ACADEMIC CURRICULA

UNDERGRADUATE DEGREE PROGRAMMES

Bachelor of Technology

(B.Tech. - Four Years)

(Choice Based Flexible Credit System)

Regulations 2018

Volume - 1

(Revised in March 2019)



SRM INSTITUTE OF SCIENCE AND TECHNOLOGY

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

Kattankulathur, Kancheepuram District 603203, Tamil Nadu, India

SRM INSTITUTE OF SCIENCE AND TECHNOLOGY

Kattankulathur, Kancheepuram District 603203, Tamil Nadu, India

4. B.Tech. in Biotechnology

4. (a) Mission of the Department

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

4. (b) Program Educational Objectives (PEO)

PEO - 1	To impart knowledge in biological and chemical sciences for application in biological systems
PEO - 2	To develop skills in basic and applied fields of biotechnology leading to professionalism and leadership
PEO - 3	To provide hands-on training to students for carrying out independent research projects in emerging areas of biotechnology

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

	Mission Stmt 1	Mission Stmt 2	Mission Stmt 3
PEO - 1	Н	H	Н
PEO - 2	M	Н	Н
PEO - 3	Н	Н	Н

H – High Correlation, M – Medium Correlation, L – Low Correlation

4. (d) Mapping Program Educational Objectives (PEO) to Program Learning Outcomes (PLO)

	- 1				-07	Progra	ım Lear	ning Ou	tcomes	(PLO)					
	-				Gra	aduate At	tributes (0	GA)		M.			Prog Out	gram <mark>Spe</mark> comes (F	ecific (SO)
	Eng <mark>in</mark> eering Knowledge	Problem Analysis	Design & Development	Analysis, Design, Research	Modem Tool Usage	Society & Culture	Environment & Sustainability	Ethics	Individual & Team Work	Communication	Project Mgt. & Finance	Life Long Learning	PSO-1	PS0-2	PSO-3
PEO - 1	Н	М	М	Н	Н	Н	Н	Н	Н	Н	М	Н	Н	Н	Н
PEO - 2	Н	Н	Н	Н	Н	Н	H	Н	Н	Н	Н	Н	H	Н	Н
PEO - 3	М	Н	Н	Н	Н	Н	Н	Н	Н	Н	Н	Н	Н	Н	Н

H – High Correlation, M – Medium Correlation, L – Low Correlation

PSO – Program Specific Outcomes (PSO)

PSO - 1	Ability to integrate biology and engineering technology for application in industry and research
PSO - 2	Able to implement the biotechnology concepts in the applied fields of biotechnology
PSO - 3	Able to contribute towards the advancement of biotechnology in the fields of research and management

