



SCHOOL OF BIO SCIENCES AND TECHNOLOGY

B.Tech Biotechnology

ACE Curriculum

(2025-2026 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

Empower lives through excellence in biotechnology education, innovation, and research.

MISSION STATEMENT OF THE SCHOOL OF BIO SCIENCES AND TECHNOLOGY

M1: Deliver excellence in biosciences, biotechnology, and allied disciplines by nurturing globally competent, ethical, and critically thinking professionals committed to improving the quality of life.

M2: Foster a vibrant innovation ecosystem that addresses societal challenges through sustainable, innovative, and cutting-edge biotechnological solutions.

M3: Promote active collaboration with industries and leading institutions in India and abroad, facilitating knowledge exchange, research, innovation, and technological advancement for the development of the nation.

B.TECH BIOTECHNOLOGY

PROGRAM EDUCATIONAL OBJECTIVES (PEOs)

PEO 1: Graduates will integrate knowledge of biological sciences, mathematics, engineering, and computational tools to design innovative, sustainable, and ethical solutions to complex biotechnological challenges

PEO 2: Graduates will undertake independent and collaborative research while applying modern experimental and computational approaches, considering health, safety, legal, cultural, environmental, and societal requirements.

PEO 3: Graduates will demonstrate effective communication, teamwork, leadership, and project management skills, while pursuing lifelong learning, adapting to emerging technologies, and fostering innovation, entrepreneurship, and professional growth



B.TECH BIOTECHNOLOGY

KNOWLEDGE AND ATTITUDE PROFILES (WK)

WK1: A systematic, theory-based understanding of the natural sciences applicable to the discipline and awareness of relevant social sciences.

WK2: Conceptually-based mathematics, numerical analysis, data analysis, statistics and formal aspects of computer and information science to support detailed analysis and modelling applicable to the discipline.

WK3: A systematic, theory-based formulation of engineering fundamentals required in the engineering discipline.

WK4: Engineering specialist knowledge that provides theoretical frameworks and bodies of knowledge for the accepted practice areas in the engineering discipline; much is at the forefront of the discipline.

WK5: Knowledge, including efficient resource use, environmental impacts, whole-life cost, re-use of resources, net zero carbon and similar concepts that supports engineering design and operations in a practice area.

WK6: Knowledge of engineering practice (technology) in the practice areas in the engineering discipline.

WK7: Knowledge of the role of engineering in society and identified issues in engineering practice in the discipline, such as the professional responsibility of an engineer to public safety and sustainable development.

WK8: Engagement with selected knowledge in the current research literature of the discipline, awareness of the power of critical thinking and creative approaches to evaluate emerging issues.

WK9: Ethics, inclusive behavior and conduct. Knowledge of professional ethics, responsibilities, and norms of engineering practice. Awareness of the need for diversity by reason of ethnicity, gender, age, physical ability etc. with mutual understanding and respect and of inclusive attitudes.



B.TECH BIOTECHNOLOGY

PROGRAMME OUTCOME (PO)

PO_1: Engineering knowledge: Apply knowledge of mathematics, natural science, computing, engineering fundamentals and an engineering specialization as specified in **WK1 to WK4** respectively to develop to the solution of complex engineering problems.

PO_2: Problem Analysis: Identify, formulate, review research literature and analyse complex engineering problems reaching substantiated conclusions with consideration for **Sustainable Development (WK1 to WK4)**.

PO_3: Design/Development of Solutions: Design creative solutions for complex engineering problems and design/develop systems/components/processes to meet identified needs with consideration for the public health and safety, whole-life cost, net zero carbon, culture, society and environment as required **(WK5)**.

PO_4: Conduct investigations of Complex Problems: Conduct investigations of complex engineering problems using research-based knowledge including design of experiments, modelling, analysis & interpretation of data to provide valid conclusions **(WK8)**.

PO_5: Engineering Tool usage: Create, select and apply appropriate techniques, resources and modern engineering & IT tools, including prediction and modelling recognizing their limitations to solve complex engineering problems. **(WK2 and WK6)**.

PO_6: The Engineer and The World: Analyze and evaluate societal and environmental aspects while solving complex engineering problems for its impact on **Sustainability** with reference to economy, health, safety, legal framework, culture and environment **(WK1, WK5, and WK7)**.

PO_7: Ethics: Apply ethical principles and commit to professional ethics, human values, diversity and inclusion; adhere to national & international laws **(WK9)**.

PO_8: Individual and Collaborative Team work: Function effectively as an individual, and as a member or leader in diverse/multi-disciplinary teams.

PO_9: Communication: Communicate effectively and inclusively within the engineering community and society at large, such as being able to comprehend and write effective reports and design documentation, make effective presentations considering cultural, language, and learning differences.

PO_10: Project Management and Finance: Apply knowledge and understanding of engineering management principles and economic decision-making and apply these to one's own work, as a member and leader in a team, and to manage projects and in multidisciplinary environments.

PO_11: Life-Long Learning: Recognize the need for, and have the preparation and ability for i) independent and life-long learning ii) adaptability to new and emerging technologies and iii) critical thinking in the broadest context of technological change **(WK8)**.

B.TECH BIOTECHNOLOGY

PROGRAM SPECIFIC OUTCOMES (PSOs)

PSO1: Apply interdisciplinary knowledge of biology, mathematics, computing, and engineering to solve problems in biotechnology.

PSO2: Design experiments, apply modern biotechnological techniques, and analyze data to address complex problems.

