



Mar Baselios College of Engineering and Technology

**CURRICULUM  
2023  
(Autonomous)  
Draft  
Version 1.0**

**B.TECH.  
CIVIL ENGINEERING**



**MAR BASELIOS COLLEGE OF ENGINEERING AND TECHNOLOGY**

**Mar Ivanios Vidyanagar, Nalanchira, Thiruvananthapuram – 695 015**

**August 2023**

# **CURRICULUM**

FOR

**B. TECH. DEGREE PROGRAMME**

IN

**CIVIL ENGINEERING**

SEMESTERS I TO VIII

**2023 SCHEME  
(AUTONOMOUS)**



**MAR BASELIOS COLLEGE OF ENGINEERING AND TECHNOLOGY**

(Approved by AICTE, Autonomous Institution Affiliated to APJ Abdul Kalam Technological University)  
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# MAR BASELIOS COLLEGE OF ENGINEERING AND TECHNOLOGY

## Vision and Mission of the Institution

### **Vision:**

To be an Institution moulding globally competent professionals as epitomes of Noble Values.

### **Mission:**

To transform the Youth as technically competent, ethically sound and socially committed professionals, by providing a vibrant learning ambience for the welfare of humanity.

## DEPARTMENT OF CIVIL ENGINEERING

### Vision and Mission of the Department

### **Vision:**

To be a Centre of Excellence in Civil Engineering education with a global perspective, creating ethically strong engineers for the service of society.

### **Mission:**

To provide Engineering Education which can create exemplary professional Civil Engineers of high ethics with strong conceptual foundation coupled with practical insight, to serve the industry and community.

## **PROGRAMME EDUCATIONAL OBJECTIVES (PEOs)**

**PEO1:** Graduates of the Programme will have a successful career as Civil Engineering practitioners, entrepreneurs or professionals, addressing the needs of the industry with a global perspective.

**PEO2:** They will contribute to society as ethical and responsible citizens with proven expertise

**PEO3:** They will engage in continuous professional development and advance to leadership roles in their chosen career.

## **PROGRAMME OUTCOMES (POs)**

**Engineering graduates will be able to:**

1. **Engineering knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
2. **Problem analysis:** Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
3. **Design/development of solutions:** Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
4. **Conduct investigations of complex problems:** Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
5. **Modern tool usage:** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
6. **The engineer and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
7. **Environment and sustainability:** Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
8. **Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
9. **Individual and team work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
10. **Communication:** Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
11. **Project management and finance:** Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
12. **Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

## **PROGRAMME SPECIFIC OUTCOMES (PSOs)**

**PSO1:** Provide feasible and sustainable solutions to problems in various Civil Engineering disciplines such as Structural, Environmental, Geotechnical, Transportation and Construction Engineering.

**PSO2:** Apply the principles, methods, software and codes of practices to design various Civil Engineering Systems.

DRAFT

**MAR BASELIOS COLLEGE OF ENGINEERING AND TECHNOLOGY**  
**THIRUVANANTHAPURAM-695015**

**DEPARTMENT OF CIVIL ENGINEERING**

**CURRICULUM 2023 UNDER AUTONOMY STATUS**

**i) Knowledge Segments and Credits**

Every course of B Tech Programme is placed in one of the nine categories as listed in table below. No semester shall have more than six lecture-based courses and two laboratory courses, and/or drawing/seminar/project courses in the curriculum.

Sl. No.	Category	Category Code	Total credits
1	Humanities and Social Sciences including Management Courses	HSC	6
2	Basic Science Courses	BSC	26
3	Engineering Science Courses	ESC	22
4	Programme Core Courses	PCC	70
5	Programme Elective Courses	PEC	18
6	Institute Elective Courses	OEC	6
7	Project Work, Seminar, Comprehensive Viva Voce and internship	PWS	12
8	Mandatory Non-credit Courses (P/F) with Grade	MNC	---
9	Mandatory Student Activities (P/F)	MSA	3
	<b>Total Mandatory Credits</b>		<b>163</b>
	Value Added Courses (Optional) – Honours/Minor	VAC	15