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

	Humanities & Social Sciences						Basic Science Courses (B)				
	including Management Courses (H)				1	Course	Course	_	rs/ W		
Course	Course	_	ırs/ W			Code	Title	L	Τ	Р	С
Code	Title	L	T	Р	С	18PYB101J	Physics: Electromagnetic Theory, Quantum	3	1	2	5
18LEH101J		2	0	2	3		Mechanics, Waves and Optics				
18LEH102J				ļ	ļ	18CYB101J		3	1	2	5
18LEH103J		2	0	2	3	18MAB1011	Calculus and Linear Algebra Advanced Calculus and Complex Analysis	3	1	0	4
18LEH104J 18LEH105J		- 2	U	2	3		Bio-Statistics for Biotechnologists	3	1	0	4
18LEH106J		1					Human Physiology and Health	3	0	0	3
	General Aptitude	0	0	2	1	100101031	Total Learning Credits		U	-	25
	Management Principles for Engineers	2	0	0	2		Total Ecanning Orcalis				20
18PDH103T	Social Engineering	2	0	0	2		Professional Core Courses (C)				
	Employability Skills & Practices	0	0	2	1	Course	Course	Hou	rs/ W	eek	
	Total Learning Credits				12	Code	Title	L	Т	Р	С
						18BTC101J	Biochemistry	3	0	2	4
	Engineering Science Courses (S)						Cell Biology	3	0	2	4
Course	Course	Ηοι	ırs/ W	_	4		Microbiology	3	0	2	4
Code	Title	L	Т	Р	С		Genetics and Cytogenetics	3	0	0	3
	Engineering Graphics and Design	1	0	4	3		Molecular Biology	3	0	2	4
	Basic Civil and Mechanical Engineering	3	1	2	5		Immunology	3	0	2	4
	Electrical and Electronics Eng. Workshop	3	0	4	3 5		Bioprocess Principles Plant Biotechnology	3	0	2	4
	Programming for Problem Solving Basic Chemical Engineering	3	0	0	3		Gene manipulation and Genomics	3	0	2	4
	Chemical Engineering Chemical Engineering Principles	3	0	0	3		Bioprocess Engineering	3	0	2	4
	Chemical Engineering Practice	0	0	4	2		Animal Biotechnology	3	0	2	4
1001102002	Total Learning Credits		0		24		Protein engineering and proteomics	3	0	0	3
							Bioseparation Technology	3	0	2	4
	Professional Elective Courses (E)						Comprehension	0	1	0	1
	(Any 6 Courses)						Total Learning Credits				51
Course	Course	Ηοι	ırs/ W	/eek							
Code	Title	L	Τ	Р	С		Open Elective Courses (O)				
	Sub-stream: Medical Biotechnology						(Any 5 Courses)				
	Developmental Biology	3	0	0	3	Code	Course Title	L	Т	Р	С
	Cellular & Molecular Neuroscience	3	0	0	3		Human Health and diseases	3	0		3
	Metabolic Disorders	3	0	0	3		Modelling of biomolecules	3	0	_	3
	Infectious Diseases	3	0	0	3		Activated carbon technology	3	0	0	3
	Cancer Biology	3	0	0	3		Defense Forces in our body	3	0	0	3
18B1E4021	Physiology of Stress and its Management	3	0	0	3		Animal Models for Research Waste to Wealth to Wheels	3	0		3
10DTF205T	Sub-stream: Pharmaceutical Biotechnology	3	0	0	3		Fundamental Neurobiology	3	0	0	3
	Pharmaceutical Biotechnology Bioinformatics	3	0	0	3	100101011	Total Learning Credits		0	10	15
	Drug Discovery and Drug Designing	3	0	0	3		Total Learning Credits				13
	Marine Biotechnology	3	0	0	3		7. Project Work, Seminar, Internship In			_	
	Vaccine Biotechnology	3	0	0	3		Industry/ Higher Technical Institutions (P)				
	Molecular Basis of Drug action	3	0	0	3	Code	Course Title	Т	Т	Р	С
	Sub-stream: Plant and Food Biotechnology						Massive Open Online Course - I	-	† ·		Ť
18BTE309T	Plant nutrition and physiology	3	0	0	3	18BTP102L	Industrial Training-I	0	0	2	1
18BTE310T	Plant Hormones and Signaling	3	0	0	3	18BTP103L		1		1	
	Pathogenesis-Related Proteins In Plants	3	0	0	3	18BTP104L	Massive Open Online Course - II				
	Food Science and Nutrition	3	0	0	3	18BTP105L	Industrial Training-II	0	0	2	1
18BTE405T	Therapeutic Compounds from Plants	3			3	18BTP106L	Seminar - II				
		3	0	0	3	18BTP107L	Minor Project	0	0	6	3
	Food safety and quality Management	_							"	Ļ	Ļ
