VINAYAKA MISSION'S RESEARCH FOUNDATION
(Deemed to be University under section 3 of the UGC Act 1956)

Faculty of Engineering and Technology

REGULATIONS 2025

DEPARTMENT OF BIOTECHNOLOGY

Programme

M. Tech. BIOTECHNOLOGY

(Full Time)

CHOICE BASED CREDIT SYSTEM (CBCS)

CURRICULUM AND SYLLABUS

(Semester I to IV)

PROGRAMME OUTCOMES

Post Graduates will be able to:

PO1	An ability to independently carry out research /investigation and development work to solve practical problems
PO2	An ability to write and present a substantial technical report/document
PO3	Students should be able to demonstrate a degree of mastery over the area as per the specialization of the program. The mastery should be at a level higher than the requirements in the appropriate bachelor program

PROGRAMME EDUCATIONAL OBJECTIVES (PEOS)

PEO1	Graduates will develop advanced theoretical knowledge and practical research skills in biotechnology, enabling them to design, analyze, and innovate biological systems, processes, and products.
PEO2	Graduates will excel in biotechnology-related industries, research organizations, and academia by demonstrating technical proficiency, ethical responsibility, teamwork, and leadership in solving complex biological and environmental challenges
PEO3	Graduates will engage in lifelong learning, adapt to emerging technologies, and contribute to sustainable development by applying biotechnological solutions that address societal, environmental, and health-related needs.

PROGRAMME SPECIFIC OBJECTIVES (PSO)

Upon successful completion of the course the students are expected:

PSO1	Graduates will be able to apply advanced knowledge of molecular biology, genetic engineering, bioprocess technology, and computational tools to analyze, design, and optimize biological systems and biotechnological processes.
PSO2	Graduates will be capable of conducting independent and collaborative research using modern laboratory techniques, data analytics, and biotechnological methodologies to develop innovative solutions for healthcare, agriculture, environment, and industrial biotechnology.
PSO3	Graduates will demonstrate proficiency in translating biotechnological concepts into practice through project management, adherence to biosafety and bioethics, and effective communication to meet industrial, regulatory, and societal needs.

Mapping of PEOs with POs for M. Tech. (BTE) Programme

PEO\PO	1	2	3
1	S	M	S
2	S	M	S
3	M	S	M

S- Strong Correlation, M – Medium Correlation, L – Low Correlation

VINAYAKA MISSIONS RESEARCH FOUNDATION
FACULTY OF ENGINEERING AND TECHNOLOGY

STRUCTURE OF PG ENGINEERING PROGRAM – REGULAR STUDENTS

<table>
<tr><th>S. No</th><th>Category of courses (credits)</th><th colspan="2">Type of courses</th><th>Suggested break up of credits (min-max)</th></tr>
<tr><td rowspan="2">1.</td><td rowspan="2">A. Foundation courses (5)</td><td colspan="2">Mathematics/Applied Mathematics</td><td>3</td></tr>
<tr><td colspan="2">Research Methodology and IPR</td><td>2</td></tr>
<tr><td>2.</td><td>B. Professional core courses (32)</td><td colspan="2">Core courses</td><td>32</td></tr>
<tr><td rowspan="3">3.</td><td rowspan="3">C. Elective courses (19)</td><td colspan="2">Professional electives</td><td>15</td></tr>
<tr><td rowspan="2">Open electives</td><td>Interdepartmental Open electives</td><td>3</td></tr>
<tr><td>University Multidisciplinary open elective</td><td>1</td></tr>
<tr><td rowspan="3">4.</td><td rowspan="3">D. Employability Enhancement Courses and courses for presentation of Technical skills related to the specialization (19)</td><td colspan="2">Project work phase I</td><td>6</td></tr>
<tr><td colspan="2">Project work phase II</td><td>12</td></tr>
<tr><td colspan="2">Internship</td><td>1</td></tr>
<tr><td>5.</td><td>E. Mandatory Courses**</td><td colspan="2">1. English for Research Paper Writing
2. Personality Development Through Life Enlighten Skills</td><td>1

1</td></tr>
<tr><td colspan="3">Minimum credits to be earned</td><td>77</td></tr>
<tr><td colspan="5">** The credits earned in category ‘’E‟ Courses will not be counted in CGPA calculation</td></tr>
</table>

