

# CURRICULUM 2023 (Autonomous)

B.TECH.  
CIVIL ENGINEERING



**MAR BASELIOS COLLEGE OF ENGINEERING AND  
TECHNOLOGY (AUTONOMOUS)**

**Mar Ivanios Vidyanagar, Nalanchira, Thiruvananthapuram – 695 015  
August 2023**



Mar Baselios College of Engineering and Technology (Autonomous)

# **CURRICULUM**

FOR

**B. TECH. DEGREE PROGRAMME**

IN

**CIVIL ENGINEERING**

SEMESTERS I TO VIII

**2023 SCHEME (AUTONOMOUS)**



## **MAR BASELIOS COLLEGE OF ENGINEERING AND TECHNOLOGY (AUTONOMOUS)**

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

**DEPARTMENT OF CIVIL ENGINEERING**

**B. TECH DEGREE PROGRAMME IN  
CIVIL ENGINEERING**

**CURRICULUM**

Items	Board of Studies (BoS)	Academic Council (AC)
Date of Approval (S1 & S2)	14-07-2023	09-08-2023
Date of Approval (S3 & S4)	21-03-2024	9-03-2024

Head of Department  
Chairman, Board of Studies

Principal  
Chairman, Academic Council



## **MAR BASELIOS COLLEGE OF ENGINEERING AND TECHNOLOGY (AUTONOMOUS)**

### **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.

**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 the 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	24
4	Programme Core Courses	PCC	74
5	Programme Elective Courses	PEC	18
6	Institute Elective Courses	IEC	6
7	Project Work, Seminar, Comprehensive Viva Voce and internship	PWS	13
8	Mandatory Student Activities (P/F)	MSA	3
	<b>Total Mandatory Credits</b>		<b>170</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	20	20	22	20	25	22	21	17	167
Credits for Activities	3								3
<i>Total Credits</i>									<b>170</b>
<i>Value Added Courses (Optional) – Honours / Minor</i>									<b>15</b>
<i>Total Credits</i>									<b>185</b>



SEMESTER I						
Slot	Category Code	Course Code	Courses	L-T-P-J	Hours	Credit
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	23ESB10K	Basics of Electrical Engineering B	1-0-2-0	3	2
E	ESC	23ESL10M	Basics of Mechanical Engineering	2-0-0-0	2	2
	ESC	23ESL10N	Basics of Civil Engineering	2-0-0-0	2	2
G	ESC	23ESL1NA	Environmental Science	2-0-0-0	2	1*
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</b>	<b>20</b>

\*Not to be considered for Grade/GPA/CGPA. Pass or Fail only

SEMESTER II						
Slot	Category Code	Course Code	Courses	L-T-P-J	Hours	Credit
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	23ESL10B	Applied Mechanics	2-1-0-0	3	3
D	ESC	23ESB10F	Problem Solving and Programming	2-0-2-0	4	3
E	ESC	23ESL10R	Building Materials and Construction Technology	3-0-0-0	3	3
G	HSC	23HSJ1NB	Professional Communication	2-0-0-2	4	1*
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</b>	<b>20</b>

\*Not to be considered for Grade/GPA/CGPA. Pass or Fail only





SEMESTER III						
Slot	Category	Course Code	Courses	L-T-P-J	Hours	Credit
A	BSC	23MAL20A	Partial Differential Equations 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 Engineering	2-0-0-0	2	2
G	HSC	23HSL2NA	Professional Ethics	2-0-0-0	2	1*
S	PCC	23CEP20A	Fluid Mechanics Laboratory	0-0-3-0	3	2
T	PCC	23CEP20B	Surveying Laboratory	0-0-3-0	3	2
M	VAC		Minor Course	3-0-0-0	3	3
<b>TOTAL</b>					<b>25/28</b>	<b>22/25</b>

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SEMESTER IV						
Slot	Category	Course Code	Courses	L-T-P-J	Hours	Credit
A	BSC	23MAL20D	Probability, Statistics 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	23CEB20F	Water and Wastewater Engineering	4-0-2-0	6	5
E	HSC	23HSL2NB	Universal Human Values II	3-0-0-0	3	1*
G	ESC	23ESL2NC	Industrial Safety Engineering	2-1-0-0	3	1*
S	PCC	23CEP20C	Material Testing Lab I	0-0-2-0	2	1
M/ H	VAC		Minor/Honours Course	3-0-0-0	3	3
<b>TOTAL</b>					<b>26/29</b>	<b>20/23</b>

\*Not to be considered for Grade/GPA/CGPA. Pass or Fail only



SEMESTER V						
Slot	Category	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	23CEJ30B	Applications of Artificial Intelligence in Civil Engineering	2-0-0-1	3	3
C	PCC	23CEL30C	Soil Mechanics	3-1-0-0	4	4
D	PCC	23CEL30D	Transportation Engineering	3-0-0-0	3	3
E	PCC	23CEJ30E	Quantity Surveying and Valuation	3-0-0-2	5	5
F	PEC	23CEL31X	Program Elective I	3-0-0-0	3	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
M/ H	VAC		Minor/Honours Course	3-0-0-0	3	3
<b>TOTAL</b>					<b>27/30</b>	<b>25/28</b>