18BTE406T	Food safety and quality Management Sub-stream: Bioprocess Technology				_		Internship (4-6 weeks)	U		20	10
18BTE406T 18BTE313T	Food safety and quality Management Sub-stream: Bioprocess Technology Enzyme Engineering and Technology	3	0	0	3	18BTP109L	Internship (4-6 weeks) Project	0	0	1 20	
18BTE406T 18BTE313T 18BTE314T	Food safety and quality Management Sub-stream: Bioprocess Technology Enzyme Engineering and Technology Membrane Technology	3	0	0	3	18BTP109L	Internship (4-6 weeks) Project Semester Internship	0	0	20	
18BTE406T 18BTE313T 18BTE314T 18BTE315T	Food safety and quality Management Sub-stream: Bioprocess Technology Enzyme Engineering and Technology Membrane Technology Industrial Fermentation Technology	3 3 3	-	0	3	18BTP109L	Internship (4-6 weeks) Project	0	0	20	15
18BTE406T 18BTE313T 18BTE314T 18BTE315T 18BTE316T	Food safety and quality Management Sub-stream: Bioprocess Technology Enzyme Engineering and Technology Membrane Technology Industrial Fermentation Technology Bioreactor Design	3 3 3 3	0 0	0 0	3 3 3	18BTP109L	Internship (4-6 weeks) Project Semester Internship Total Learning Credits	0	0	20	
18BTE406T 18BTE313T 18BTE314T 18BTE315T 18BTE316T 18BTE407T	Food safety and quality Management Sub-stream: Bioprocess Technology Enzyme Engineering and Technology Membrane Technology Industrial Fermentation Technology Bioreactor Design Bioprocess Modelling and Simulation	3 3 3 3 3	0 0 0	0 0 0 0	3 3 3	18BTP109L 18BTP110L	Internship (4-6 weeks) Project Semester Internship Total Learning Credits Mandatory Courses (M)	0			15
18BTE406T 18BTE313T 18BTE314T 18BTE315T 18BTE316T 18BTE407T	Food safety and quality Management Sub-stream: Bioprocess Technology Enzyme Engineering and Technology Membrane Technology Industrial Fermentation Technology Bioreactor Design Bioprocess Modelling and Simulation Bioprocess Plant Design	3 3 3 3	0 0	0 0	3 3 3	18BTP109L 18BTP110L	Internship (4-6 weeks) Project Semester Internship Total Learning Credits Mandatory Courses (M) Course Title	- 0	T	P	
18BTE406T 18BTE313T 18BTE314T 18BTE315T 18BTE316T 18BTE407T 18BTE408T	Food safety and quality Management Sub-stream: Bioprocess Technology Enzyme Engineering and Technology Membrane Technology Industrial Fermentation Technology Bioreactor Design Bioprocess Modelling and Simulation Bioprocess Plant Design Sub-stream: Environmental Biotechnology	3 3 3 3 3 3	0 0 0 0 0	0 0 0 0	3 3 3 3 3	18BTP109L 18BTP110L Code 18PDM101L	Internship (4-6 weeks) Project Semester Internship Total Learning Credits Mandatory Courses (M)	- 0 L 0	T 0	P 2	15 C
18BTE406T 18BTE313T 18BTE314T 18BTE315T 18BTE316T 18BTE408T 18BTE317T	Food safety and quality Management Sub-stream: Bioprocess Technology Enzyme Engineering and Technology Membrane Technology Industrial Fermentation Technology Bioreactor Design Bioprocess Modelling and Simulation Bioprocess Plant Design Sub-stream: Environmental Biotechnology Environmental Biotechnology	3 3 3 3 3 3 3	0 0 0	0 0 0 0 0	3 3 3 3 3	18BTP109L 18BTP110L Code 18PDM101L 18PDM201L	Internship (4-6 weeks) Project Semester Internship Total Learning Credits Mandatory Courses (M) Course Title Professional Skills and Practices	- 0	T	P	15 C
18BTE406T 18BTE313T 18BTE314T 18BTE315T 18BTE316T 18BTE407T 18BTE408T 18BTE317T 18BTE318T	Food safety and quality Management Sub-stream: Bioprocess Technology Enzyme Engineering and Technology Membrane Technology Industrial Fermentation Technology Bioreactor Design Bioprocess Modelling and Simulation Bioprocess Plant Design Sub-stream: Environmental Biotechnology Environmental Biotechnology Industrial Waste Management	3 3 3 3 3 3	0 0 0 0 0	0 0 0 0	3 3 3 3 3	18BTP109L 18BTP110L Code 18PDM101L 18PDM201L 18PDM203L	Internship (4-6 weeks) Project Semester Internship Total Learning Credits Mandatory Courses (M) Course Title Professional Skills and Practices Competencies in Social Skills	L 0	T 0	P 2 2	C 0 0