CURRICULUM

M.TECH.BIOTECHNOLOGY

SEMESTER I TO IV

A. FOUNDATION COURSES – CREDITS (5)									
S. NO	**CODE**	**COURSE**	**OFFERING DEPT**	**CATEGORY**	**L**	**T**	**P**	**C**	**PREREQUISITE**
1	48125B01	APPLIED MATHEMATICS FOR BIO-ENGINEERING	MATH	FC-BS	2	1	0	3	NIL
2	48125H01	RESEARCH METHODOLOGY AND IPR	BTE	FC-HS	2	0	0	2	NIL
B. PROFESSIONAL CORE COURSES									
CORE COURSES - CREDITS (32)									
S. NO	**CODE**	**COURSE**	**OFFERING DEPT**	**CATEGORY**	**L**	**T**	**P**	**C**	**PREREQUISITE**
1	48125C01	ADVANCED BIOCHEMISTRY	BTE	CC	3	0	0	3	NIL
2	48125C02	MICROBIAL TECHNOLOGY	BTE	CC	3	0	0	3	NIL
3	48125C03	CHEMICAL TECHNOLOGY IN BIOENGINEERING	BTE	CC	4	0	0	4	NIL
4	48125C04	SYSTEM BIOLOGY	BTE	CC	3	0	0	3	NIL
5	48125C05	IMMUNO TECHNOLOGY	BTE	CC	3	0	0	3	NIL
6	48125C06	STEM CELL BIOLOGY	BTE	CC	3	0	0	3	NIL
7	48125C07	ADVANCED BIOPROCESS ENGINEERING	BTE	CC	3	0	0	3	NIL
8	48125C08	MOLECULAR PATHOGENESIS	BTE	CC	3	0	0	3	NIL
9	48125C09	PLANT AND ANIMAL DISEASE AND THEIR CONTROL	BTE	CC	3	0	0	3	NIL
10	48125C10	MOLECULAR MEDICINE	BTE	CC	3	0	0	3	NIL
11	48125C11	BIO SEPERATION TECHNOLOGY	BTE	CC	3	0	0	3	NIL
12	48125C12	SUSTAINABLE BIOENERGY	BTE	CC	3	0	0	3	NIL
13	48125C81	ADVANCED BIOCHEMISTRY LAB	BTE	CC	0	0	4	2	NIL
14	48125C82	MICROBIAL TECHNOLOGY LAB	BTE	CC	0	0	4	2	NIL

15	48125C83	BIOSEPERATION LAB	BTE	CC	0	0	4	2	NIL
16	48125C84	MOLECULAR AND GENETIC ENGINEERING LAB	BTE	CC	0	0	4	2	NIL
17	48125C85	IMMUNO TECHNOLOGY LAB	BTE	CC	0	0	4	2	NIL
18	48125C86	ADVANCED BIOPROCESS LAB	BTE	CC	0	0	4	2	NIL
C. ELECTIVE COURSES									
C.1-PROFESSIONAL ELECTIVES -CREDITS (15)									
1	48125P01	MOLECULAR DIAGNOSTICS AND THERAPEUTICS	BTE	EC-PS	3	0	0	3	NIL
2	48125P02	MOLECULAR MODELING AND COMPUTER AIDED DRUG DESIGN	BTE	EC-PS	3	0	0	3	NIL
3	48125P03	BIOPHYSICS	BTE	EC-PS	3	0	0	3	NIL
4	48125P04	FUNCTIONAL GENOMICS AND PROTEOMICS	BTE	EC-PS	3	0	0	3	NIL
5	48125P06	BIOPHARMACEUTICAL TECHNOLOGY	BTE	EC-PS	3	0	0	3	NIL
6	48125P05	GREEN BIOTECHNOLOGY AND POLLUTION ABETMENT	BTE	EC-PS	3	0	0	3	NIL
7	48125P07	METABOLIC ENGINEERING	BTE	EC-PS	3	0	0	3	NIL
8	48125P08	MARINE BIOTECHNOLOGY	BTE	EC-PS	3	0	0	3	NIL
9	48125P10	FOOD AND NUTRITION TECHNOLOGY	BTE	EC-PS	3	0	0	3	NIL
C.2-INTERDEPARTMENTAL OPEN ELECTIVES - CREDITS (3)									
1	41425O01	URBAN PLANNING AND SUSTAINABILITY	CIVIL-CEM	OE-EA	3	0	0	3	NIL
2	40925O01	ENVIRONMENTAL IMPACT ASSESSMENT	CIVIL-SE	OE-EA	3	0	0	3	NIL
3	43425O01	BIOMEDICAL PRODUCT	BME	OE-EA	3	0	0	3	NIL