**ii) Semester-wise Credit Distribution**

Semester	I	II	III	IV	V	VI	VII	VIII	Total
Credits for Courses	19	19	21	21	22	25	18	15	<b>160</b>
Credits for Activities	3								<b>3</b>
Total Credits									<b>163</b>
Value Added Courses (Optional) – Honours / Minor									<b>15</b>
Total Credits									<b>178</b>

<b>SEMESTER I</b>						
<b>Slot</b>	<b>Category Code</b>	<b>Course Code</b>	<b>Courses</b>	<b>L-T-P-J</b>	<b>Hours</b>	<b>Credit</b>
A	BSC	23MAL10A	Linear Algebra and Calculus	3-1-0-0	4	4
B	BSC	23CYL10A	Engineering Chemistry	3-1-0-0	4	4
C	ESC	23ESB10A	Engineering Graphics	2-0-2-0	4	3
D	ESC	23ESB10D	Basics of Electrical Engineering A	1-0-2-0	3	2
E	ESC	23ESL10A	Basics of Mechanical Engineering	2-0-0-0	2	2
	ESC	23ESL10B	Basics of Civil Engineering	2-0-0-0	2	2
G	MNC	23NCL10A	Environmental Science	2-0-0-0	2	---
S	BSC	23CYP10A	Engineering Chemistry Lab	0-0-2-0	2	1
T	ESC	23ESP10A	Manufacturing and Construction Practices A	0-0-2-0	2	1
<b>TOTAL</b>					<b>25/26</b>	<b>19</b>

<b>SEMESTER II</b>						
<b>Slot</b>	<b>Category Code</b>	<b>Course Code</b>	<b>Courses</b>	<b>L-T-P-J</b>	<b>Hours</b>	<b>Credit</b>
A	BSC	23MAL10B	Vector Calculus, Differential Equations and Transforms	3-1-0-0	4	4
B	BSC	23PYL10A	Engineering Physics	3-1-0-0	4	4
C	ESC	23ESL10D	Applied Mechanics	2-1-0-0	3	3
D	ESC	23ESL10F	Building Materials and Construction Technology	3-0-0-0	3	3
F	ESC	23ESB10G	Problem Solving and Programming	2-0-2-0	4	3
G	HSC	23NCJ10B	Professional Communication	2-0-0-2	4	---
S	BSC	23PYP10A	Engineering Physics Lab	0-0-2-0	2	1
T	ESC	23ESP10C	Design Studio I	0-0-2-0	2	1
<b>TOTAL</b>					<b>26/27</b>	<b>19</b>

<b>SEMESTER III</b>						
<b>Slot</b>	<b>Category Code</b>	<b>Course Code</b>	<b>Courses</b>	<b>L-T-P-J</b>	<b>Hours</b>	<b>Credit</b>
A	BSC	23MAL20A	Partial Differential Equation and Complex Analysis	3-1-0-0	4	4
B	PCC	23CEL20A	Mechanics of Structures	3-1-0-0	4	4
C	PCC	23CEL20B	Fluid Mechanics and Hydraulics	3-1-0-0	4	4
D	PCC	23CEL20C	Surveying and Geomatics	3-0-0-0	3	3
E	ESC	23ESL00A	Design and Engineering	2-0-0-0	2	2
G	MNC	23NCL20A	Professional Ethics	2-0-0-0	2	---
S	PCC	23CEP20A	Fluid Mechanics Laboratory	0-0-3-0	3	2
T	PCC	23CEP20B	Surveying Laboratory	0-0-3-0	3	2
R/M	VAC		Remedial/Minor Course	3-0-0-0	3	3
<b>TOTAL</b>					<b>25/28</b>	<b>21/24</b>