18BTE406T 18BTE313T 18BTE314T 18BTE315T 18BTE316T 18BTE407T 18BTE408T 18BTE317T 18BTE318T 18BTE318T	Food safety and quality Management Sub-stream: Bioprocess Technology Enzyme Engineering and Technology Membrane Technology Industrial Fermentation Technology Bioreactor Design Bioprocess Modelling and Simulation Bioprocess Plant Design Sub-stream: Environmental Biotechnology Environmental Biotechnology Industrial Waste Management Bioenergy	3 3 3 3 3 3 3	0 0 0 0 0 0	0 0 0 0 0	3 3 3 3 3 3	18BTP109L 18BTP110L 18BTP110L 18PDM101L 18PDM201L 18PDM203L 18PDM202L 18PDM204L	Internship (4-6 weeks) Project Semester Internship Total Learning Credits Mandatory Courses (M) Course Title Professional Skills and Practices Competencies in Social Skills Entrepreneurial Skill Development Critical and Creative Thinking Skills Business Basics for Entrepreneurs	- 0 L 0	T 0	P 2	15 C
18BTE406T 18BTE313T 18BTE314T 18BTE315T 18BTE316T 18BTE407T 18BTE408T 18BTE317T 18BTE318T 18BTE319T 18BTE320T	Food safety and quality Management Sub-stream: Bioprocess Technology Enzyme Engineering and Technology Membrane Technology Industrial Fermentation Technology Bioreactor Design Bioprocess Modelling and Simulation Bioprocess Plant Design Sub-stream: Environmental Biotechnology Environmental Biotechnology Industrial Waste Management	3 3 3 3 3 3 3 3 3	0 0 0 0 0 0	0 0 0 0 0 0	3 3 3 3 3 3 3	Code 18PDM101L 18PDM201L 18PDM201L 18PDM202L 18PDM202L 18PDM202L 18PDM301L	Internship (4-6 weeks) Project Semester Internship Total Learning Credits Mandatory Courses (M) Course Title Professional Skills and Practices Competencies in Social Skills Entrepreneurial Skill Development Critical and Creative Thinking Skills Business Basics for Entrepreneurs Analytical and Logical Thinking Skills	L 0 0	T 0 0 0	P 2 2 2	15 C 0 0
18BTE406T 18BTE313T 18BTE314T 18BTE315T 18BTE407T 18BTE408T 18BTE317T 18BTE318T 18BTE319T 18BTE320T 18BTE409T	Food safety and quality Management Sub-stream: Bioprocess Technology Enzyme Engineering and Technology Membrane Technology Industrial Fermentation Technology Bioreactor Design Bioprocess Modelling and Simulation Bioprocess Plant Design Sub-stream: Environmental Biotechnology Environmental Biotechnology Industrial Waste Management Bioenergy Environmental Microbiology. & Metagenomics	3 3 3 3 3 3 3 3 3	0 0 0 0 0 0 0 0	0 0 0 0 0 0 0	3 3 3 3 3 3 3 3	Code 18PDM101L 18PDM201L 18PDM201L 18PDM203L 18PDM202L 18PDM204L 18PDM301L 18PDM301L 18PDM302L	Internship (4-6 weeks) Project Semester Internship Total Learning Credits Mandatory Courses (M) Course Title Professional Skills and Practices Competencies in Social Skills Entrepreneurial Skill Development Critical and Creative Thinking Skills Business Basics for Entrepreneurs Analytical and Logical Thinking Skills Entrepreneurship Management	L 0 0 0 0 0	T 0 0 0 0	P 2 2 2 2 2	15 0 0 0
