SETHU INSTITUTE OF TECHNOLOGY

PULLOOR, KARIAPATTI – 626115
(An Autonomous Institution
Affiliated to Anna University Chennai)

B.TECH. BIOTECHNOLOGY

CURRICULUM

REGULATIONS 2021
CHOICE BASED CREDIT SYSTEM

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

**Approved in the Academic Council Meeting held on
27.05.2023**

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(An Autonomous Institution)

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	10	6.17 %
2	Basic Science courses (BS)	9	27	16.7 %
3	Engineering Science courses (ES)	9	21	12.9 %
4	Professional Core courses (PC)	24	59	36.42 %
5	Professional Elective (PE)	6	18	11.11 %
6	Open Elective (OE)	4	12	7.4 %
7	Project work (P)	3	13	8.02 %
8	Mandatory Courses (MC)	9	2	1.23 %
	TOTAL	70	162	100

COURSE CREDITS - SEMESTER WISE

Branch	I	II	III	IV	V	VI	VII	VIII	TOTAL
BT	20	21	19	19	24.5	23.5	21	14	162

S. No.	Course Code	Course Title	Course Category	L	T	P	C
THEORY							
1.	21UEN101	**English for Technical Communication (Common to ALL except CSBS)**	HS	2	0	0	2
2.	21UMA102	**Matrix and Calculus (Common to ALL except CSBS)**	BS	3	1	0	4
3.	21UPH103	**Engineering Physics (Common to ALL except CSBS)**	BS	3	0	0	3
4.	21UCY105	**Applied Chemistry (Common to ECE, EEE, CSE, IT, BT, BME, CSD, AIDS & AIML)**	BS	3	0	0	3
5.	21UCS108	**Problem Solving and Python Programming (Common to ALL except CSBS)**	ES	3	0	0	3
6.	21UME109	**Engineering Graphics (Common to ALL except CSBS & CSD)**	ES	3	1	0	4
PRACTICAL							
7.	21UCS110	**Problem Solving and Python Programming Laboratory (Common to ALL except CSBS)**	ES	0	0	2	1
8.	21UCS112	**Engineering Fundamentals Lab (Common to ECE, CSE, IT, BT & BME)**	ES	0	0	2	1
9.	21UGS113	**Basic Sciences Laboratory - I (Common to ALL except CSBS)**	BS	0	0	2	1
MANDATORY							
10.	21UGM131	**Induction Program (Common to ALL)**	MC	0	3	0	P/F
			Total	17	5	6	22
Total Credits : 22							

SEMESTER II

S. No.	Course Code	Course Title	Course Category	L	T	P	C
THEORY							
1.	21UEN201	**Communication Skills for Professionals (except CSBS)**	HS	1	0	1	1.5
2.	21UMA207	**Calculus, Complex Analysis and Transform Techniques (Common to AGRI, BT& BME)**	BS	3	1	0	4
3.	21UPH204	**Biomaterial Physics**	BS	3	0	0	3
4.	21UBT204	**Microbiology**	ES	3	0	0	3
5.	21UBT205	**Principles of Biochemistry**	BS	3	0	0	3
PRACTICAL							
7.	21UGS210	**Basic Sciences Laboratory - II (Common to ALL except CSBS)**	BS	0	0	2	1
8.	21UBT211	**Microbiology Laboratory**	ES	0	0	3	1.5
MANDATORY							
9.	21UGM231	**Environmental Science (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.	21UMA326	**Transform Techniques and Partial Differential Equations (Common to AGRI, BME & BT)**	**BS**	**3**	**1**	**0**	**4**
2.	21UBT302	**Stoichiometry and Fluid Mechanics**	**ES**	**3**	**0**	**0**	**3**
3.	21UBT303	**Applied Thermodynamics for Biotechnologists**	**PC**	**3**	**0**	**0**	**3**
4.	21UBT304	**Cell Biology**	**PC**	**3**	**0**	**0**	**3**
5.	21UBT305	**Biochemical Metabolism**	**PC**	**3**	**0**	**0**	**3**
6.	21UBT503	**Enzyme Engineering and Technology**	**PC**	**3**	**0**	**0**	**3**
PRACTICAL							
6.	21UBT306	**Biochemistry Laboratory**	**PC**	**0**	**0**	**3**	**1.5**
7.	21UBT307	**Cell Biology Laboratory**	**PC**	**0**	**0**	**3**	**1.5**
			Total	**18**	**1**	**6**	**22**
Total Credits : 22							

