



SETHU INSTITUTE OF TECHNOLOGY

PULLOOR, KARIAPATTI – 626115

(An Autonomous Institution

Affiliated to Anna University, Chennai)

B.TECH. BIOTECHNOLOGY

CURRICULUM

REGULATIONS R2021

CHOICE BASED CREDIT SYSTEM

(Applicable to candidates admitted in the Academic Year 2023 - 2024)



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B.Tech. Degree Programme CHOICE BASED CREDIT SYSTEM CURRICULUM

Regulation 2021 (Academic Year 2023 – 2024)

Bachelor of Technology in Biotechnology

OVERALL COURSE STRUCTURE

S.No	Course Category	Total No. of Courses	Credits	Percentage
1	Humanities and Social Sciences (HS)	6	9.5	5.8 %
2	Basic Science courses (BS)	8	24	14.62 %
3	Engineering Science courses (ES)	9	22.5	13.72 %
4	Professional Core courses (PC)	25	59	36 %
5	Professional Elective (PE)	6	18	10.97 %
6	Open Elective (OE)	4	12	7.32 %
7	Project work (P)	3	13	7.92 %
8	Mandatory Courses (MC)	11	6	3.65 %
TOTAL		72	164	100

COURSE CREDITS - SEMESTER WISE

Branch	I	II	III	IV	V	VI	VII	VIII	TOTAL
BT	19	18	22	23	26	23	19	14	164

SEMESTER I

S. No.	Course Code	Course Title	Course Category	L	T	P	C
THEORY							
1.	R21UEN101	English for Technical Communication (Common to ALL except CSBS)	HS	2	0	0	2
2.	R21UMA102	Matrix and Calculus (Common to ALL except CSBS)	BS	3	1	0	4
3.	R21UME109	Engineering Graphics (Common to ALL except CSBS, CSD, AIDS &AIML)	ES	1	3	0	4
4.	R21UCY105	Applied Chemistry	BS	3	0	0	3
5.	R21UBT105	Bioorganic Chemistry	ES	3	0	0	3
PRACTICAL							
6.	R21UME111	Engineering Practices Lab (Common to Mech, Civil, EEE, Agri, Chemical & BT)	ES	0	0	2	1
7.	R21UCY113	Chemistry Laboratory (Common to Mech, ECE, EEE, Civil, Agri, CSE Allied branches, Chemical, BME, BT)	BS	0	0	2	1
MANDATORY							
8.	R21UGM131	Induction Program (Common to ALL)	MC	0	3	0	P/F
9.	R21UGT140	Heritage of Tamils (Common to ALL)	MC	1	0	0	1
Total				13	7	4	19
Total Credits : 19							

SEMESTER II

S.No.	Course Code	Course Title	Course Category	L	T	P	C
THEORY							
1.	R21UEN201	Communication Skills for Professionals (except CSBS)	HS	1	0	1	1.5
2.	R21UMA207	Calculus, Complex Analysis and Transform Techniques (Common to AGRI, BT & BME)	BS	3	1	0	4
3.	R21UPH204	Biomaterial Physics	BS	3	0	0	3
4.	R21UBT204	Microbiology	ES	3	0	0	3
5.	R21UBT205	Cell Biology	ES	3	0	0	3
PRACTICAL							
6.	R21UPH210	Applied Physics Laboratory (Common to ALL except Mech, ECE, EEE, Civil, Chemical, BME)	BS	0	0	2	1
7.	R21UBT211	Cell and Microbiology Laboratory	ES	0	0	3	1.5
MANDATORY							
8.	R21UGT241	Tamils and Technology (Common to ALL)	MC	1	0	0	1
Total				14	1	6	18
Total Credits : 18							