18BTE406T 18BTE313T 18BTE314T 18BTE315T 18BTE316T 18BTE407T 18BTE318T 18BTE318T 18BTE318T 18BTE319T 18BTE320T 18BTE409T	Food safety and quality Management Sub-stream: Bioprocess Technology Enzyme Engineering and Technology Membrane Technology Industrial Fermentation Technology Bioreactor Design Bioprocess Modelling and Simulation Bioprocess Plant Design Sub-stream: Environmental Biotechnology Environmental Biotechnology Industrial Waste Management Bioenergy Environmental Microbiology. & Metagenomics Bioremediation Technology	3 3 3 3 3 3 3 3 3 3 3 3 3	0 0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0 0	3 3 3 3 3 3 3 3 3 3	Code 18PDM101L 18PDM201L 18PDM203L 18PDM202L 18PDM204L 18PDM301L 18PDM301L 18PDM301L 18PDM301L 18PDM301L	Internship (4-6 weeks) Project Semester Internship Total Learning Credits Mandatory Courses (M) Course Title Professional Skills and Practices Competencies in Social Skills Entrepreneurial Skill Development Critical and Creative Thinking Skills Business Basics for Entrepreneurs Analytical and Logical Thinking Skills Entrepreneurship Management Constitution of India	0 L 0 0 0	0 0 0	P 2 2 2	0 0 0 0
18BTE406T 18BTE313T 18BTE314T 18BTE315T 18BTE316T 18BTE407T 18BTE318T 18BTE318T 18BTE318T 18BTE319T 18BTE320T 18BTE409T	Food safety and quality Management Sub-stream: Bioprocess Technology Enzyme Engineering and Technology Membrane Technology Industrial Fermentation Technology Bioreactor Design Bioprocess Modelling and Simulation Bioprocess Plant Design Sub-stream: Environmental Biotechnology Environmental Biotechnology Industrial Waste Management Bioenergy Environmental Microbiology. & Metagenomics Bioremediation Technology Environmental Biosensors Total Learning Credits	3 3 3 3 3 3 3 3 3 3 3 3 3	0 0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0 0	3 3 3 3 3 3 3 3 3 3	Code 18PDM101L 18PDM201L 18PDM203L 18PDM203L 18PDM203L 18PDM301L 18PDM301L 18PDM301L 18PDM301L 18LEM101T 18LEM101T	Internship (4-6 weeks) Project Semester Internship Total Learning Credits Mandatory Courses (M) Course Title Professional Skills and Practices Competencies in Social Skills Entrepreneurial Skill Development Critical and Creative Thinking Skills Business Basics for Entrepreneurs Analytical and Logical Thinking Skills Entrepreneurship Management Constitution of India Value Education	0 0 0 0	0 0 0 0	P 2 2 2 2 2 0 1	15 C C O O O O O O O O O O O O O O O O O
18BTE406T 18BTE313T 18BTE314T 18BTE315T 18BTE316T 18BTE408T 18BTE317T 18BTE318T 18BTE319T 18BTE320T 18BTE409T 18BTE410T	Food safety and quality Management Sub-stream: Bioprocess Technology Enzyme Engineering and Technology Membrane Technology Industrial Fermentation Technology Bioreactor Design Bioprocess Modelling and Simulation Bioprocess Plant Design Sub-stream: Environmental Biotechnology Environmental Biotechnology Industrial Waste Management Bioenergy Environmental Microbiology. & Metagenomics Bioremediation Technology Environmental Biosensors Total Learning Credits Mandatory Courses (M)	3 3 3 3 3 3 3 3 3 3 3 3 3	0 0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0 0	3 3 3 3 3 3 3 3 3 3 3 3 3 3	Code 18PDM101L 18PDM201L 18PDM203L 18PDM203L 18PDM301L 18PDM301L 18PDM301L 18PDM301L 18PDM301L 18PDM301L 18PDM301L 18PM301L 18EM101T 18LEM101T	Internship (4-6 weeks) Project Semester Internship Total Learning Credits Mandatory Courses (M) Course Title Professional Skills and Practices Competencies in Social Skills Entrepreneurial Skill Development Critical and Creative Thinking Skills Business Basics for Entrepreneurs Analytical and Logical Thinking Skills Entrepreneurship Management Constitution of India Value Education Physical and Mental Health using Yoga	0 L 0 0 0	0 0 0	P 2 2 2 2 2	0 0 0 0