SEMESTER IV

S.No.	Course Code	Course Title	Course Category	L	T	P	C
THEORY							
1.	21UMA424	**Probability and Inferential Statistics (Common to BT & BME)**	**BS**	**3**	**1**	**0**	**4**
2.	21UBT402	**Bioprocess Principles**	**PC**	**3**	**0**	**0**	**3**
3.	21UBT403	**Basic Industrial Biotechnology**	**PC**	**3**	**0**	**0**	**3**
4.	21UBT404	**Protein Engineering**	**PC**	**3**	**0**	**0**	**3**
5.	21UBT405	**Principles of Genetics**	**PC**	**3**	**0**	**0**	**3**
PRACTICAL							
6.	21UBT406	**Chemical Engineering Laboratory**	**ES**	**0**	**0**	**3**	**1.5**
7.	21UBT407	**Instrumental Methods of Analysis Laboratory**	**PC**	**0**	**0**	**3**	**1.5**
MANDATORY							
8.	21UGM431	**Gender Equality (Common to ALL)**	**MC**	**1**	**0**	**0**	**P/F**
			Total	**19**	**1**	**8**	**19**
Total Credits : 19							

SEMESTER V

S.No.	Course Code	Course Title	Course Category	L	T	P	C
THEORY							
1.	21UBT501	**Molecular Biology**	PC	3	0	0	3
2.	21UBT502	**Bioprocess Engineering**	PC	3	0	0	3
3.	21UBT503	**Enzyme Engineering and Technology**	ES	3	0	0	3
4.	21UBT504	**Mass Transfer Operations**	PE	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.	21UBT507	**Molecular Biology Laboratory**	PC	0	0	4	1.5
8.	21UBT508	**Bioprocess Laboratory - II**	PC	0	0	4	1.5
SPECIAL COURSE							
9.	21UBT507	**Creative Thinking and Innovation**	P	0	0	2	1
10.	21UGS533	**Interpersonal Skills Laboratory (Common to Mech, Civil, BT & BME)**	HS	0	0`	3	1.5
MANDATORY							
11.	21UGT140	**Heritage of Tamils**	MC	1	0	0	1
			Total	15	0	13	24.5
		Total Credits : 24.5					

SEMESTER VI

S.No.	Course Code	Course Title	Course Category	L	T	P	C
THEORY							
1.	21UBT601	**Genetic Engineering**	PC	3	0	0	3
2.	21UBT602	**Bioinformatics**	PC	3	0	0	3
3.	PE – II	**Professional Elective – II**	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.	21UBT606	**Genetic Engineering Laboratory**	PC	0	0	3	1.5
7.	21UBT608	**Bioinformatics Laboratory**	PC	0	0	3	1.0
SPECIAL COURSE							
8.	21UBT607	**Product Development Project**	P	0	0	8	4
9.	21UGS631	**Logical Reasoning and Aptitude (Common to Civil, BT & BME)**	HS	1	0	0	1
10.	21UGS632	**Soft skills and Communication Laboratory**	HS	0	0	2	1
MANDATORY							
11.	21UGM631	**Indian Constitution (Common to ALL)**	MC	1	0	0	P/F
			Total	17	0	16	23.5
		Total Credits : 23.5					

SEMESTER VII

S.No.	Course Code	Course Title	Course Category	L	T	P	C
THEORY							
1.	21UME701	**Project Management and Finance (Common to ALL except CSBS)**	HS	3	0	0	3
2.	21UBT702	**Downstream Processing**	PC	3	0	0	3
3.	21UBT703	**Immunology**	PC	3	0	0	3
4.	PE – IV	**Professional Elective – IV**	PE	3	0	0	3
5.	PE – V	**Professional Elective – V**	PE	3	0	0	3
6.	OE – III	**Open Elective – III**	OE	3	0	0	3
PRACTICAL							
7.	21UBT707	**Downstream Processing Laboratory**	PC	0	0	3	1.5
8.	21UBT708	**Immunology Laboratory**	PC	0	0	3	1.5
9.	21UGE710	**MDP Phase - I**	PW				
MANDATORY							
10.	21UGM731	**Sports & Social Development (Common to ALL)**	MC	-	-	-	P/F
11.	21UGM732	**Skill Development (Common to ALL)**	MC	-	-	-	P/F
			Total	18	0	9	21
		Total Credits : 21					

