



**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

WORKING PROFESSIONALS

CHOICE BASED CREDIT SYSTEM (CBCS)

CURRICULUM AND SYLLABUS

(Semester I to IV sem)

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 OUTCOMES (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 FOUNDATIONS
FACULTY OF ENGINEERING AND TECHNOLOGY

STRUCTURE OF PG ENGINEERING PROGRAM – REGULAR STUDENTS

S.No	Category of courses (credits)	Type of courses	Suggested break up of credits (min-max)	
1.	A. Foundation courses (5)	Mathematics/Applied Mathematics	3	
		Research Methodology and IPR	2	
2.	B. Professional core courses (32)	Core courses	32	
3.	C. Elective courses (19)	Professional electives	15	
		Open electives	Interdepartmental Open electives	3
			University Multidisciplinary open elective	1
4.	D. Employability Enhancement Courses and courses for presentation of Technical skills related to the specialization (19)	Project work phase I	6	
		Project work phase II	12	
		Research presentation skills	1	
5.	E. Mandatory Courses**	1. English for Research Paper Writing	1	
		2. Personality Development Through Life Enlighten Skills	1	
Minimum credits to be earned			77	
** The credits earned in category ‘E’ Courses will not be counted in CGPA calculation				

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)									
SL. 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)

S. NO	CODE	COURSE	OFFERING DEPT.	CATEGORY	L	T	P	C	PREREQUISITE
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	48125P05	GREEN BIOTECHNOLOGY AND POLLUTION ABETMENT	BTE	EC-PS	3	0	0	3	NIL
6	48125P06	BIOPHARMACEUTICAL TECHNOLOGY	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	48125P09	PLANT AND ANIMAL TISSUE CULTURE	BTE	EC-PS	3	0	0	3	NIL
10	48125P10	FOOD AND NUTRITION TECHNOLOGY	BTE	EC-PS	3	0	0	3	NIL

C.2-INTERDEPARTMENTAL OPEN ELECTIVES - CREDITS (3)

S. NO	CODE	COURSE	OFFERING DEPT.	CATEGORY	L	T	P	C	PREREQUISITE
1	41425001	URBAN PLANNING AND SUSTAINABILITY	CIVIL-CEM	OE-EA	3	0	0	3	NIL
2	40925001	ENVIRONMENTAL IMPACT ASSESSMENT	CIVIL-SE	OE-EA	3	0	0	3	NIL
3	43425001	BIOMEDICAL PRODUCT DESIGN AND DEVELOPMENT	BME	OE-EA	3	0	0	3	NIL
4	43325001	BIO MEMS	ECE	OE-EA	3	0	0	3	NIL
5	40225001	METAL ADDITIVE MANUFACTURING	MECH	OE-EA	3	0	0	3	NIL
6	41125001	INDUSTRIAL SAFETY	MECH-ISE	OE-EA	3	0	0	3	NIL
7	45125001	ARTIFICIAL INTELLIGENCE AND EXPERT SYSTEMS	CSE	OE-EA	3	0	0	3	NIL
8	45125002	PRINCIPLES OF CYBER SECURITY	CSE	OE-EA	3	0	0	3	NIL
9	44725001	SOLAR AND ENERGY STORAGE SYSTEMS	EEE	OE-EA	3	0	0	3	NIL

C.3-UNIVERSITY MULTIDISCIPLINARY OPEN ELECTIVES - CREDIT (1)

S. NO	CODE	COURSE	OFFERING DEPT.	CATEGORY	L	T	P	C	PREREQUISITE
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	HOMOEOPATHY	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	PHYSIOTHERAPY	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)

S.NO	CODE	COURSE	OFFERING DEPT.	CATEGORY	L	T	P	C	PREREQUISITE
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.	48125D81	RESEARCH PRESENTATION SKILLS	BTE	PI-I	0	0	0	1	NIL

E. MANDATORY COURSES CRDITS (2)									
S.NO	CODE	COURSE	OFFERING DEPT.	CATEGORY	L	T	P	C	PREREQUISITE
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									
S.NO	CODE	COURSE	OFFERING DEPT.	CATEGORY	L	T	P	C	PREREQUISITE
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