SEMESTER III

S.No.	Course Code	Course Title	Course Category	L	T	P	C
THEORY							
1.	R21UMA326	Transform Techniques and Partial Differential Equations (Common to AGRI, BME & BT)	BS	3	1	0	4
2.	R21UBT302	Analytical Methods and Instrumentation	ES	3	0	0	3
3.	R21UBT303	Basic Industrial Biotechnology	PC	3	0	0	3
4.	R21UBT304	Biochemistry	PC	3	0	0	3
5.	R21UBT305	Fluid Mechanics and Heat Transfer Operations	PC	3	0	0	3
6.	R21UBT306	Stoichiometry	PC	3	0	0	3
PRACTICAL							
7.	R21UBT307	Biochemistry Laboratory	PC	0	0	3	1.5
8.	R21UBT308	Chemical Engineering Laboratory	PC	0	0	3	1.5
MANDATORY							
9.	21UGM231	Environmental Science (Common to ALL)	MC	2	0	0	P/F
Total				20	1	6	22
Total Credits : 22							

SEMESTER IV

S.No.	Course Code	Course Title	Course Category	L	T	P	C
THEORY							
1.	R21UMA424	Probability and Inferential Statistics (Common to BT & BME)	BS	3	1	0	4
2.	R21UBT402	Applied Thermodynamics for Biotechnologists	PC	3	0	0	3
3.	R21UBT403	Bioprocess Principles	PC	3	0	0	3
4.	R21UBT404	Enzyme Engineering and Technology	PC	3	0	0	3
5.	R21UBT405	Molecular Biology and Genetics	PC	3	0	0	3
6.	R21UCS426	Fundamentals of C Programming (Common to Mech, EEE, Civil, BME, BT, Agri & Chem)	ES	3	0	0	3
PRACTICAL							
6.	R21UBT407	Bioprocess Laboratory – I	PC	0	0	3	1.5
7.	R21UBT408	Molecular Biology Laboratory	PC	0	0	3	1.5
8.	R21UCS428	Fundamentals of C Programming Laboratory (Common to Mech, EEE, Civil, BME, BT, Agri & Chem)	ES	0	0	2	1
MANDATORY							
9.	R21UGM431	Gender Equality (Common to ALL)	MC	1	0	0	P/F
Total				19	1	8	23
Total Credits : 23							

SEMESTER V

S.No.	Course Code	Course Title	Course Category	L	T	P	C
THEORY							
1.	R21UBT501	Bioprocess Engineering	PC	3	0	0	3
2.	R21UBT502	Genetic Engineering	PC	3	0	0	3
3.	R21UBT503	Mass Transfer Operations	PC	3	0	0	3
4.	R21UBT504	Protein Engineering	PC	3	0	0	3
5.	PE - I	Professional Elective – I	PE	3	0	0	3
6.	OE - I	Open Elective – I	OE	3	0	0	3
PRACTICAL							
7.	R21UBT507	Bioprocess Laboratory – II	PC	0	0	4	1.5
8.	R21UBT508	Genetic Engineering Laboratory	PC	0	0	4	1.5
SPECIAL COURSE							
9.	R21UBT509	Creative Thinking and Innovation	P	0	0	2	1
10.	R21UGS533	Interpersonal Skills Laboratory (Common to Mech, Civil, BT & BME)	HS	0	0	2	1
MANDATORY							
11.	R21UGM435	UHV- II	MC	2	1	0	3
Total				18	0	12	26
Total Credits : 26							

SEMESTER VI

S.No.	Course Code	Course Title	Course Category	L	T	P	C
THEORY							
1.	R21UBT601	Bioinformatics	PC	3	0	0	3
2.	R21UBT602	Immunology	PC	3	0	0	3
3.	PE – II	Professional Elective – II (Through SWAYAM portal)	PE	3	0	0	3
4.	PE – III	Professional Elective – III	PE	3	0	0	3
5.	OE – II	Open Elective – II	OE	3	0	0	3
PRACTICAL							
6.	R21UBT606	Bioinformatics Laboratory	PC	0	0	2	1
7.	R21UBT607	Immunology Laboratory	PC	0	0	2	1
SPECIAL COURSE							
8.	R21UBT608	Product Development Project	P	0	0	8	4
9.	R21UGS631	Logical Reasoning and Aptitude (Common to Civil, BT & BME)	HS	1	0	0	1
10.	R21UGS632	Soft skills and Communication Laboratory	HS	0	0	2	1
MANDATORY							
11.	R21UGM631	Indian Constitution (Common to ALL)	MC	1	0	0	P/F
Total				19	0	14	23
Total Credits : 23							

