SETHU INSTITUTE OF TECHNOLOGY

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

B.TECH. BIOTECHNOLOGY

REGULATIONS 2019

Estd : 1995

CURRICULUM AND SYLLABUS
(1st SEMESTER TO 8th SEMESTER)

(Applicable to candidates admitted from the Academic Year 2020 - 2021)

Approved in the Academic Council Meeting held on
25.09.2021

HEAD OF THE DEPARTMENT
Department of Biotechnology
Sethu Institute of Technology,
Pullor, Kariapatti-626 115

CHAIRMAN
ACADEMIC COUNCIL
Sethu Institute of Technology
Pulloor, Kariapatti - 625 115

DEPARTMENT OF BIOTECHNOLOGY

The Department of Biotechnology is established in the year 2020 to promote academic excellence in producing competent Biotechnologists. The B.Tech program has been approved by AICTE. The department has specialized faculty in the areas of Immunology, Bioprocess and Chemical Engineering, Genetic Engineering, Computational Biology and Nanobiotechnology. The students are trained to realize the need of Biotechnologists in the society and upgrade the recent advancements in the Biotechnology field.

VISION STATEMENT

- To achieve excellence in technical education and scientific research in the field of Biotechnology for the benefit of the society.

MISSION STATEMENT

- Providing quality technical education to enable the students to meet the industrial needs.
- Providing holistic learning environment to produce competent Biotechnologists.
- Enhancing professional skills towards employability and entrepreneurship in the field of Biotechnology.
- Fostering Industry Institute Interaction to upgrade recent technologies in the field of Biotechnology.
- Promoting scientific knowledge and creativity in research and development.
- Serving the society by imparting knowledge and providing solution in the field of Biotechnology.

PROGRAM EDUCATIONAL OBJECTIVES

1. Our graduates will practice as competent Biotechnologists by exhibiting the state of the art technical skills to cater to the needs of the Bio-industries. **[Core Competence]**

2. Our graduates will engage in research and sustained learning activities for solving real time problems in the society**. [Life-Long Learning]**

3. Our graduates will exhibit effective interpersonal skills in the industry and society. **[Professionalism]**

PROGRAM SPECIFIC OUTCOMES:

PSO-1 Our Engineering graduates will design solutions for complex engineering problems at the molecular level in the field of Genetic Engineering.

PSO-2 Our Engineering Graduates will design, perform and analyze the experiments using Bioreactors in the field of Bioprocess Engineering.

PSO -3 Our Engineering Graduates will design, model and analyze various computational methods using Bioinformatics databases to meet the industrial needs

PROGRAMME OUTCOMES:

The graduates of Biotechnology Program will have an ability to:

PO-1: Apply the knowledge of mathematics, science, engineering fundamentals and Engineering specialization to the solution of complex engineering problems. **(Engineering knowledge)**

PO-2: Identify, formulate, research literature, and analyze engineering problems to arrive at substantiated conclusions using first principles of mathematics, natural, and engineering sciences. **(Problem Analysis)**

PO-3: Design solutions for complex engineering problems and design system components, processes to meet the specifications with consideration for the public health and safety, and the cultural, societal, and environmental considerations. **(Design and Development of Solutions)**

PO-4: Use research-based knowledge including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions. **(Conduct investigations of complex problems)**

PO-5: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations. **(Modern Engineering Tools)**.

PO-6: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional

engineering practice. **(Engineer and Society)**.

PO-7: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development. **(Environment and sustainability)**

PO-8: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice. **(Ethics)**

PO-9: Function effectively as an individual, and as a member or leader in teams, and in multidisciplinary settings. **(Individual and Team Work)**.

PO-10: Communicate effectively with the engineering community and with society at large. Be able to comprehend and write effective reports documentation. Make effective presentations, and give and receive clear instructions. **(Communication)**.

PO-11: Demonstrate knowledge and understanding of engineering and management principles and apply these to one's own work, as a member and leader in a team. Manage projects in multidisciplinary environments. **(Project Management and Finance)**

PO-12: Recognize the need for, and have the preparation and ability to engage in independent and lifelong learning in the broadest context of technological change. **(Life-long learning)**

SETHU INSTITUTE OF TECHNOLOGY

Pulloor, Kariapatti - 626 115

(An Autonomous Institution)

B.Tech. Degree Programme

CHOICE BASED CREDIT SYSTEM

CURRICULUM

Regulation 2019

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	5.85%
2	Basic Science courses (BS)	9	27.5	16.08%
3	Engineering Science courses (ES)	7	17.5	10.23%
4	Professional Core courses (PC)	30	75	43.86%
5	Professional Elective (PE)	6	18	10.53%
6	Open Elective (OE)	4	12	7.02%
7	Project work (P)	4	11	6.43%
8	Mandatory Courses (MC)	5	--	--
TOTAL		71	171	100

COURSE CREDITS - SEMESTER WISE

Branch	I	II	III	IV	V	VI	VII	VIII	TOTAL
BT	23	20.5	22	23	23	23.5	22	14	171

Employability Courses
Skill Development Courses
Entrepreneurship Development Courses
Any two or all of the above

