SCHOOL OF BIO SCIENCES AND TECHNOLOGY

B.Tech Biotechnology

(B.Tech BBT)

Curriculum

(2020-2021 admitted students)

VISION STATEMENT OF VELLORE INSTITUTE OF TECHNOLOGY

Transforming life through excellence in education and research.

MISSION STATEMENT OF VELLORE INSTITUTE OF TECHNOLOGY

World class Education: Excellence in education, grounded in ethics and critical thinking, for improvement of life.

Cutting edge Research: An innovation ecosystem to extend knowledge and solve critical problems.

Impactful People: Happy, accountable, caring and effective workforce and students.

Rewarding Co-creations: Active collaboration with national & international industries & universities for productivity and economic development.

Service to Society: Service to the region and world through knowledge and compassion.

VISION STATEMENT OF THE SCHOOL OF BIO SCIENCES AND TECHNOLOGY

To nurture high-quality bioengineers and science graduates with the potential to innovate, invent and disseminate knowledge for the benefit of society and environment.

MISSION STATEMENT OF THE SCHOOL OF BIO SCIENCES AND TECHNOLOGY

- To create opportunities for multi-disciplinary education, training and research in biotechnology and bio-sciences.

- To instill a spirit of innovation and creativity in young minds from across the globe with sound research aptitude.

- To foster ethically strong biologists who effectively contribute towards the growth of the nation.

B.TECH BIOTECHNOLOGY

PROGRAMME EDUCATIONAL OBJECTIVES (PEOs).

1. Graduates will be engineering practitioners and leaders, who would help solve industry's technological problems

2. Graduates will be engineering professionals, innovators or entrepreneurs engaged in technology development, technology deployment, or engineering system implementation in industry

3. Graduates will function in their profession with social awareness and responsibility

4. Graduates will interact with their peers in other disciplines in industry and society and contribute to the economic growth of the country

5. Graduates will be successful in pursuing higher studies in engineering or management

6. Graduates will pursue career paths in teaching or research

B.TECH BIOTECHNOLOGY

PROGRAMME OUTCOMES (POs).

PO_01: Having an ability to apply mathematics and science in engineering applications.

PO_02: Having a clear understanding of the subject related concepts and of contemporary issues and apply them to identify, formulate and analyse complex engineering problems.

PO_03: Having an ability to design a component or a product applying all the relevant standards and with realistic constraints, including public health, safety, culture, society and environment

PO_04: Having an ability to design and conduct experiments, as well as to analyse and interpret data, and synthesis of information

PO_05: Having an ability to use techniques, skills, resources and modern engineering and IT tools necessary for engineering practice

PO_06: Having problem solving ability- to assess social issues (societal, health, safety, legal and cultural) and engineering problems

PO_07: Having adaptive thinking and adaptability in relation to environmental context and sustainable development

PO_08: Having a clear understanding of professional and ethical responsibility

PO_09: Having cross cultural competency exhibited by working as a member or in teams

PO_10: Having a good working knowledge of communicating in English – communication with engineering community and society

PO_11: Having a good cognitive load management skills related to project management and finance

PO_12: Having interest and recognise the need for independent and lifelong learning

B.TECH BIOTECHNOLOGY

PROGRAMME SPECIFIC OUTCOMES (PSOs)

On completion of B. Tech. (Biotechnology) programme, graduates will be able to

- PSO1: Apply knowledge to find innovative solutions for biotechnological problems

- PSO2: Explore problems related to biotechnology and provide valid conclusions through industry-academia interface

- PSO3: Infer the potentials and impact of biotechnological innovations for finding sustainable ethical solutions to issues pertaining to health, environment and agriculture

B.TECH BIOTECHNOLOGY

CREDIT STRUCTURE

Category-wise Credit distribution

Category	Credits
University core (UC)	70
Programme core (PC)	51
Programme elective (PE)	47
University elective (UE)	12
Bridge course (BC)	4 (Not counted for credits)
Total credits	**180**