		DESIGN AND DEVELOPMENT							
4	43325O01	BIO MEMS	ECE	OE-EA	3	0	0	3	NIL
5	40225O01	METAL ADDITIVE MANUFACTURING	MECH	OE-EA	3	0	0	3	NIL
6	41125O01	INDUSTRIAL SAFETY	MECH-ISE	OE-EA	3	0	0	3	NIL
7	45125O01	ARTIFICIAL INTELLIGENCE AND EXPERT SYSTEMS	CSE	OE-EA	3	0	0	3	NIL
8	45125O02	PRINCIPLES OF CYBER SECURITY	CSE	OE-EA	3	0	0	3	NIL
9	44725O01	SOLAR AND ENERGY STORAGE SYSTEMS	EEE	OE-EA	3	0	0	3	NIL
C.3-UNIVERSITY MULTIDISCIPLINARY OPEN ELECTIVES - CREDIT (1)									
1		DENTAL HYGIENE & QUALITY OF LIFE	DENTISTRY	OE-UOE	1	0	0	1	NIL
2		NUTRITION FOR WELLNESS & SPECIFIC DISEASES	NURSING	OE-UOE	1	0	0	1	NIL
3		FUNDAMENTALS OF HOMOEOPATHY	HOMOEO PATHY	OE-UOE	1	0	0	1	NIL
4		ADVERTISING	ARTS & SCIENCE	OE-UOE	1	0	0	1	NIL
5		TEAMWORK & COLLABORATION	ARTS & SCIENCE	OE-UOE	1	0	0	1	NIL
6		EMOTIONAL INTELLIGENCE	ARTS & SCIENCE	OE-UOE	1	0	0	1	NIL
7		MEDIA MANAGEMENT	ARTS & SCIENCE	OE-UOE	1	0	0	1	NIL
8		EXERCISE ESSENTIALS FOR PHYSICAL FITNESS	PHYSIO THERAPY	OE-UOE	1	0	0	1	NIL
9		ESSENTIAL SKILLS FOR MEDICAL EMERGENCIES	MEDICINE	OE-UOE	1	0	0	1	NIL
10		MEDICINE PLANTS IN DISEASE MANAGEMENT	PHARMACY	OE-UOE	1	0	0	1	NIL

11		BASIC LIFE SUPPORT	ALLIED HEALTH SCIENCES	OE-UOE	1	0	0	1	NIL
12		MALLARKHAMBAM	PHYSICAL EDUCATION	OE-UOE	1	0	0	1	NIL
13		SILAMBAM	PHYSICAL EDUCATION	OE-UOE	1	0	0	1	NIL
14		BASIC FITNESS TRAINING	PHYSICAL EDUCATION	OE-UOE	1	0	0	1	NIL
15		RECREATIONAL GAMES	PHYSICAL EDUCATION	OE-UOE	1	0	0	1	NIL
16		INTRODUCTION TO LAW	LAW	OE-UOE	1	0	0	1	NIL
17		FUNDAMENTALS OF LAW IN TECHNOLOGY AND CYBER SPACE	LAW	OE-UOE	1	0	0	1	NIL
18		FOUNDATION COURSE IN YOGA	REHABILITATION AND BEHAVIORAL SCIENCES	OE-UOE	1	0	0	1	NIL
19		INTRODUCTION TO PSYCHOLOGY	REHABILITATION AND BEHAVIORAL SCIENCES	OE-UOE	1	0	0	1	NIL
20		INTRODUCTION TO PUBLIC POLICY AND GOVERNANCE	LIBERAL ARTS	OE-UOE	1	0	0	1	NIL
21		INDIAN ECONOMY AND DEVELOPMENT CHALLENGES	LIBERAL ARTS	OE-UOE	1	0	0	1	NIL
22		ANY SWAYAM / MOOC / NPTEL COURSES WHICH ARE NOT RELATED TO THE DISCIPLINE OF STUDY OF THE STUDENT CAN BE CHOSEN AS AN OPEN ELECTIVE IN CONSULTATION WITH THE RESPECTIVE FACULTY ADVISOR OF THE INSTITUTION.		OE-UOE	1	0	0	1	NIL
D. EMPLOYABILITY ENHANCEMENT COURSES AND COURSES FOR PRESENTATION OF TECHNICAL SKILLS RELATED TO THE SPECIALIZATION CREDITS (19|)									

1	48125RP1	PROJECT WORK PHASE I	BTE	EE-P	0	0	12	6	NIL
2	48125RP2	PROJECT WORK PHASE II	BTE	EE-P	0	0	24	12	NIL
3	48125I81	INTERNSHIP	BTE	PI-I	0	0	0	1	NIL
E. MANDATORY COURSES CRDITS (2)									
1	44125Z81	ENGLISH FOR RESEARCH PAPER WRITING	ENG	AC	0	0	2	1	NIL
2	44125Z82	PERSONALITY DEVELOPMENT THROUGH LIFE ENLIGHTEN SKILL	ENG	AC	0	0	2	1	NIL
Minimum credits to be earned									**77**
EXIT COURSE – SKILL DEVELOPMENT PROGRAMME									
1		BIOREMEDIATION FOR POLLUTANTS	BTE	EC (SDC)	0	0	4	2	NIL
2		COSMETIC SCIENCE AND TECHNOLOGY LAB	BTE	EC (SDC)	0	0	4	2	NIL
3		MEDICINAL PLANT PRODUCT	BTE	EC (SDC)	0	0	4	2	NIL
4		PLANT-BASED NANOPARTICLES FOR BIOMEDICAL APPLICATIONS	BTE	EC (SDC)	0	0	4	2	NIL