

ACADEMIC CURRICULA
UNDERGRADUATE/ INTEGRATED
POST GRADUATE DEGREE
PROGRAMMES

(With exit option of Diploma)

(Choice Based Flexible Credit System)

Regulations 2021

Volume – 1

(Revised on July 2024)



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	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>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					
		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		
21GNH401T	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	
Non Credit Courses (M)							
Course Code	Course Title	Hours / Week					
		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	
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	
Professional Elective Courses (E) (Any 5 Courses)							
Course Code	Course Title	Hours / Week					
		L	T	P	C		
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	

Open Elective Courses (O) (Any 3 Courses)						
Course Code	Course Title	Hours / Week				
		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	

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	15	
21BTP402L	Major Project	0	0	20	10	
21BTP403L	Internship#	0	0	10	5	
Total Credits					19	

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						
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 – 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	0	0	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 – 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	0	0	3	
O	Open Elective – II	3	0	0	3	
21BTP302L ¹	Project	0	0	6	3	
21BTP303T ¹	MOOC	3	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 - 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



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