



VIT[®]

Vellore Institute of Technology

(Deemed to be University under section 3 of UGC Act, 1956)

SCHOOL OF CIVIL ENGINEERING

B. Tech. Civil Engineering

(B. Tech. BCL)

ACE Curriculum

(2025-2026)

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 CIVIL ENGINEERING

To excel in Civil Engineering education and research with a global perspective and commitment to sustainability.

MISSION STATEMENT OF THE SCHOOL OF CIVIL ENGINEERING

- **M1. Academic Excellence:** Impart high-quality Civil Engineering education through innovative teaching methodologies and modern laboratory facilities.
- **M2. Research:** Promote research, consultancy, and innovation addressing real-world Civil Engineering challenges with emphasis on sustainable infrastructure and societal needs.
- **M3. Global Perspective & Industry Engagement:** Prepare globally competent Civil Engineers through industry interaction and collaboration with national and international institutions.
- **M4. Ethics, Sustainability & Lifelong Learning:** Produce socially responsible Civil Engineers with strong ethical values and leadership skills, dedicated to sustainable development and lifelong learning.

B. Tech. Civil Engineering

PROGRAMME EDUCATIONAL OBJECTIVES (PEOs)

PEO-1: Graduates will become successful Civil Engineering professionals / entrepreneur.

PEO-2: Graduates will pursue higher studies and research for professional development.

PEO3: Graduates will demonstrate civic responsibility in addressing societal and environmental challenges.

B. Tech. Civil Engineering

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.

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PROGRAMME OUTCOMES (POs)

PO1: 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.

PO2: Problem Analysis: Identify, formulate, review research literature and analyze complex engineering problems reaching substantiated conclusions with consideration for sustainable development. (WK1 to WK4)

PO3: 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)

PO4: 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)

PO5: 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)

PO6: 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)

PO7: Ethics: Apply ethical principles and commit to professional ethics, human values, diversity and inclusion; adhere to national & international laws. (WK9)

PO8: Individual and Collaborative Team work: Function effectively as an Individual and as a member or leader in diverse / multi-disciplinary teams.

PO9: 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

PO10: 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.

PO11: 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)

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Programme Specific Outcome (PSO)

PSO-1: Apply core civil engineering principles in structural, geotechnical, transportation, environmental and water resources engineering to create resilient infrastructure.

PSO-2: Apply emerging technologies to plan, model, design and manage civil engineering projects to meet global infrastructure needs.

PSO-3: Analyse societal challenges and develop innovative solutions for the sustainable built environment.

B. Tech. Civil Engineering

Programme Credit Structure	Credits
University Core Courses	60
Professional Core Courses	60
Programme Core	40
Concentration	20
Open Elective Courses	40
Total Graded Credit Requirement	160

University Core Courses

60

		L	T	P	C
BAPHY100	Physics*				4
BACHY100	Chemistry*				4
BAMAT101	Multivariable Calculus and Differential Equations	3	0	2	4
BAMAT200	Mathematics II*				4
BAEEE101	Basic Engineering	3	0	2	4
BACSE101	Problem Solving Using Python	0	0	4	2
BACSE102	Problem Solving Using Java	0	0	4	2
BAENG101	Technical English Communication	3	0	2	4
BASTS101	Qualitative and Quantitative Skills Practice I	3	0	0	1
BASTS102	Qualitative and Quantitative Skills Practice II	3	0	0	1
BAFLC100	Foreign Language	1	0	2	2
BAHSM100	Humanities, Social Science and Management	3	0	0	3
BAHUM101	India Studies	1	0	0	1
BACHY101	Environmental Sciences	2	0	0	2
BAHUM100	Ethics and Values*				2
BAMGT101	Entrepreneurship	3	0	0	3
BACLE191	Basic Multidisciplinary Project	0	0	4	2
BACLE291	Innovative Design Project	0	0	4	2
BACLE391	Research / Design Project	0	0	6	3
BACLE491	Technical Answers for Real World Problems	1	0	4	3
BACLE399	Internship I	0	0	2	1
BACLE499	Internship II / Capstone Project	0	0	12	6

BAENG100	Effective English Communication (NCC)	0	0	4	2
BAEXC100	Extracurricular Activities (NCCM)	0	0	4	2
BAPHY103	Physics and Mechanics for Engineers	3	0	2	4
BACHY103	Chemistry for Civil Engineers	3	0	2	4
BAMAT201	Complex Variables and Linear Algebra	3	1	0	4
BAHUM104	Professional Practices and Construction Ethics	2	0	0	2

Human Science Management (HSM)

BACLE104	Waste Management	3	0	0	3
BACLE105	Disaster Mitigation and Management	3	0	0	3
BACLE106	Urban Planning and Development	3	0	0	3
BACLE1					

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BACLE310	Additive Manufacturing for Construction	3	1	0	4
BACLE311	Construction Quality and Safety	3	1	0	4
BACLE312	Groundwater Engineering	4	0	0	4
BACLE313	Environmental Impact Assessment	4	0	0	4
BACLE314	Industrial Waste Management	4	0	0	4
BACLE315	Air and Noise Pollution Control	4	0	0	4
BACLE316	Solid Waste Management	4	0	0	4
BACLE406	Resource Management and Circular Economy	4	0	0	4
BACLE407	Traffic Engineering	4	0	0	4
BACLE408	Ground Improvement Techniques	3	1	0	4
BACLE409	Geotechnical Earthquake Engineering	3	1	0	4
Ancillary courses					
BALCE410	AI in Climate-Resilient Infrastructure	3	0	0	3
BACLE411	Unmanned Aerial Systems in Transportation Systems	3	0	0	3
BACLE412	Digital Project Management	3	0	0	3
BACLE413	Smart Buildings and Energy Performance	3	1	0	4
BACLE414	Structural Health Monitoring	3	0	2	4
BACLE415	Digital Twins in Built Environment	3	1	0	4
Minor in Environment and Sustainable Infrastructure					
BACLE304	Introduction to Civil Engineering and Built Environment	3	0	0	3
BACLE305	Water and Environmental System	3	0	0	3
BACLE306	Transportation Systems and Urban Mobility	3	0	0	3
BACLE307	Environmental Sustainability and Smart Cities	3	0	0	3
BACLE403	Infrastructure Management and Disaster Resilience	3	0	0	3
BACLE404	Climate Change and Urban Resilience	3	0	0	3
BACLE405	Geo-Informatics and Remote Sensing Applications	3	0	0	3

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

Honors (additional 20 credits) - Students can opt for an "Honors 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 Honors 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.

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.