SEMESTER I

S.No.	Course Code	Course Title	Course Category	L	T	P	C
THEORY							
1.	19UEN101	English for Technical Communication (Common to ALL)	HS	2	0	0	2
2.	19UMA102	Engineering Mathematics – I (Common to ALL)	BS	3	1	0	4
3.	19UPH103	Engineering Physics (Common to ALL)	BS	3	0	0	3
4.	19UCY105	Applied Chemistry (Common to ECE, EEE, CSE, IT, BME & BT)	BS	3	0	0	3
5.	19UCS108	Problem Solving and PYTHON Programming (Common to ALL)	ES	3	0	0	3
6.	19UME109	Engineering Graphics (Common to ALL)	ES	3	1	0	4
PRACTICAL							
7.	19UCS110	Problem Solving and PYTHON Programming Laboratory (Common to ALL)	ES	0	0	3	1.5
8.	19UCS112	Engineering Fundamentals Lab (Common to ECE, CSE, IT, BME & BT)	ES	0	0	3	1.5
9.	19UGS113	Basic Sciences Laboratory (Common to ALL)	BS	0	0	2	1
MANDATORY							
10.	19UGM131	Induction Program (Common to ALL)	MC	0	0	2	P/F
			Total	17	2	10	23
Total Credits : 23							

SEMESTER II

S.No.	Course Code	Course Title	Course Category	L	T	P	C
THEORY							
1.	19UEN201	Communication Skills for Professionals	HS	1	0	1	1.5
2.	19UMA207	Calculus, Complex Analysis and Transform Techniques (Common to AGRI, CHE, BME & BT)	BS	3	1	0	4
3.	19UPH204	Biomaterial Physics (BME & BT)	BS	3	0	0	3
4.	19UCY204	Environmental Science (Common to ALL)	HS	3	0	0	3
5.	19UBT205	Microbiology	ES	3	0	0	3
6.	19UBT206	Principles of Biochemistry	ES	3	0	0	3
PRACTICAL							
7.	19UGS210	Energy and Environmental Science Laboratory (Common to ALL)	BS	0	0	3	1.5
8.	19UBT211	Biochemistry Laboratory	ES	0	0	3	1.5
			Total	16	1	7	20.5
Total Credits : 20.5							

SEMESTER III

S.No.	Course Code	Course Title	Course Category	L	T	P	C
THEORY							
1.	19UMA326	Transform Techniques and Partial Differential Equations (Common to AGRI, CHE, BME & BT)	BS	3	1	0	4
2.	19UBT302	Stoichiometry	PC	3	0	0	3
3.	19UBT303	Instrumental Methods of Analysis	PC	3	0	0	3
4.	19UBT304	Applied Thermodynamics for Biotechnologists	PC	3	0	0	3
5.	19UBT305	Principles of Genetics	PC	3	0	0	3
6.	19UBT306	Biochemical Metabolism	PC	3	0	0	3
PRACTICAL							
7.	19UBT307	Microbiology Laboratory	PC	0	0	3	1.5
8.	19UBT308	Instrumental Methods of Analysis 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.	19UMA424	Probability and Inferential Statistics	BS	3	1	0	4
2.	19UBT402	Cell Biology	PC	3	0	0	3
3.	19UBT403	Basic Industrial Biotechnology	PC	3	0	0	3
4.	19UBT404	Enzyme Engineering and Technology	PC	3	0	0	3
5.	19UBT405	Fluid Particle Mechanics & Mechanical Operations	PC	3	0	0	3
6.	19UBT406	Bioprocess Principles	PC	3	0	0	3
PRACTICAL							
7.	19UBT407	Cell Biology Laboratory	PC	0	0	3	1.5
8.	19UBT408	Fluid Particle Mechanics & Mechanical Operations Laboratory	PC	0	0	3	1.5
9.	19UBT409	Technical Seminar	P	0	0	2	1
MANDATORY							
10.	19UGM431	Gender Equality	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.	19UBT501	Molecular Biology	PC	3	0	0	3
2.	19UBT502	Bioprocess Engineering	PC	3	0	0	3
3.	19UBT503	Heat Transfer and Mass Transfer Operations	PC	3	0	0	3
4.	19UBT504	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.	19UBT508	Molecular Biology Laboratory	PC	0	0	3	1.5
8.	19UBT509	Bioprocess Principles Laboratory	PC	0	0	3	1.5
9.	19UGM507	Creative Thinking and Innovation	P	0	0	2	1
10.	19UGS533	Interpersonal Skills Laboratory	HS	0	0	2	1
			Total	18	0	10	23
Total Credits : 23							

