech. in Biotechnology (Computational Biology)

Humanities & Social Sciences including Management Courses (H)						
Course Code	Course Title	Hours / Week			C	
		L	T	P		
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			C	
		L	T	P		
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			C	
		L	T	P		
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		0
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					
21GNM103L ¹	National Cadet Corps					
21GNM104L ¹	National Sports Organization					
Total Credits						03
Open Elective Courses (O) (Any 3 Courses)						
Course Code	Course Title	Hours / Week			C	
		L	T	P		
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
Basic Science Courses (B)						
Course Code	Course Title	Hours / Week			C	
		L	T	P		
21PYB101J	Physics: Electromagnetic Theory, Quantum Mechanics, Waves and Optics	3	1	2	5	
21CYB101J	Chemistry	3	1	2	5	
21MAB101T ¹	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			C	
		L	T	P		
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
Professional Elective Courses (E) (Any 5 Courses)						
Course Code	Course Title	Hours / Week			C	
		L	T	P		
21BTE208T	Sequence Analysis and Molecular Phylogeny	3	0	0	3	
21BTE319T	Advanced Genomics	3	0	0	3	
21BTE320T	Algorithms in Computational Biology	3	0	0	3	
21BTE321T	Python for Bioinformatics	3	0	0	3	
21BTE322T	Data Sciences in Biology	3	0	0	3	
21BTE425T	R Programming for Biologists	3	0	0	3	
21BTE426T	Systems Biology - Modeling and Simulation	3	0	0	3	
21BTE427T	Computational Approaches in Drug Discovery	3	0	0	3	
21BTE428T	Machine Learning in Biological Sciences	3	0	0	3	
Total Credits						15
Project Work, Seminar, Internship in Industry / Higher Technical Institutions (P)						
Course Code	Course Title	Hours / Week			C	
		L	T	P		
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

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9. (f) Programme Articulation: B.Tech. in Biotechnology (Computational Biology)

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	-	-	-	-	-	-	-	-	2.67	3
21BTC101T	Biochemistry	3	2	-	3	-	-	-	-	-	-	-	-	3	2	-
21BTC201L	Biochemistry Laboratory	3	2	-	3	-	-	-	-	-	-	-	-	3	2	-
21BTC202T	Microbiology	2.5	2	2.25	2.67	3	-	2	2	-	-	-	-	1.83	-	2
21BTC203L	Cell and Microbiology Laboratory	2.5	2	2.25	2.67	3	-	2	2	-	-	-	-	1.83	-	2
21BTC204T	Bioprocess Principles	2.5	2.67	2.25	2	2	-	-	-	-	-	-	-	2.67	1.75	-
21BTC205L	Bioprocess Principles Laboratory	2.5	2.67	2.25	2	2	-	-	-	-	-	-	-	2.67	1.75	-
21BTC206T	Genetics and Cytogenetics	2.67	2.5	2.2	2	-	-	-	-	-	-	-	-	-	2.5	2.5
21BTC207T	Molecular Biology	3	2.75	2.4	-	-	-	-	-	-	-	-	-	-	2.67	2.83
21BTC208L	Molecular Biology Laboratory	3	2.75	2.4	-	-	-	-	-	-	-	-	-	-	2.67	2.83
21BTC209T	Bioprocess Engineering	-	3	1.75	2.25	2	-	-	-	-	-	-	-	2	2	1
21BTC210L	Bioprocess Engineering Laboratory	-	3	1.75	2.25	2	-	-	-	-	-	-	-	2	2	1
21BTC301J	Gene manipulation and Genomics	2.67	2.67	2.5	2.33	2.75	-	-	2	-	-	-	-	-	2.83	2.83
21BTC302J	Immunology	-	-	2	2.6	2.33	1	-	-	-	-	-	-	1.67	-	2
21BTC303T	Protein engineering	1.5	2	3	2	3	-	-	-	-	-	-	-	-	3	3
21BTC304T	Animal Biotechnology	3	3	3	3	-	-	-	-	-	-	-	-	-	3	3
21BTC305L	Animal biotechnology Laboratory	3	3	3	3	-	-	-	-	-	-	-	-	-	3	3
21BTC306T	Plant Biotechnology	3	2.6	3	3	3	-	-	-	-	-	-	-	2.5	2	2.75
21BTC401L	Plant Biotechnology Laboratory	3	2.6	3	3	3	-	-	-	-	-	-	-	2.5	2	2.75
21BTC402J	Bio separation Technology	3	2.33	2.5	1	-	-	-	-	-	-	-	-	-	2.5	2.67
21BTM191T	Bioethics and IPR	1.83	2.33	-	-	-	-	2.67	3	-	-	-	-	2.67	-	3
21BTE208T	Sequence Analysis and Molecular Phylogeny	2.2	3	-	2.25	2.67	-	-	-	-	-	-	2	2	2	2
21BTE319T	Advanced Genomics	2.33	2.25	2	2	2	2.5	-	-	-	-	-	-	2	-	2.5
21BTE320T	Algorithms in Computational Biology	3	2.8	2.5	2	-	-	-	-	-	-	-	-	2	2	2
21BTE321T	Python for Bioinformatics	2.2	2.25	2.25	2.25	-	-	-	-	-	-	-	2	-	-	2.2
21BTE322T	Data Sciences in Biology	3	2.5	2	2.5	3	-	-	-	-	-	-	-	2	-	2
21BTE425T	R Programming for Biologists	2.33	2.6	2	2	2.6	-	-	-	-	-	-	2	2	2.33	2.25
21BTE426T	Systems Biology – Modeling and Simulation	3	2.8	2.4	2.5	-	-	-	-	-	-	-	-	-	-	2
21BTE427T	Computational Approaches in Drug Discovery	2	2	1.67	-	1.5	-	-	-	-	-	-	2	-	-	1.8
21BTE428T	Machine Learning in Biological Sciences	2	2	2	2	2	-	-	-	-	-	-	-	-	-	2
21GNP301LQ	Community Connect	3	2	2	-	-	-	-	-	-	2	-	2	2	2	-
21BTP302LQ	Project	3	2	2	-	-	-	-	-	-	2	-	2	2	2	-
21BTP303TQ	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		2.65	2.53	2.40	2.46	2.52	2.30	2.45	2.57	3.00	2.60	3.00	2.33	2.33	2.39	2.41

9. (g) Implementation Plan: B.Tech. in Biotechnology (Computational Biology)

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

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