SEMESTER VI						
Slot	Category	Course Code	Courses	L-T-P-J	Hours	Credit
A	PCC	23CEL30F	Design of Steel Structures	3-1-0-0	4	4
B	PCC	23CEL30G	Foundation Engineering	3-0-0-0	3	3
C	PEC	23CEL32X	Program Elective II	3-0-0-0	3	3
E	IEC	23IEL31X	Institute Elective I	3-0-0-0	3	3
F	HSC	23HSL30A	Business Economics and Accountancy	3-0-0-0	3	3
S	PCC	23CEP30C	Geotechnical Engineering Laboratory	0-0-3-0	3	2
T	PCC	23CEP30D	Design Studio II	0-0-3-0	3	2
U	PWS	23CES38A	Seminar	0-0-3-0	3	2
M/ H	VAC		Minor/Honours Course	3-0-0-0	3	3
<b>TOTAL</b>					<b>25/28</b>	<b>22/25</b>



SEMESTER VII						
Slot	Category	Course Code	Courses	L-T-P-J	Hours	Credit
A	PCC	23CEJ40B	Traffic Engineering and Management	3-0-0-2	5	5
B	PEC	23CEL43X	Program Elective III	3-0-0-0	3	3
C	PCC	23CEB40B	Construction Project Management	3-0-2-0	5	4
E	IEC	23IEL42X	Institute Elective II	3-0-0-0	3	3
T	PWS	23CEV48A	Comprehensive Course Viva	0-0-2-0	2	1
U	PWS	23CEJ48A	Project	0-0-10-0	10	5
		23CEI48A	Internship*			
M/H	VAC		Minor/Honours Course	3-0-0-0	3	3
<b>TOTAL</b>					<b>28/31</b>	<b>21/24</b>

\* Students can opt for Internship either in S7 or S8. However, in S7, the internship can be permitted only if there are no pending Programme/Course requirements in the semester, that need to be completed in College in the offline mode, such as laboratory sessions.

SEMESTER VIII						
Slot	Category	Course Code	Courses	L-T-P-J	Hours	Credit
A	PCC	23CEL40C	Integrated Waste Management	3-0-0-0	3	3
B	PEC	23CEL44X	Program Elective IV	3-0-0-0	3	3
C	PEC	23CEL45X	Program Elective V	3-0-0-0	3	3
D	PEC	23CEL46X	Program Elective VI	3-0-0-0	3	3
U	PWS	23CEJ48B	Project	0-0-10-0	10	5
		23CEI48A	Internship*			
M/H	VAC		Minor/Honours Course	0-0-6-0	6	3
<b>TOTAL</b>					<b>22/25</b>	<b>17/20</b>



# MINOR BASKET



Semester	Basket I				Basket II				Basket III			
	Infrastructure Development and Management				Environmental and Water Resource Engineering				Transportation Engineering			
	Course Code	Course	L-T-P-J	Credits	Course Code	Course	L-T-P-J	Credits	Course Code	Course	L-T-P-J	Credits
<b>S3</b>	23CEL2MA	Building Information Modelling	3-0-0-0	3	23CEL2MC	Climate Change and Disaster Mitigation	3-0-0-0	3	23CEL2ME	Traffic Engineering	3-0-0-0	3
<b>S4</b>	23CEL2MB	Infrastructure Health Monitoring	3-0-0-0	3	23CEL2MD	Watershed Management	3-0-0-0	3	23CEL2MF	Urban Transportation Planning	3-0-0-0	3
<b>S5</b>	23CEL3MA	Infrastructure Project Management	3-0-0-0	3	23CEL3MC	Air Pollution and Control Techniques	3-0-0-0	3	23CEL3ME	Traffic Flow Theory and Modelling	3-0-0-0	3
<b>S6</b>	23CEL3MB	Performance and Risk Assessment of Infrastructure Systems	3-0-0-0	3	23CEL3MD	Integrated Waste Management for Smart Cities	3-0-0-0	3	23CEL3MF	Transportation and logistics management	3-0-0-0	3
<b>S7/ S8</b>	23CEI4MA	Mini Project	0-0-6-0	3	23CEL4MC	Mini Project	0-0-6-0	3	23CEL4ME	Mini Project	0-0-6-0	3



# HONOURS BASKET



Semester	Basket I				Basket II				Basket III			
	Course Code	Course	L-T-P-J	Credits	Course Code	Course	L-T-P-J	Credits	Course Code	Course	L-T-P-J	Credits
S4	23CEL2HB	Advanced Mechanics of Solids	3-0-0-0	3	23CEL2HD	Environmental Pollution Control Techniques	3-0-0-0	3	23CEL2HF	Geographical Information System	2-0-2-0	3
S5	23CEL3HA	Modern Construction Materials	3-0-0-0	3	23CEL3HC	Ground Water Hydrology	3-0-0-0	3	23CEL3HE	Pavement Construction and Management	3-0-0-0	3
S6	23CEL3HB	Finite Element Method	3-0-0-0	3	23CEL3HD	Environmental Pollution Modelling	3-0-0-0	3	23CEL3HF	Transportation System Management	3-0-0-0	3
S7	23CEL4HA	Structural Dynamics	3-0-0-0	3	23CEL4HC	Earth Dams and Earth Retaining Structure	3-0-0-0	3	23CEL4HE	Soil Dynamics and Machine Foundation	3-0-0-0	3
S8	23CEL4HB	Mini Project	0-0-6-0	3	23CEL4HD	Mini Project	0-0-6-0	3	23CEL4HF	Mini Project	0-0-6-0	3