PSO3: Develop ethical, sustainable, and socially responsible solutions while adapting to emerging biotechnologies.

Bachelor of Technology in Biotechnology

School of Biosciences and Technology

Programme Credit Structure		Credits	Programme Core Courses		40
University Core Courses		60	BABIT101	Biochemistry	3 0 2 4
Professional Core Courses		60	BABIT102	Microbiology	3 0 2 4
Programme Core		40	BABIT103	Cell and Molecular Biology	3 0 2 4
Concentration		20	BABIT201	Principles of Chemical Engineering	3 0 2 4
Open Elective Courses		40	BABIT202	Fundamentals of Bioinformatics	2 1 2 4
Total Graded Credit Requirement		160	BABIT203	Analytical Techniques in Biotechnology	3 0 2 4
University Core Courses		60	BABIT204	Industrial Biotechnology	3 1 0 4
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BAPHY100	Physics*	4	BABIT206	Bioprocess Engineering	3 0 2 4
BACHY100	Chemistry*	4	BABIT207	Genetic Engineering	3 0 2 4
BAMAT101	Multivariable Calculus and Differential Equations	3 0 2 4	Concentrations		
BAMAT200	Mathematics II*	4	Microbial Technology		
BAEEE101	Basic Engineering	3 0 2 4	20		
BACSE101	Problem Solving Using Python	0 0 4 2	BABIT301	Environmental Biotechnology	3 1 0 4
BACSE102	Problem Solving Using Java	0 0 4 2	BABIT302	Industrial Enzymology	3 1 0 4
BAENG101	Technical English Communication	3 0 2 4	BABIT303	Biochemical Engineering	3 1 0 4
BASTS101	Qualitative and Quantitative Skills Practice I	3 0 0 1	BABIT401	Downstream Processing	3 0 2 4
BASTS102	Qualitative and Quantitative Skills Practice II	3 0 0 1	BABIT402	Protein Engineering and Design	3 1 0 4
BAFLC100	Foreign Language	1 0 2 2	Applied Bioinformatics		
BAHSM100	Humanities, Social Science and Management	3 0 0 3	20		
BAHUM101	India Studies	1 0 0 1	BABIT304	Structural Bioinformatics	3 0 2 4
BACHY101	Environmental Sciences	2 0 0 2	BABIT305	Computational Biology	2 1 2 4
BAHUM100	Ethics and Values*	2	BABIT306	Systems Biology	3 1 0 4
BAMGT101	Entrepreneurship	3 0 0 3	BABIT403	Biological Data Analytics	3 1 0 4
BABIT191	Basic Multidisciplinary Project	0 0 4 2	BABIT404	Artificial Intelligence and Machine Learning in Biology	2 1 2 4
BABIT291	Innovative Design Project	0 0 4 2	Bio-Pharmaceuticals		
BABIT391	Research / Design Project	0 0 6 3	20		
BABIT491	Technical Answers for Real World Problems	1 0 4 3	BABIT307	Pharmaceutical Biotechnology	3 1 0 4
BABIT399	Internship I	0 0 2 1	BABIT308	Medical Diagnostics	3 1 0 4
BABIT499	Internship II / Capstone Project	0 0 12 6	BABIT309	Pharmacoinformatics and Pharmacovigilance	3 0 2 4
BAENG100	Effective English Communication (NCC)	0 0 4 2	BABIT405	Drug Discovery and Development	3 1 0 4
BAEXC100	Extracurricular Activities (NCCM)	0 0 4 2	BABIT406	Toxicology	3 1 0 4
BABIT100	Biology (NCC)	3 1 0 4	Plant and Animal Biotechnology		
BAMAT100	Foundations of Mathematics (NCC)	3 1 0 4	20		
*-Basket Details			BABIT310	Plant Biotechnology	3 1 0 4
BAPHY102	Physics for Biologist	3 0 2 4	BABIT311	Animal Biotechnology	3 1 0 4
BACHY102	Organic Chemistry for Biotechnologists	3 0 2 4	BABIT312	Food Process Engineering	3 1 0 4
BAMAT203	Linear Algebra and Dynamical Systems	3 1 0 4	BABIT407	Developmental Biology and Regenerative Medicine	3 1 0 4
BAHUM103	Ethics and Values	2 0 0 2	BABIT408	Genomics and Proteomics	3 1 0 4
			Open Elective Courses		
			40		
			Engineering Sciences Humanities Social Sciences Liberal Arts Economics Finance Management		

Ancillary (20 credits) - Students can opt for "Ancillary" in other disciplines by earning 20 credits from the courses listed in the Ancillary options under Open Elective. Ancillary details will be mentioned only on the transcript.

Additional Concentration (20 credits) - Students can opt for "Additional Concentrations" in their own discipline by earning 20 credits from the courses listed in the Concentration options under Open Elective. Concentration details will be mentioned only on the transcript.

Minor (additional 20 credits) - Students can opt for a "Minor Degree" in other disciplines 20 credits in addition to the minimum credit requirement of the Undergraduate Degree from the courses listed in the Minor options

Honours (additional 20 credits) - Students can opt for an "Honours Degree" in the same discipline by earning 20 credits in addition to the minimum credit requirement of the Undergraduate Degree from the courses listed in the Honours options.

Second Major (additional 40 credits) - Students can opt for a "Second Major" in other disciplines by earning 40 credits in addition to the minimum credit requirement of the Undergraduate Degree from the courses listed in the Second Major options.