18BTE406T 18BTE313T 18BTE314T 18BTE315T 18BTE407T 18BTE408T 18BTE317T 18BTE318T 18BTE319T 18BTE320T 18BTE409T 18BTE409T	Food safety and quality Management Sub-stream: Bioprocess Technology Enzyme Engineering and Technology Membrane Technology Industrial Fermentation Technology Bioreactor Design Bioprocess Modelling and Simulation Bioprocess Plant Design Sub-stream: Environmental Biotechnology Industrial Waste Management Bioenergy Environmental Microbiology. & Metagenomics Bioremediation Technology Environmental Biosensors Total Learning Credits Mandatory Courses (M) Course Title	3 3 3 3 3 3 3 3 3 3 3	0 0 0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0 0	3 3 3 3 3 3 3 3 3 3 18	Code 18PDM101L 18PDM201L 18PDM203L 18PDM203L 18PDM301L	Internship (4-6 weeks) Project Semester Internship Total Learning Credits Mandatory Courses (M) Course Title Professional Skills and Practices Competencies in Social Skills Entrepreneurial Skill Development Critical and Creative Thinking Skills Business Basics for Entrepreneurs Analytical and Logical Thinking Skills Entrepreneurship Management Constitution of India Value Education Physical and Mental Health using Yoga NSS	0 0 0 0 0	0 0 0 0	P 2 2 2 2 2 0 1 1 2 2	0 0 0 0 0 0
18BTE406T 18BTE313T 18BTE314T 18BTE315T 18BTE316T 18BTE407T 18BTE318T 18BTE318T 18BTE319T 18BTE320T 18BTE409T 18BTE410T	Food safety and quality Management Sub-stream: Bioprocess Technology Enzyme Engineering and Technology Membrane Technology Industrial Fermentation Technology Bioreactor Design Bioprocess Modelling and Simulation Bioprocess Plant Design Sub-stream: Environmental Biotechnology Environmental Biotechnology Industrial Waste Management Bioenergy Environmental Microbiology. & Metagenomics Bioremediation Technology Environmental Biosensors Total Learning Credits Mandatory Courses (M) Course Title Indian Art Form	3 3 3 3 3 3 3 3 3 3 3 3 3 3 4 5 4 1 1 1 1 1 1 1 1 1 1 1 1 1 1	0 0 0 0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0 0 0	3 3 3 3 3 3 3 3 3 3 3 18	Code 18PDM101L 18PDM201L 18PDM201L 18PDM202L 18PDM301L 18PDM301L 18PDM301L 18PDM301L 18PDM301L 18PDM301L 18PM301L	Internship (4-6 weeks) Project Semester Internship Total Learning Credits Mandatory Courses (M) Course Title Professional Skills and Practices Competencies in Social Skills Entrepreneurial Skill Development Critical and Creative Thinking Skills Business Basics for Entrepreneurs Analytical and Logical Thinking Skills Entrepreneurship Management Constitution of India Value Education Physical and Mental Health using Yoga NSS NCC	0 0 0 0	0 0 0 0	P 2 2 2 2 2 0 1	15 C O O O O O O O O O O O O O O O O O O
18BTE406T 18BTE313T 18BTE314T 18BTE315T 18BTE316T 18BTE407T 18BTE408T 18BTE319T 18BTE319T 18BTE320T 18BTE409T 18BTE409T 18BTE409T 18BTE409T 18BTE409T 18BTE409T 18BTE409T 18BTE409T 18BTE409T 18BTE409T	Food safety and quality Management Sub-stream: Bioprocess Technology Enzyme Engineering and Technology Membrane Technology Industrial Fermentation Technology Bioreactor Design Bioprocess Modelling and Simulation Bioprocess Plant Design Sub-stream: Environmental Biotechnology Industrial Waste Management Bioenergy Environmental Microbiology. & Metagenomics Bioremediation Technology Environmental Biosensors Total Learning Credits Mandatory Courses (M) Course Title	3 3 3 3 3 3 3 3 3 3 3	0 0 0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0 0 0	3 3 3 3 3 3 3 3 3 3 18	Code 18PDM101L 18PDM201L 18PDM201L 18PDM201L 18PDM202L 18PDM301L 1	Internship (4-6 weeks) Project Semester Internship Total Learning Credits Mandatory Courses (M) Course Title Professional Skills and Practices Competencies in Social Skills Entrepreneurial Skill Development Critical and Creative Thinking Skills Business Basics for Entrepreneurs Analytical and Logical Thinking Skills Entrepreneurship Management Constitution of India Value Education Physical and Mental Health using Yoga NSS NCC	0 0 0 0 0	0 0 0 0	P 2 2 2 2 2 0 1 1 2 2	0 0 0 0 0 0