B.TECH BIOTECHNOLOGY

DETAILED CURRICULUM

University Core

S. No.	Course Code	Course Title	L	T	P	J	C
1	BIT3099	Industrial Internship	0	0	0	0	2
2	BIT1901	Technical Answers for Real World Problems (TARP)	1	0	0	4	2
3	BIT4098	Comprehensive Examination	0	0	0	0	2
4	BIT4099	Capstone Project	0	0	0	0	20
5	CHY1002	Environmental Sciences	3	0	0	0	3
6	CHY1701	Engineering Chemistry	3	0	2	0	4
7	CSE1001	Problem Solving and Programming	0	0	6	0	3
8	CSE1002	Problem Solving and Object Oriented Programming	0	0	6	0	3
9	ENG1011	English for Engineers	0	0	4	0	2
10	FLC4097	Foreign Language Course Basket	0	0	0	0	2
11	HUM1021	Ethics and Values	2	0	0	0	2
12	MAT1011	Calculus for Engineers	3	0	2	0	4
13	MAT2001	Statistics for Engineers	2	1	2	0	4
14	MGT1022	Lean Start-up Management	1	0	0	4	2

15	PHY1701	Engineering Physics	3	0	2	0	4
16	PHY1999	Introduction to Innovative Projects	1	0	0	4	2
17	EXC4097	Co-Extra Curricular Basket	0	0	0	0	2
18	STS4097	Soft Skills Course Basket	0	0	0	0	6

B.TECH BIOTECHNOLOGY

Programme Core

S. No.	Course Code	Course Title	L	T	P	J	C
1	BIT1005	Biochemistry	3	0	2	0	4
2	BIT1006	Cell Biology and Genetics	3	0	2	0	4
3	BIT1007	Microbiology	2	0	2	4	4
4	BIT1008	Principles of Chemical Engineering	3	0	2	0	4
5	BIT2004	Bioinformatics	2	0	2	0	3
6	BIT2005	Analytical Techniques in Biotechnology	3	0	4	0	5
7	BIT2006	Molecular Biology	3	0	2	0	4
8	BIT2007	Down Stream Processing	2	1	2	0	4
9	BIT2008	Immunology and Immunotechnology	3	0	2	0	4
10	BIT2017	Industrial Biotechnology	3	0	0	4	4
11	BIT2020	Chemical Reaction Engineering and Unit Operations	2	1	0	0	3

| 12 | BIT3006 | Genetic Engineering | 3 | 0 | 2 | 0 | 4 |
| 13 | BIT3012 | Bioprocess Engineering and Bioreactor Design | 2 | 1 | 2 | 0 | 4 |

B.TECH BIOTECHNOLOGY

Programme Electives

S. No.	Course Code	Course Title	L	T	P	J	C
1	BIT1002	Biostatistics	3	0	0	0	3
2	BIT1009	Biobusiness	3	0	0	4	4
3	BIT1010	Computational Biochemistry	2	0	0	4	3
4	BIT1011	Social Entrepreneurship	2	0	0	4	3
5	BIT2009	Protein Engineering and Design	3	0	0	4	4
6	BIT2010	Pharmaceutical Biotechnology	3	0	0	4	4
7	BIT2011	Developmental Biology and Regenerative Medicine	3	0	0	0	3
8	BIT2012	Metabolic Engineering	3	0	0	0	3
9	BIT2013	Industrial Enzymology	3	0	0	0	3
10	BIT2014	Proteomics	2	0	2	0	3
11	BIT2015	Stem Cell Technology	3	0	2	0	4
12	BIT2016	Cancer Biology and Informatics	3	0	0	0	3
13	BIT2018	Food Biotechnology	3	0	0	0	3
14	BIT2019	Environmental Biotechnology	2	0	0	4	3