SEMESTER VI

S.No.	Course Code	Course Title	Course Category	L	T	P	C
THEORY							
1.	19UBT601	Genetic Engineering	PC	3	0	0	3
2.	19UBT602	Genomics And Proteomics	PC	3	0	0	3
3.	19UBT603	Bioethics, IPR and Biosafety	PC	3	0	0	3
4.	PE – II	Professional Elective – II	PE	3	0	0	3
5.	PE – III	Professional Elective – III	PE	3	0	0	3
6.	OE – II	Open Elective – II	OE	3	0	0	3
PRACTICAL							
7.	19UBT608	Genetic Engineering Laboratory	PC	0	0	3	1.5
8.	19UBT609	Bioprocess Engineering Laboratory	PC	0	0	3	1.5
9.	19UGS631	Logical Reasoning and Aptitude	HS	1	0	0	1
10.	19UGS632	Soft skills and Communication Laboratory	HS	0	0	3	1.5
MANDATORY							
11.	19UGM632	Indian Constitution and Essence of Indian Traditional Knowledge (Common to BME, CSE, ECE, IT & BT)	MC	1	0	0	P/F
			Total	20	0	9	23.5
Total Credits : 23.5							

SEMESTER VII

S.No.	Course Code	Course Title	Course Category	L	T	P	C
THEORY							
1.	19UBT701	Downstream Processing	PC	3	0	0	3
2.	19UBT702	Immunology– Basics for Immunotechnology	PC	3	0	0	3
3.	19UBT703	Bioinformatics	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.	19UBT707	Summer Internship	P	0	0	0	1
8.	19UBT708	Downstream Processing Laboratory	PC	0	0	3	1.5
9.	19UBT709	Immunology Laboratory	PC	0	0	3	1.5
MANDATORY							
10.	19UGM731	Professional Ethics and Human Values	MC	2	0	0	P/F
			Total	20	0	6	22
Total Credits : 22							

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.	19UBT801	Project work	P	0	0	16	8
			Total	6	0	16	14
Total Credits : 14							

LIST OF ELECTIVES

S.No.	Course Code	Course Title	L	T	P	C
1.	19UBT901	Artificial Intelligence in Biotechnology	3	0	0	3
2.	19UBT902	Bioremediation Technology	3	0	0	3
3.	19UBT903	Biopharmaceutical Technology	3	0	0	3
4.	19UBT904	Principles of food processing	3	0	0	3
5.	19UBT905	Process Economics and Plant Design	3	0	0	3
6.	19UBT906	Molecular Pathogenesis of Infectious Diseases	3	0	0	3
7.	19UBT907	Stem Cell Technology in Healthcare	3	0	0	3
8.	19UBT908	Molecular Farming	3	0	0	3
9.	19UBT909	Marine Biotechnology	3	0	0	3
10.	19UBT910	Cancer Biology	3	0	0	3
11.	19UBT911	Biofuel	3	0	0	3
12.	19UBT912	Nano Medicine	3	0	0	3
13.	19UBT913	Therapeutic nutrition	3	0	0	3
14.	19UBT914	Fundamentals of Nanotechnology	3	0	0	3
15.	19UBT915	Vaccine Technology	3	0	0	3
16.	19UBT916	Bioreactor Engineering and Design	3	0	0	3
17.	19UBT917	Molecular Diagnostics	3	0	0	3
18.	19UBT918	Preclinical and Clinical Regulatory affairs	3	0	0	3
19.	19UBT919	Systems Biology	3	0	0	3
20.	19UBT920	Neurobiology and Cognitive Sciences	3	0	0	3
21.	19UBT921	Biochemical Toxicology and Degenerative Diseases	3	0	0	3
22.	19UBT922	Metabolic Engineering	3	0	0	3
23.	19UBT923	Environmental Biotechnology	3	0	0	3
24.	19UBT924	Biotechnology in Hazardous Waste Management	3	0	0	3
25.	19UBT925	Bioplastics	3	0	0	3

LIST OF OPEN ELECTIVES

S.No.	Course Code	Course Title	Course Category	L	T	P	C
1.	19UBT971	Herbal Medicines	OE	3	0	0	3
2.	19UBT972	Quality Assurance and Control In Food Industry	OE	3	0	0	3
3.	19UBT973	Food Packaging and System Development	OE	3	0	0	3
4.	19UBT974	Nanomedicine for Cancer Treatment	OE	3	0	0	3
5.	19UBT975	Patents and Copyright	OE	3	0	0	3

LIST OF ONE CREDIT COURSES

S.No.	Course Code	Course Title	L	T	P	C
1.	19UBT861	Food microbiology and Fermentation laboratory	0	0	2	1
2.	19UBT862	Computational Reckoning of Bioprocess	0	0	2	1
3.	19UBT863	Automated Interactive Tools for Conformational Studies	0	0	2	1
4.	19UBT864	Environmental Engineering Laboratory	0	0	2	1
5.	19UBT865	3D Bio-printing of Living tissues	0	0	2	1
6.	19UBT866	Introduction to PERL Programming & Bio-Perl	0	0	2	1
7.	19UBT867	Bioentrepreneurship	0	0	2	1
8.	19UBT868	Regulation Perspective of Clinical Research	1	0	0	1
9.	19UBT869	Introduction to Fuzzy Logic and Genetic Algorithms	1	0	0	1
10.	19UBT870	Numerical methods for Biotechnologists	1	0	0	1