4. (f) Program Articulation (B.Tech. in Biotechnology)

Course Name Cours					Р	roa	ram	Lea	arni	na (Outo	com	ies	(PL	D)		
180TC1013 Blobing						- 5										PSO	
180TC1013 Blobing						5											
180TC1013 Blobing			ge		ŧ	searc			inabi		٥Ł		8			1	
180TC1013 Blobing	Course		wled	s	bme	.Re	age	a)	nsta		W.		inand	g.		1	
180TC1013 Blobing		Course Name	Kno	alysi	evelo	esign	l Us	alfa.	\$ S		Teal	tion	∞.	earni		1	
180TC1013 Blobing	Code		ering	пAп	~ O	is, D	70c	% C	Jmer		al &	in is	Mgt	ng Le	_	2	
180TC1013 Blobing			gine	lelqo.	esign	nalys	oderi	ciet	IVIFOI	Sjet	divid	umo	ojeci	e Co	ò	ő	ő
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188TC1051 Molecular Biology		0,							_								
18BTC1071 Biogeoses Principles		, ,															-
188TC1031 Bignocess Principles		07							_								
188TC2012 Pant Blotechnology		0,															
188TC2021 Gene manipulation and Genomics																	
188TC2031 Pignocess Engineering		9.															
188TC2031 Ainmal Biotechnology		·															
18BTC3017 Disceptaration Technology										_			1		_		_
188TE3017 Developmental Biology		0,	_												_		
18BTE3017 Developmental Biology			_														
18BTE3037 Metabolic Disorders																	
188E3037 Metabolic Disorders	18BTE <mark>301T</mark>	Developmental Biology	М	М					М				_		_		Н
18BTE-3047 Inflictious Diseases	18BTE302T			М									_		_		_
18BTE4017 Cancer Biology	18BTE303T	Metabolic Disorders	М	М	Н				Н	Н	Н	Н		Н			Н
18BTE-907 Physiology of Stress and its Management	18BTE304T	Infectious Diseases	Н	Н	Н	Н	Н	Н	М	М	Н	Н	Н	Н	Н	Н	Н
18BTE305T Pharmaceutical Biotechnology	18BTE401T	Cancer Biology	Н	Н	М	Н	Н	Н	М	Н	Н	Н	Н	Н	Н	Н	Н
188TE300T Boinformatics	18BTE402T	Physiology of Stress and its Management	М	Н	М	Н	Н	М	М	Н	Н	Н	Н	Н	Н	Н	Н
188TE3077 Drug Discovery and Drug Designing	18BTE305T	Pharmaceutical Biotechnology	Н	Н	Н	Н	Н	Н	Н	Н	Н	Н	Н	Н	Н	Н	Н
188TE307T Drug Discovery and Drug Designing	18BTE306T	Bioinformatics	М	Н	Н	Н	H	Н	Н	Н	Н	Н	Н	Н	Н	Н	Н
188TE3087 Marine Biotechnology			Н	Н	Н	Н	Н	Н	Н	Н	Н	Н	Н	Н	Н	Н	Н
18BTE404T Molecular Basis of Drug action			Н	Н	Н	Н	Н	Н	Н	Н	Н	Н	Н	Н	Н	Н	Н
18BTE404T Molecular Basis of Drug action	18BTE403T	Vaccine Biotechnology	М	Н	Н	Н	Н	Н	Н	Н	Н	Н	Н	Н	Н	Н	Н
18BTE310T Plant nutrition and physiology		0.	Н							_							
18BTE310T Plant Hormones and Signalling																	
18BTE311T Pathogenesis-Related Proteins In Plants M M H		, , , ,							_	_			_		_		_
18BTE312T Food Science and Nutrition M M M H				_													
18BTE405T Therapeutic Compounds from Plants		ů – – – – – – – – – – – – – – – – – – –				_											
18BTE406T Food safety and quality Management H																	
18BTE313T Enzyme Engineering and Technology									_								
18BTE315T Industrial Fermentation Technology									1								
18BTE315T Industrial Fermentation Technology M H																	
18BTE316T Bioreactor Design H <td></td> <td></td> <td></td> <td>_</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>_</td> <td></td> <td></td> <td></td> <td>_</td>				_									_				_
18BTE407T Bioprocess Modelling and Simulation H <td></td> <td>_</td> <td></td> <td></td>															_		
18BTE408T Bioprocess Plant Design M H <t< td=""><td></td><td>3</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></t<>		3															
18BTE317T Environmental Biotechnology H																	
18BTE318T Industrial Waste Management H M M M M M H H M H																	
18BTE319T Bioenergy H M M M M M M H		ŭ,											_		_		_
18BTE320T Environmental Microbiology. & Metagenomics H <t< td=""><td></td><td></td><td></td><td></td><td></td><td></td><td>_</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></t<>							_										
18BTE409T Bioremediation Technology H									_								_
18BTE410T Environmental Biosensors H			_														
18BTP101L Massive Open Online Course - I H M M M M M M M M M H H M H M M M M H H H H H H H H H H H M M M M M H H H H H H M M M M M M H H H H H H M															_		-
18BTP102L Industrial Training-I H M M M M M M M H H M H																	
18BTP103L Seminar - I H M M M M M M M M H H M H		· · · · · · · · · · · · · · · · · · ·	_														_
18BTP104L Massive Open Online Course - II H M M M M M M H H M H									_								
18BTP105L Industrial Training-II H M M M M M H H M H <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>_</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>_</td>									_								_
18BTP106L Seminar - II H M M M M M M M H		,					-		_						_		_
18BTP107L Minor Project H <td< td=""><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>_</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></td<>									_								
18BTP108L Internship (4-6 weeks) H <td></td>																	
18BTP109L Project H <td></td> <td>•</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>_</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>_</td>		•							_								_
18BTP110L Semester Internship H<																	_
Program Average H		•							_				_				
	18BTP110L	Semester Internship							_						_		М
			Н	Н	Н	Н	Н	Н	Н	Н	Н	Н	Н	Н	Н	Н	Н