<b>SEMESTER IV</b>						
<b>Slot</b>	<b>Category Code</b>	<b>Course Code</b>	<b>Courses</b>	<b>L-T-P-J</b>	<b>Hours</b>	<b>Credit</b>
A	BSC	23MAL20D	Probability, Random Processes and Numerical Methods	3-1-0-0	4	4
B	PCC	23CEL20D	Structural Analysis	3-1-0-0	4	4
C	PCC	23CEL20E	Hydrology and Water Resources Engineering	4-0-0-0	4	4
D	PCC	23CEB20A	Water and Wastewater Engineering	4-0-2-0	6	5
E	HSC	23HSL20A	Universal Human Values	3-0-0-0	3	3
G	MNC	23NCL20B	Industrial Safety Engineering	2-1-0-0	3	---
T	PCC	23CEP20C	Material Testing Lab I	0-0-2-0	2	1
R/M/H	VAC		Remedial/Minor/Honours Course	3-0-0-0	3	3
<b>TOTAL</b>					<b>26/29</b>	<b>21/24</b>



SEMESTER V						
Slot	Category Code	Course Code	Courses	L-T-P-J	Hours	Credit
A	PCC	23CEL30A	Design of Reinforced Concrete Structures	3-0-0-0	3	3
B	PCC	23CEJ30A	Applications of Artificial Intelligence in Civil Engineering	2-0-0-1	3	3
C	PCC	23CEL30B	Soil Mechanics	2-1-0-0	3	3
D	PEC	23CEL31X	Program Elective I	3-0-0-0	3	3
E	PCC	23CEL30C	Transportation Engineering	3-0-0-0	3	3
F	PCC	23CEB30A	Construction Project Management	2-0-2-0	4	3
S	PCC	23CEP30A	Material Testing Lab II	0-0-3-0	3	2
T	PCC	23CEP30B	Transportation Engineering Laboratory	0-0-3-0	3	2
R/M/H	VAC		Remedial/Minor/Honours Course	3-0-0-0	3	3
<b>TOTAL</b>					<b>25/28</b>	<b>22/25</b>

SEMESTER VI						
Slot	Category Code	Course Code	Courses	L-T-P-J	Hours	Credit
A	PCC	23CEJ30B	Quantity Surveying and Estimation	3-0-0-2	5	5
B	PCC	23CEL30D	Foundation Engineering	3-0-0-0	3	3
C	PCC	23CEL30E	Integrated Waste Management	3-0-0-0	3	3
D	HSC	23HSL00A	Business Economics and Accountancy	3-0-0-0	3	3
E	OEC	23IEL31X	Institute Elective I	3-0-0-0	3	3
F	PEC	23CEL32X	Program Elective II	3-0-0-0	3	3
S	PWS	23CES38A	Seminar	0-0-3-0	3	2
T	PCC	23CEP30C	Geotechnical Engineering Laboratory	0-0-3-0	3	2
U	PWS	23CEI38A	Internship	—	—	1
R/M/H	VAC		Remedial/Minor/Honours Course	3-0-0-0	3	3
<b>TOTAL</b>					<b>26/29</b>	<b>25/28</b>

SEMESTER VII						
Slot	Category Code	Course Code	Courses	L-T-P-J	Hours	Credit
A	PCC	23CEL40A	Design of Steel Structures	3-0-0-0	3	3
B	PCC	23CEJ40A	Traffic Engineering and Management	3-0-0-2	5	5
C	PEC	23CEL43X	Program Elective III	3-0-0-0	3	3
E	OEC	23IEL42X	Institute Elective II	3-0-0-0	3	3
S	PWS	23CEV48A	Comprehensive Course Viva	0-0-2-0	2	1
T	PWS	23CEJ48A	Mini Project	0-0-4-0	4	2
U	PCC	23CEP40A	Design Studio II	0-0-2-0	2	1
R/M/H	VAC		Remedial/Minor/Honours Course	3-0-0-0	3	3
<b>TOTAL</b>					<b>22/25</b>	<b>18/21</b>

SEMESTER VIII						
Slot	Category Code	Course Code	Courses	L-T-P-J	Hours	Credit
A	PEC	23CEL44X	Program Elective IV/MOOC	3-0-0-0	3	3
B	PEC	23CEL45X	Program Elective V/MOOC	3-0-0-0	3	3
C	PEC	23CEL46X	Program Elective VI/MOOC	3-0-0-0	3	3
S	PWS	23CEJ48A	Project/ Internship	0-0-12-0	12	6
R/M/H	VAC		Remedial/Minor/Honours Course	0-0-0-3	3	3
<b>TOTAL</b>					<b>21/24</b>	<b>15/18</b>