15	BIT2021	Mass and Heat Transfer Operations	2	1	0	0	3
16	BIT3004	Nanobiotechnology	3	0	0	4	4
17	BIT3005	Biological Spectroscopy	3	0	0	0	3
18	BIT3007	Animal Biotechnology	3	0	2	0	4
19	BIT3008	Plant Biotechnology	3	0	0	0	3
20	BIT3009	Forensic Science and Technology	3	0	0	4	4
21	BIT3010	Food Process Technology	2	0	0	4	3
22	BIT3011	Plant Cell and Tissue Culture	2	0	4	0	4
23	BIT4001	Bioprocess Plant Design, Economics and Optimization	3	0	0	0	3
24	BIT4002	Medical Diagnostics	3	0	0	4	4
25	BIT4003	Molecular Modelling and Drug Design	3	0	0	0	3
26	BIT4004	Tissue Engineering	3	0	0	4	4
27	BIT4005	Genomics	2	0	2	0	3
28	BIT4006	Neurobiology and Cognitive Science	3	0	0	4	4

University Electives (12 credits)

S. No.	Course Code	Course Title	L	T	P	J	C
1	UE	Management Course Basket/ Humanity Course Basket/ Other school Basket/ SBST school Basket					

University Electives (School Basket Course for B.Tech Biotechnology Students)

S. No.	Course Code	Course Title	L	T	P	J	C
1	BIT1026	Food, Nutrition And Health	3	0	0	0	3
2	BIT1027	Introduction to Research Methods	2	0	0	4	3
3	BIT1028	Bio-inspired design	2	0	0	4	3

Bridge Courses (Not counted for Credits)

S. No.	Course Code	Course Title	L	T	P	J	C
1	BIT1001	Introduction to Life Sciences	4	0	0	0	4
2	MAT1001	Fundamentals of Mathematics	3	2	0	0	4
3	ENG1002	Effective English	0	0	4	0	2

Management courses

Sl.No	Code	Title	L	T	P	J	C
1	MGT1001	Basic Accounting	3	0	0	0	3
2	MGT1002	Principles of Management	2	0	0	4	3
3	MGT1003	Economics for Engineers	2	0	0	4	3
4	MGT1004	Resource Management	2	0	0	4	3
5	MGT1005	Design, Systems and Society	2	0	0	4	3
6	MGT1006	Environmental and Sustainability Assessment	2	0	0	4	3

7	MGT1007	Gender, Culture and Technology	2	0	0	4	3
8	MGT1008	Impact of Information Systems on Society	2	0	0	4	3
9	MGT1009	Technological Change and Entrepreneurship	2	0	0	4	3
10	MGT1010	Total Quality Management	2	2	0	0	3
11	MGT1014	Supply Chain Management	3	0	0	0	3
12	MGT1015	Business Mathematics	3	0	0	0	3
13	MGT1016	Intellectual Property Rights	3	0	0	0	3
14	MGT1017	Business Regulatory Framework For Start-ups	3	0	0	0	3
15	MGT1018	Consumer Behaviour	3	0	0	0	3
16	MGT1019	Services Marketing	3	0	0	0	3
17	MGT1020	Marketing Analytics	2	0	2	0	3
18	MGT1021	Digital and Social Media Marketing	3	0	0	0	3
19	MGT1022	Lean Start-up Management	1	0	0	4	2
20	MGT1023	Fundamentals of Human Resource Management	3	0	0	4	4
21	MGT1024	Organizational Behaviour	3	0	0	4	4
22	MGT1025	Foundations of Management And Organizational Behaviour	3	0	0	4	4
23	MGT1026	Information Assurance and Auditing	2	0	0	4	3
24	MGT1028	Accounting and Financial Management	2	2	0	4	4