H – High Correlation, M – Medium Correlation, L – Low Correlation

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

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	Semester - I						Semester - II						
Code	Course Title Hours/ Week L T P C			Code	Course Title	Hou	rs/ W T	leek P	С				
18LEH101J	English	2	0	2	3	18I FH10X.I	Chinese / French / German / Japanese/ Korean	2	0	2	3		
	Calculus and Linear Algebra	3	1	0	4		Advanced Calculus and Complex Analysis	3	1	0	4		
	Physics: Electromagnetic Theory, Quantum	_				18CYB101J		3	1	2	5		
18PYB101J	Mechanics, Waves and Optics	3	1	2	5		Programming for Problem Solving	3	0	4	5		
	Engineering Graphics and Design	1	0	4	3	18EES102L	Electrical and Electronics Eng. Workshop	1	0	4	3		
18MES102J	Basic Civil and Mechanical Engineering	3	1	2	5	18PDH101T	General Aptitude	0	0	2	1		
	Professional Skills and Practices	0	0	2	0		Value Education	1	0	1	0		
	Constitution of India	1	0	0	0	18GNM102L							
18GNM101L	Physical and Mental Health using Yoga	0	0	2	0	18GNM103L		0	0	2	0		
	Total Learning Credit	S			20	18GNM104L							
							Total Learning Credits				21		
	Semester - III					Semester - IV							
Code	Course Title		ırs/ V		С	Code	Course Title		rs/ W		С		
		L	T	Р				L	T	Р			
	Human Physiology and Health	3	0	0	3		Chemical Engineering Principles	3	0	0	3		
	Basic Chemical Engineering	3	0	0	3		Molecular Biology	3	0	2	4		
	Biochemistry	3	0	2	4		Immunology	3	0	2	4		
	Cell Biology	3	0	2	4		Bioprocess Principles	3	0	2	4		
	Microbiology	3	0	2	4	18B1C108J	Plant Biotechnology	3	0	2	4		
	Genetics and Cytogenetics	3	0	0	3	40DD11400T	Open Elective - I	3	0	0	3		
	Management Principles for Engineers	2	0	0	2		Social Engineering	2	0	0	2		
	Competencies in Social Skills	- 0	0	2	0	18PDM202L	Critical and Creative Thinking Skills	0	0	2	0		
18PDM203L	Entrepreneurial Skill Development					18PDM204L	Business Basics for Entrepreneurs						
	Total Learning Credit	S			23	18CYM1011	Environmental Science	1	0	0	0 24		
							Total Learning Credits				24		
				16									
	Semester - V						Semester - VI						
		Hou	ırs/ V	Veek				Hou	rs/ W	/eek			
Code	Course Title	I	T	Р	С	Code	Course Title	I	Т	Р	С		
18CHS253L	Chemical Engineering Practice	0	0	4	2	18MAB303T	Bio-Statistics for Biotechnologists	3	1	0	4		
	Gene manipulation and Genomics	3	0	2	4		Animal Biotechnology	3	0	2	4		
	Bioprocess Engineering	3	0	2	4		Protein engineering and proteomics	3	0	0	3		
	Professional Elective – 1	3	0	0	3		Comprehension	0	1	0	1		
	Professional Elective – 2	3	0	0	3	100100001	Professional Elective – 3	3	0	0	3		
	Open Elective – 2	3	0	0	3		Professional Elective – 4	3	0	0	3		
	Open Elective – 3	3	0	0	3		Open Elective – 4	3	0	0	3		
18BTP101L	Massive Open Online Course - I					18PDH201T	Employability Skills and Practices	0	0	2	1		
18BTP102L	Industrial Training-I	0	0	2	1		Massive Open Online Course - II	Ü	•	-			
18BTP103L							Industrial Training-II	0	0	2	1		
18PDM301L	Analytical and Logical Thinking Skills	_	_	_	_	18BTP106L		Ü	U	_	'		
	Entrepreneurship Management	0	0	2	0		Indian Art Form	0	0	2	0		
	Indian Traditional Knowledge	1	0	0	0	TOLLIMITOL	Total Learning Credits	U	U		23		
	Total Learning Credit	s			23		Total Editing Globits						
	7771	т					Compating VIII						
	Comacton VIII					III	Semester - VIII			/I			
	Semester - VII	1				-							
Code	Semester - VII Course Title		ırs/ V	Veek P	С	Code	Course Title	Hou	rs/ W	Р	С		
	Course Title	L		Р	C 4			L	Τ	Р			
Code 18BTC301J	Course Title	L 3	T		4	18BTP109L					C 10		
	Course Title Bioseparation Technology Professional Elective – 5	3 3	T 0 0	P 2 0	3	18BTP109L	Project	L	Τ	Р			
	Course Title Bioseparation Technology Professional Elective – 5 Professional Elective – 6	3 3 3	T 0	P 2 0 0	4 3 3	18BTP109L	Project	L	Τ	Р			
18BTC301J	Course Title Bioseparation Technology Professional Elective – 5 Professional Elective – 6 Open Elective – 5	3 3 3 3	T 0 0 0 0 0	P 2 0 0 0 0	4 3 3 3	18BTP109L	Project	L	Τ	Р			
18BTC301J 18BTP107L	Course Title Bioseparation Technology Professional Elective – 5 Professional Elective – 6 Open Elective – 5 Minor Project	3 3 3	T 0 0	P 2 0 0	4 3 3	18BTP109L	Project	L	Τ	Р			
18BTC301J 18BTP107L 18BTP108L	Course Title Bioseparation Technology Professional Elective – 5 Professional Elective – 6 Open Elective – 5 Minor Project Internship (4-6 weeks)	3 3 3 3 - 0	T 0 0 0 0 0 0	P 2 0 0 0 0 6	4 3 3 3 3	18BTP109L	Project Semester Internship	L	Τ	Р	10		
18BTC301J 18BTP107L 18BTP108L	Course Title Bioseparation Technology Professional Elective – 5 Professional Elective – 6 Open Elective – 5 Minor Project	3 3 3 3 0	T 0 0 0 0 0	P 2 0 0 0 0	4 3 3 3	18BTP109L	Project	L	Τ	Р			