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.	21UBT801	Project work	P	0	0	16	8
MANDATORY							
4.	21UGM831	Professional Ethics and Human Values (Common to ALL)	MC	1	0	0	P/F
			Total	7	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 : 21BTV100 BIOPROCESS TECHNOLOGY							
1.	21BTV101	Fermentation Technology	3	0	0	3
2.	21BTV102	Environmental Biotechnology	3	0	0	3
3.	21BTV103	Bioprocess Modelling	3	0	0	3
4.	21BTV104	Biopharmaceutical Technology	3	0	0	3
5.	21BTV105	Bioreactor Design and Scale up process	3	0	0	3
6.	21BTV106	Biofuel Technology	3	0	0	3
7.	21BTV107	Metabolic Engineering	3	0	0	3
Vertical - II : 21BTV200 BIOSCIENCES						
1.	21BTV201	Genomics and Proteomics	3	0	0	3
2.	21BTV202	Fundamentals of Nanotechnology	3	0	0	3
3.	21BTV203	Marine Biotechnology	3	0	0	3
4.	21BTV204	Stem Cell technology	3	0	0	3
5.	21BTV205	Neurobiology and Cognitive Sciences	3	0	0	3
6.	21BTV206	Human Physiology	3	0	0	3
7.	21BTV207	Biosensors in Disease Management	3	0	0	3
Vertical - III : 21BTV300 MEDICAL BIOTECHNOLOGY						
1.	21BTV301	Cancer Biology	3	0	0	3
2.	21BTV302	Tissue Engineering	3	0	0	3
3.	21BTV303	Nanomedicine for Theranostics	3	0	0	3
4.	21BTV304	Molecular Pathogenesis	3	0	0	3
5.	21BTV305	Vaccine Technology	3	0	0	3
6.	21BTV306	Molecular Therapeutics & Diagnostics	3	0	0	3
7.	21BTV307	Biomedical Engineering	3	0	0	3
Vertical - IV : 21BTV400 COMPUTATIONAL BIOTECHNOLOGY						
1.	21BTV401	Programming for Bioinformatics Applications	3	0	0	3
2.	21BTV402	Fundamentals of Algorithms for Bioinformatics	3	0	0	3
3.	21BTV403	Computer Aided Drug Design	3	0	0	3
4.	21BTV404	Metabolomics and Metabolic Engineering	3	0	0	3
5.	21BTV405	Molecular Modelling	3	0	0	3
6.	21BTV406	Data Mining And Machine Learning Techniques For Bioinformatics	3	0	0	3
Vertical - V : 21BTV500 AGRO BIOTECHNOLOGY						
1.	21BTV501	Plant Anatomy	3	0	0	3

2.	21BTV502	Plant Biotechnology	3	0	0	3
3.	21BTV503	Plant molecular Farming	3	0	0	3
4.	21BTV504	Plant tissue culture	3	0	0	3
5.	21BTV505	Biotechnological approach in crop improvement	3	0	0	3
6.	21BTV506	Therapeutic applications of phytochemicals	3	0	0	3
7.	21BTV507	Bio fertilizer production and Mushroom cultivation	3	0	0	3
Vertical - VI : 21BTV600 ANIMAL BIOTECHNOLOGY						
1.	21BTV601	Fundamentals of Animal Biotechnology	3	0	0	3
2.	21BTV602	Animal Health and Nutrition	3	0	0	3
3.	21BTV603	Animal Physiology & Metabolism	3	0	0	3
4.	21BTV604	Animal cell culture Technology	3	0	0	3
5.	21BTV605	Advances in Animal Biotechnology	3	0	0	3
6.	21BTV606	Tissue Engineering	3	0	0	3
7.	21BTV607	Dairy Technology	3	0	0	3