SEMESTER VII

S.No.	Course Code	Course Title	Course Category	L	T	P	C
THEORY							
1.	R21UME701	Project Management and Finance	HS	3	0	0	3
2.	R21UBT702	Downstream Processing	PC	3	0	0	3
3.	PE – IV	Professional Elective – IV	PE	3	0	0	3
4.	PE – V	Professional Elective – V	PE	3	0	0	3
5.	OE – III	Open Elective – III	OE	3	0	0	3
	OR						
	R21UGE710	MDP Phase – I	P	0	0	3	3
PRACTICAL							
8.	R21UBT707	Downstream Processing Laboratory	PC	0	0	3	1.5
9.	R21UBT708	Plant Tissue Culture Laboratory	PC	0	0	3	1.5
MANDATORY							
10.	R21UBT706	Summer Internship	MC	0	0	0	1
11.	R21UGM731	Sports & Social Development (Common to ALL)	MC	-	-	-	P/F
12.	R21UGM732	Skill Development (Common to ALL)	MC	-	-	-	P/F
13.	R21UGM733	Professional Ethics and Human Values (Common to ALL)	MC	1	0	0	P/F
Total				16	0	6	19
Total Credits : 19							

SEMESTER VIII

S.No.	Course Code	Course Title	Course Category	L	T	P	C
THEORY							
1.	PE - VI	Professional Elective – VI	PE	3	0	0	3
2.	OE - IV	Open Elective – IV	OE	3	0	0	3
PRACTICAL							
3.	R21UBT801	Project work	P	0	0	16	8
Total				6	0	16	14
Total Credits : 14							

LIST OF PROFESSIONAL ELECTIVES FOR HONORS DEGREE

S.No.	Course Code	Course Title	L	T	P	C
Vertical - I : R21BTV100 BIOPROCESS TECHNOLOGY						
1.	R21BTV101	Environmental Biotechnology	3	0	0	3
2.	R21BTV102	Bioprocess Modelling	3	0	0	3
3.	R21BTV103	Biopharmaceutical Technology	3	0	0	3
4.	R21BTV104	Bioreactor Design and Scale up process	3	0	0	3
5.	R21BTV105	Biofuel Technology	3	0	0	3
6.	R21BTV106	Metabolic Engineering	3	0	0	3
Vertical - II : R21BTV200 BIOSCIENCES						
1.	R21BTV201	Genomics and Proteomics	3	0	0	3
2.	R21BTV202	Fundamentals of Nanotechnology	3	0	0	3
3.	R21BTV203	Marine Biotechnology	3	0	0	3
4.	R21BTV204	Stem Cell technology	3	0	0	3
5.	R21BTV205	Neurobiology and Cognitive Sciences	3	0	0	3
6.	R21BTV206	Human Physiology	3	0	0	3
7.	R21BTV207	Biosensors in Disease Management	3	0	0	3
Vertical - III : R21BTV300 MEDICAL BIOTECHNOLOGY						
1.	R21BTV301	Cancer Biology	3	0	0	3
2.	R21BTV302	Tissue Engineering	3	0	0	3
3.	R21BTV303	Nanomedicine for Theranostics	3	0	0	3
4.	R21BTV304	Molecular Pathogenesis	3	0	0	3
5.	R21BTV305	Vaccine Technology	3	0	0	3
6.	R21BTV306	Molecular Therapeutics & Diagnostics	3	0	0	3
7.	R21BTV307	Biomedical Engineering	3	0	0	3
Vertical - IV : R21BTV400 COMPUTATIONAL BIOTECHNOLOGY						
1.	R21BTV401	Programming for Bioinformatics Applications	3	0	0	3
2.	R21BTV402	Fundamentals of Algorithms for Bioinformatics	3	0	0	3
3.	R21BTV403	Computer Aided Drug Design	3	0	0	3
4.	R21BTV404	Metabolomics and Metabolic Engineering	3	0	0	3
5.	R21BTV405	Molecular Modelling	3	0	0	3
6.	R21BTV406	Data Mining And Machine Learning Techniques For Bioinformatics	3	0	0	3
Vertical - V : R21BTV500 AGRO BIOTECHNOLOGY						
1.	R21BTV501	Plant Anatomy	3	0	0	3
2.	R21BTV502	Plant Biotechnology	3	0	0	3
3.	R21BTV503	Plant molecular Farming	3	0	0	3