## ELECTIVES

<b>Program Elective I</b>		
<b>Course Code</b>	<b>Course Name</b>	<b>Stream</b>
23CEL31X	Advanced Concrete Technology	<b>ST</b>
23CEL31X	Structural health monitoring and retrofitting	<b>ST</b>
23CEL31X	Geotechnical Investigation	<b>GT</b>
23CEL31X	Mechanics of Fluid Flow	<b>WRE</b>
23CEL31X	Air Quality Management	<b>EE</b>
23CEL31X	Transportation Planning	<b>TE</b>

<b>Program Elective II</b>		
<b>Course Code</b>	<b>Course Name</b>	<b>Stream</b>
23CEL32X	Advanced Structural Analysis	<b>ST</b>
23CEL32X	Prestressed Concrete	<b>ST</b>
23CEL32X	Ground Improvement Techniques	<b>GT</b>
23CEL32X	Applied soil mechanics	<b>GT</b>
23CEL32X	Applied Hydrology	<b>WRE</b>
23CEL32X	Solid and Hazardous Waste Management	<b>EE</b>
23CEL32X	Traffic Flow Modelling	<b>TE</b>

<b>Program Elective III</b>		
<b>Course Code</b>	<b>Course Name</b>	<b>Stream</b>
23CEL43X	Computed aided Structural analysis	<b>ST</b>
23CEL43X	Advanced Design of Structures	<b>ST</b>
23CEL43X	Environmental Geotechnics	<b>GT</b>
23CEL43X	Integrated Watershed Management	<b>WRE</b>
23CEL43X	Industrial Wastewater Management	<b>EE</b>
23CEL43X	Ecological Engineering	<b>EE</b>
23CEL43X	Road Safety and Management	<b>TE</b>
23CEL43X	Geometric Design of Transportation Facilities	<b>TE</b>

<b>Program Elective IV</b>		
<b>Course Code</b>	<b>Course Name</b>	<b>Stream</b>
23CEL44X	Introduction to Bridge Engineering	<b>ST</b>
23CEL44X	Structural Dynamics	<b>ST</b>
23CEL44X	Soil Dynamics and Machine Foundation	<b>GT</b>
23CEL44X	Geosynthetics and Reinforced Soil Structures	<b>GT</b>
23CEL44X	Irrigation and Drainage	<b>WRE</b>
23CEL44X	Advanced Environmental Engineering	<b>EE</b>
23CEL44X	Mass Transportation Systems	<b>TE</b>
23CEL44X	Pavement Analysis and Design	<b>TE</b>

<b>Program Elective V</b>		
<b>Course Code</b>	<b>Course Name</b>	<b>Stream</b>
23CEL45X	Seismic Design of Structures	<b>ST</b>
23CEL45X	Advanced Numerical Methods	<b>ST</b>
23CEL45X	Soil Structure Interaction	<b>GT</b>
23CEL45X	Earth & Rockfill Dam Engineering	<b>GT</b>
23CEL45X	Hydroclimatology	<b>WRE</b>
23CEL45X	Environmental Impact Assessment	<b>EE</b>
23CEL45X	Railway, Airport and Harbour Engineering	<b>TE</b>
23CEL45X	Pavement Asset Management for Roads, Airports and Ports	<b>TE</b>

<b>Program Elective VI</b>		
<b>Course Code</b>	<b>Course Name</b>	<b>Stream</b>
23CEL46X	Structural Masonry and alternative building technologies	<b>ST</b>
23CEL45X	Probability in Civil Engineering	<b>ST</b>
23CEL45X	Geotechnical Earthquake Engineering	<b>GT</b>
23CEL45X	Introductory Rock Mechanics	<b>GT</b>
23CEL45X	Environmental Microbiology	<b>EE</b>
23CEL45X	Analysis and Evaluation of Transportation Systems	<b>TE</b>
23CEL45X	Pavement Evaluation, Rehabilitation and Maintenance	<b>TE</b>