GENERAL VERTICALS FOR MINOR DEGREE

S. No.	Course Code	Course Title	L	T	P	C
		Vertical – 21CBVG00 Fintech and Block Chain				
1.	21CBVG01	Financial Management	3	0	0	3
2.	21CBVG02	Fundamentals of Investment	3	0	0	3
3.	21CBVG03	Banking, Financial Services and Insurance	3	0	0	3
4.	21CBVG04	Introduction to Blockchain and its Applications	3	0	0	3
5.	21CBVG05	Fintech Personal Finance and Payments	3	0	0	3
6.	21CBVG06	Introduction to Fintech	3	0	0	3
		Vertical – 21MEVG00 Entrepreneurship				
1.	21MEVG01	Foundations of Entrepreneurship	3	0	0	3
2.	21MEVG02	Team Building & Leadership Management forBusines	3	0	0	3
3.	21MEVG03	Creativity & Innovation in Entrepreneurship	3	0	0	3
4.	21MEVG04	Principles of Marketing Management for Business	3	0	0	3
5.	21MEVG05	Human Resource Management for Entrepreneurs	3	0	0	3
6.	21MEVG06	Financing New Business Ventures	3	0	0	3
		Vertical – 21EEVG00 Public Administration				
1.	21EEVG01	Principles of Public Administration	3	0	0	3
2.	21EEVG02	Constitution of India	3	0	0	3
3.	21EEVG03	Public Personnel Administration	3	0	0	3
4.	21EEVG04	Administrative Theories	3	0	0	3
5.	21EEVG05	Indian Administrative System	3	0	0	3
6.	21EEVG06	Public Policy Administration	3	0	0	3
		Vertical – 21CSVG00 Business Data Analytics				
1.	21CSVG01	Statistics for Management	3	0	0	3
2.	21CSVG02	Data mining for Business Intelligence	3	0	0	3
3.	21CSVG03	Human Resource Analytics	3	0	0	3
4.	21CSVG04	Marketing and Social Media Web Analytics	3	0	0	3
5.	21CSVG05	Operation and Supply Chain Analytics	3	0	0	3
6.	21CSVG06	Financial Analytics	3	0	0	3
		Vertical – 21CEVG00 Environment and Sustainability				
1.	21CEVG01	Sustainable infrastructure Development	3	0	0	3
2.	21CEVG02	Sustainable Agriculture and EnvironmentalManagement	2	0	2	3
3.	21CEVG03	Sustainable Bio Materials	3	0	0	3
4.	21CEVG04	Materials for Energy Sustainability	3	0	0	3
5.	21CEVG05	Green Technology	3	0	0	3
6.	21CEVG06	Environmental Quality Monitoringand Analysis	3	0	0	3
7.	21CEVG07	Integrated Energy Planning for SustainableDevelopment	3	0	0	3
8.	21CEVG08	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.	21UCS971	Artificial Intelligence and machine Learning Fundamentals	3	0	0	3
2.	21UCD972	Data Science Fundamentals	3	0	0	3
3.	R21UEN971	English For Competitive Exam	3	0	0	3
4.	21UGR974	German for Engineers	3	0	0	3
Open Electives - II						
1.	21UEC976	IoT Concepts and Applications	3	0	0	3
2.	21UAD971	Augmented and Virtual Reality	3	0	0	3
3.	21UJN975	Japanese for Engineers	3	0	0	3
4.	21UEN972	Speak Better, Write Better	3	0	0	3
5.	21UFR973	French for Engineers	3	0	0	3
Open Electives - III						
1.	21UCB971	Digital Marketing Strategy	3	0	0	3
2.	21UCB973	Strategic Management and Leadership	3	0	0	3
3.	21UCS977	Mobile Application Development	3	0	0	3
4.	21UEC971	Automotive Electronics	3	0	0	3
5.	21UME976	Lean Concepts, Tools and Practices	3	0	0	3
6.	21UBM975	Robotics in Health Care	3	0	0	3
Open Electives - IV						
1.	21UBM974	Forensic Science	3	0	0	3
2.		Fire safety Engineering	3	0	0	3
3.	21UAD974	Working with Emotional Intelligence	3	0	0	3
4.	21UCD973	Digital Media and Society	3	0	0	3
5.	21UCS980	Web Technologies and Applications	3	0	0	3
6.	21UIT975	Introduction to 3D Animation	3	0	0	3
7.	21UME981	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.	21UBT861	Food microbiology and Fermentation laboratory	0	0	2	1
2.	21UBT862	Computational Reckoning of Bioprocess	0	0	2	1
3.	21UBT863	Automated Interactive Tools for Conformational Studies	0	0	2	1
4.	21UBT864	Introduction to Statistical Analysis System	1	0	0	1
5.	21UBT865	3D Bio-printing of Living tissues	1	0	0	1
6.	21UBT866	Introduction to PERL Programming & Bio-Perl	0	0	2	1
7.	21UBT867	Regulation Perspective of Clinical Research	1	0	0	1
8.	21UBT868	Introduction to Fuzzy Logic and Genetic Algorithms	0	0	2	1
9.	21UBT869	Numerical methods for Biotechnologists	1	0	0	1
10.	21UBT870	Biosafety Regulations	1	0	0	1
11.	21VBT01	Mushroom Farming	Value Added Course			
12.	21VBT02	Single Cell Protein Cultivation Strategies	Value Added Course			
13.	21VBT03	Synthesis of Nanoparticles & Characterization	Value Added Course			
14.	21VBT04	Statistical Tools for Biotechnologists	Value Added Course			
15.	21VBT05	Current Good Manufacturing Practices	Value Added Course			
16.	21VBT06	Industrial Training in Bioprocess Engineering	Value Added Course			
17.	21VBT07	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.	21UBT971	Herbal Medicines	OE	3	0	0	3
2.	21UBT972	Bionanotechnology	OE	3	0	0	3
3.	21UBT973	Nutraceuticals	OE	3	0	0	3
4.	21UBT974	Patents and Copyrights	OE	3	0	0	3
5.	21UBT975	Quality Assurance and Control In Food Industry	OE	3	0	0	3