5.	R21BTV504	Plant Tissue Culture	3	0	0	3
6.	R21BTV505	Pharmacognosy	3	0	0	3
7.	R21BTV506	Bio fertilizer production and Mushroom cultivation	3	0	0	3
Vertical - VI : R21BTV600 ANIMAL BIOTECHNOLOGY						
1.	R21BTV601	Animal Biotechnology	3	0	0	3
2.	R21BTV602	Animal Health and Nutrition	3	0	0	3
3.	R21BTV603	Animal Physiology & Metabolism	3	0	0	3
4.	R21BTV604	Animal cell culture Technology	3	0	0	3
5.	R21BTV605	Advances in Animal Biotechnology	3	0	0	3
6.	R21BTV606	Tissue Engineering	3	0	0	3
7.	R21BTV607	Dairy Technology	3	0	0	3

GENERAL VERTICALS FOR MINOR DEGREE

S. No.	Course Code	Course Title	L	T	P	C
Vertical – R21CBVG00 Fintech and Block Chain						
1.	R21CBVG01	Financial Management	3	0	0	3
2.	R21CBVG02	Fundamentals of Investment	3	0	0	3
3.	R21CBVG03	Banking, Financial Services and Insurance	3	0	0	3
4.	R21CBVG04	Introduction to Block chain and its Applications	3	0	0	3
5.	R21CBVG05	Fintech Personal Finance and Payments	3	0	0	3
6.	R21CBVG06	Introduction to Fintech	3	0	0	3
Vertical – R21MEVG00 Entrepreneurship						
1.	R21MEVG01	Foundations of Entrepreneurship	3	0	0	3
2.	R21MEVG02	Team Building & Leadership Management for Business	3	0	0	3
3.	R21MEVG03	Creativity & Innovation in Entrepreneurship	3	0	0	3
4.	R21MEVG04	Principles of Marketing Management for Business	3	0	0	3
5.	R21MEVG05	Human Resource Management for Entrepreneurs	3	0	0	3
6.	R21MEVG06	Financing New Business Ventures	3	0	0	3
Vertical – R21EEVG00 Public Administration						
1.	R21EEVG01	Principles of Public Administration	3	0	0	3
2.	R21EEVG02	Constitution of India	3	0	0	3
3.	R21EEVG03	Public Personnel Administration	3	0	0	3
4.	R21EEVG04	Administrative Theories	3	0	0	3
5.	R21EEVG05	Indian Administrative System	3	0	0	3
6.	R21EEVG06	Public Policy Administration	3	0	0	3
Vertical – R21CSVG00 Business Data Analytics						
1.	R21CSVG01	Statistics for Management	3	0	0	3
2.	R21CSVG02	Data mining for Business Intelligence	3	0	0	3
3.	R21CSVG03	Human Resource Analytics	3	0	0	3
4.	R21CSVG04	Marketing and Social Media Web Analytics	3	0	0	3
5.	R21CSVG05	Operation and Supply Chain Analytics	3	0	0	3
6.	R21CSVG06	Financial Analytics	3	0	0	3
Vertical – R21CEVG00 Environment and Sustainability						
1.	R21CEVG01	Sustainable infrastructure Development	3	0	0	3
2.	R21CEVG02	Sustainable Agriculture and Environmental Management	2	0	2	3
3.	R21CEVG03	Sustainable Bio Materials	3	0	0	3
4.	R21CEVG04	Materials for Energy Sustainability	3	0	0	3
5.	R21CEVG05	Green Technology	3	0	0	3
6.	R21CEVG06	Environmental Quality Monitoring and	3	0	0	3

		Analysis				
7.	R21CEVG07	Integrated Energy Planning for Sustainable Development	3	0	0	3
8.	R21CEVG08	Energy Efficiency for Sustainable Development	3	0	0	3