25	MGT1029	Financial Management	2	1	0	4	4
26	MGT1030	Entrepreneurship Development	3	0	0	4	4
27	MGT1031	International Business	3	0	0	4	4
28	MGT1032	Managing Asian Business	3	0	0	4	4
29	MGT1033	Research Methods in Management	2	1	0	4	4
30	MGT1034	Project Management	3	0	0	4	4
31	MGT1035	Operations Management	3	0	0	0	3
32	MGT1036	Principles of Marketing	3	0	0	4	4
33	MGT1037	Financial Accounting and Analysis	2	1	0	4	4
34	MGT1038	Financial Econometrics	2	0	0	4	3
35	MGT1039	Financial Markets and Institutions	2	0	0	4	3
36	MGT1040	Personal Financial Planning	2	0	0	4	3
37	MGT1041	Financial Derivatives	2	1	0	4	4
38	MGT1042	Investment Analysis and Portfolio Management	2	0	0	4	3
39	MGT1043	Applications in Neuro Marketing	3	0	0	4	4
40	MGT1044	Global Brand Marketing Strategies	3	0	0	4	4
41	MGT1045	Industrial Marketing	3	0	0	4	4
42	MGT1046	Sales and Distribution Management	3	0	0	4	4
43	MGT1047	Social Marketing	3	0	0	4	4

44	MGT1048	Political Economy of Globalization	3	0	0	4	4
45	MGT1049	Sustainable Business Models	3	0	0	4	4
46	MGT1050	Software Engineering Management	2	0	0	4	3
47	MGT1051	Business Analytics for Engineers	2	2	0	0	3
48	MGT1052	Bottom of the Pyramid Operations	3	0	0	0	3
49	MGT1053	Entrepreneurship Development, Business Communication and IPR	1	0	2	0	2
50	MGT1054	Product Planning and Strategy	2	2	0	0	3
51	MGT1055	Design Management	2	2	0	0	3
52	MGT1056	Accounting and Financial Management	3	0	0	4	4
53	MGT6001	Organizational Behaviour	2	0	0	4	3

Humanities courses

Sl.No	Code	Title	L	T	P	J	C
1	HUM1001	Fundamentals of Cyber Laws	3	0	0	0	3
2	HUM1002	Business Laws	3	0	0	0	3
3	HUM1003	Basic Taxation for Engineers	3	0	0	0	3
4	HUM1004	Corporate Law for Engineers	3	0	0	0	3
5	HUM1005	Cost Accounting for Engineers	3	0	0	0	3
6	HUM1006	Business Accounting for Engineers	3	0	0	0	3

7	HUM1007	Contemporary Legal Framework for Business	3	0	0	0	3
8	HUM1009	International Business	3	0	0	0	3
9	HUM1010	Foreign Trade Environment	3	0	0	0	3
10	HUM1011	Export Business	3	0	0	0	3
11	HUM1012	Introduction to Sociology	3	0	0	0	3
12	HUM1013	Population Studies	3	0	0	0	3
13	HUM1021	Ethics and Values	2	0	0	0	2
14	HUM1022	Psychology in Everyday Life	2	0	0	4	2
15	HUM1023	Indian Heritage and Culture	2	0	0	4	2
16	HUM1024	India and Contemporary World	2	0	0	4	2
17	HUM1025	Indian Classical Music	1	0	2	4	1
18	HUM1033	Micro Economics	3	0	0	0	3
19	HUM1034	Macro Economics	3	0	0	0	3
20	HUM1035	Introductory Econometrics	2	0	2	0	2
21	HUM1036	Engineering Economics and Decision Analysis	2	0	0	4	2
22	HUM1037	Applied Game Theory	2	0	0	4	2
23	HUM1038	International Economics	3	0	0	0	3
24	HUM1039	Community Development in India	2	0	0	4	2
25	HUM1040	Indian Social Problems	3	0	0	0	3

26	HUM1041	Indian Society Structure and Change	3	0	0	0	3
27	HUM1042	Industrial Relations and Labour Welfare in India	3	0	0	0	3
28	HUM1043	Mass Media and Society	2	0	0	4	2
29	HUM1044	Network Society	3	0	0	0	3
30	HUM1045	Introduction to Psychology	2	0	2	0	2
31	HUM1706	Business Accounting for Engineers	3	0	0	0	3