LIST OF OPEN ELECTIVES

S. No.	Course Code	Course Title	L	T	P	C
Open Electives - I						
1.	R21UCS971	Artificial Intelligence and machine Learning Fundamentals	3	0	0	3
2.	R21UCD972	Data Science Fundamentals	3	0	0	3
3.	R21UEN971	English For Competitive Exam	3	0	0	3
4.	R21UGR974	German for Engineers	3	0	0	3
Open Electives - II						
1.	R21UEC976	IoT Concepts and Applications	3	0	0	3
2.	R21UAD971	Augmented and Virtual Reality	3	0	0	3
3.	R21UJN975	Japanese for Engineers	3	0	0	3
4.	R21UEN972	Speak Better, Write Better	3	0	0	3
5.	R21UFR973	French for Engineers	3	0	0	3
Open Electives - III						
1.	R21UCB971	Digital Marketing Strategy	3	0	0	3
2.	R21UCB973	Strategic Management and Leadership	3	0	0	3
3.	R21UCS977	Mobile Application Development	3	0	0	3
4.	R21UEC971	Automotive Electronics	3	0	0	3
5.	R21UME976	Lean Concepts, Tools and Practices	3	0	0	3
6.	R21UBM975	Robotics in Health Care	3	0	0	3
Open Electives - IV						
1.	R21UBM974	Forensic Science	3	0	0	3
2.	R21UCH971	Fire safety Engineering	3	0	0	3
3.	R21UAD974	Working with Emotional Intelligence	3	0	0	3
4.	R21UCD973	Digital Media and Society	3	0	0	3
5.	R21UCS980	Web Technologies and Applications	3	0	0	3
6.	R21UIT975	Introduction to 3D Animation	3	0	0	3
7.	R21UME981	Quality Engineering	3	0	0	3

LIST OF INDUSTRY DESIGNED COURSES /VALUE ADDED COURSE

S.No.	Course Code	Course Title	L	T	P	C
1.	R21UBT861	Mushroom Cultivation	0	0	2	1
2.	R21UBT862	Food microbiology and Fermentation laboratory	0	0	2	1
3.	R21UBT863	Automated Interactive Tools for Conformational Studies	0	0	2	1
4.	R21UBT864	Introduction to Statistical Analysis System	0	0	2	1
5.	R21UBT865	Computational Reckoning of Bioprocess	1	0	0	1
6.	R21UBT866	Animal Cell Culture	1	0	0	1
7.	R21UBT867	Introduction to PERL Programming & Bio-Perl	0	0	2	1
8.	R21UBT868	Regulation Perspective of Clinical Research	1	0	0	1
9.	R21UBT869	Numerical methods for Biotechnologists	0	0	2	1
10.	R21UBT870	Biosafety Regulations	1	0	0	1
11.	R21UBT871	Fundamentals of Medical Coding	1	0	0	1
12.	R21VBT01	Mushroom Farming	Value Added Course			
13.	R21VBT02	Single Cell Protein Cultivation Strategies	Value Added Course			
14.	R21VBT03	Synthesis of Nanoparticles & Characterization	Value Added Course			
15.	R21VBT04	Statistical Tools for Biotechnologists	Value Added Course			
16.	R21VBT05	Current Good Manufacturing Practices	Value Added Course			
17.	R21VBT06	Industrial Training in Bioprocess Engineering	Value Added Course			
18.	R21VBT07	Drug Discovery and Development	Value Added Course			

LIST OF OPEN ELECTIVES

(OFFERED FOR OTHER BRANCH STUDENTS)

S.No.	Course Code	Course Title	Course Category	L	T	P	C
1.	R21UBT971	Bio nanotechnology	OE	3	0	0	3
2.	R21UBT972	Herbal Medicines	OE	3	0	0	3
3.	R21UBT973	Nano medicine for Cancer Treatment	OE	3	0	0	3
4.	R21UBT974	Patents and Copyrights	OE	3	0	0	3
5.	R21UBT975	Quality Assurance and Control in Food Industry	OE	3	0	0	3
6.	R21UBT976	Bioentrepreneurship	OE	3	0	0	3
7.	R21UBT977	Food and Dairy Technology	OE	3	0	0	3