

Programme Template

1. Name of the Programme and Code	Bachelor of Technology in Civil Engineering, CE
2. Degree (UG/PG)	UG
3. Minimum Duration of the Programme (Specify for FT and PT, if applicable)	8 Semesters
4. Maximum Duration of the Programme (Specify for FT and PT, if applicable)	12 Semesters
5. Capacity (Max. Student Strength) of the Programme	110
6. Number of Regular Faculty Members Involved as Teaching Faculty in the Programme	45
7. Minimum Credit Requirements for the Degree	155

8. Articulate the Program Learning Outcomes (PLO)

[For example see: Objectives vs. Outcomes and Student Outcomes]

PLO1. Analyze and design structural systems (including steel, concrete, sustainable engineered materials, prestressed components) using advanced theoretical concepts, applications of artificial intelligence and machine learning, and computational methods.

PLO2. Equip students with geotechnical engineering fundamentals, laboratory and field skills, design and analysis skills, modern tools, and sustainable solutions for civil engineering applications.

PLO3. Comprehend fundamental concepts, analyze key issues, design and manage water systems, develop understanding on climate change, acquaintance with modern tools such as remote sensing, geographic information systems, and integrating sustainability and ethical considerations in problem-solving.

PLO4. Develop proficiency in scientific, analytical, and technical approaches to evaluate, monitor, and mitigate environmental pollution while incorporating sustainable solutions, regulatory policies, introducing advanced surveying techniques, and climate adaptation strategies to enhance environmental health and sustainability.

PLO5. Understand fundamentals of highway materials and design and planning of transportation systems, introducing data analytics tools.

PLO6. Enable to appraise, plan and schedule civil engineering projects and be acquainted with the latest construction practices and introduce automation using advanced robotics and applications of unmanned aerial vehicles in civil engineering.

9. Map PLOs with Institute Learning Outcomes (ILOs) of the Degree

[Indicate '1' for weak, '2' for good, and '3' for excellent relation. Leave the cell blank to indicate no relation]

	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6
ILO1	1	1	3	3	3	1
ILO2		3	1	2	1	2
ILO3	3	1	2	3	2	2
ILO4	2	2	2	3	1	1
...	...	...	...	...	...	...

10. Number of Programme Core Credits

65.0

11. Number of Programme Elective Credits

18.0

12. Number of Open Credits

9.0

13. Number of Project Core Credits	3 (for BTech), 15 (for BTech Honours)
14. Details of Creative Expression and Ethical Reasoning (CEER) Component in the Programme [Mandatory for UG]	
Number of Credits Assigned	
Courses Involved and Credits Accounted [e.g., <i>If one module in AMLXXX with contact hours YY satisfies Z credits, then write AMLXXX (Z credits)</i>]	1. CVD 4800 BTP/Capstone Project (3 credits) *
15. Details of Emerging Trends (ETT) Component in the Programme [Mandatory for UG]	
Number of Credits Assigned	
Courses Involved and Credits Accounted [e.g., <i>If one module in AMLXXX with contact hours YY satisfies Z credits, then write AMLXXX (Z credits)</i>]	1. CVL3061: Traffic Engineering and Transportation Planning (3 credits) 2. CVL1021: Geological Engineering (3 credits) 3. CVL3041: Structural Analysis using ANN 4. CVL3081: Irrigation and Design of Hydraulic Structures (4 credits)
16. Details of Environment and Sustainability (E&S) Component in the Programme [Mandatory for UG]	
Number of Credits Assigned	
Courses Involved and Credits Accounted [e.g., <i>If one module in AMLXXX with contact hours YY satisfies Z credits, then write AMLXXX (Z credits)</i>]	1. CVL3012: Environmental Pollution and Health (4 credits) 2. CVLXXXX: Climate Change and Adaptation (2 credits) 3. CVL4012: Environmental Pollution and Climate
17. Details of Research/Technical Communication Component in the Programme [Mandatory for PG]	
Number of Credits Assigned	NA
Courses Involved and Credits Accounted [e.g., <i>If one module in AMLXXX with contact hours YY satisfies Z credits, then write AMLXXX (Z credits)</i>]	NA

18. Details of Professional Ethics Component in the Programme [Mandatory for PG]

Number of Credits Assigned	NA
Courses Involved and Credits Accounted [e.g., If one module in AMLXXX with contact hours YY satisfies Z credits, then write AMLXXX (Z credits)]	NA

19. Details of External Connect Component in the Programme [Mandatory for PG]

Number of Credits Assigned	NA
Courses Involved and Credits Accounted [e.g., If one module in AMLXXX with contact hours YY satisfies Z credits, then write AMLXXX (Z credits)]	NA

20. List of prescribed courses in all baskets (BS, GE, DC/PC, DE/PE, ...)

Basic Sciences (BS)	General Engineering (GE)	Departmental/Programme Core (DC/PC)	Departmental/Programme Elective (DE/PE)
Details are given below.	Details are given below.	Details are given below.	Details are given below.

Basic Sciences (BS):

S. No.	Course title	L-T-P	Credits
1.	MTL1001: Mathematics I Calculus	3-1-0	4.0
2.	PYP1000: Physics Laboratory	0-0-4	2.0
3.	PYL1003: Mechanics & Special Theory of Relativity	2-1-0	3.0
4.	MTL1002: Mathematics II Linear Algebra and Differential Equations	3-1-0	4.0

5.	CMP1000: Chemistry Laboratory	0-0-4	2.0
6.	CML1001: Structural Insights into Atoms and Molecules	2-1-0	3.0
7.	SBLXXXX: Biology for Engineers: Microbes in health and disease;	2-0-0	2.0
8.	SBPXXXX: Experimental Biology for Engineers	0-0-2	1.0
9.	BS Elective (Student's Choice)	3-0-0	3.0
Total			24.0 Credits

General Engineering (GE):

S. No.	Course title	L-T-P	Credits
1.	COL1000: Introduction to Programming - I	1-0-1	1.5
2.	COP0100: Computer Literacy	0-0-2	1.0
3.	APL1100: Engineering Mechanics	3-1-0	4.0
4.	ELL1000: Introduction to Electrical Engineering	2-1-2	4.0
5.	COL1001: Introduction to Programming - II	1-0-1	1.5
6.	CVLXXXX: Climate Change and Adaptation	2-0-0	2.0
7.	MCP1001: Engineering Visualization	0.5-0-3	2.0
8.	MCP1101: Manufacturing for Product Innovation	0.5-0-3	2.0
9.	CVLXXXX: Disaster Mitigation and Management	2-0-0	2.0
10.	GE Elective (Student's Choice)	4-0-0	4.0
Total			24.0 Credits

Department Core (DC)			
S. No.	Course Title	L-T-P	Credits
1	CVLXXXX: Mechanics of Fluids	2-0-2	3.0
2	CVLXXXX: Mechanics of Solids	2-0-2	3.0
3	CVL2044: Construction Contracts and Practices	2-0-0	2.0
4	CVL1001: Remote Sensing and Surveying & CVP1001: Remote Sensing and Surveying	2-0-2	3.0
5	CVL3012: Environmental Pollution and Health	3-0-2	4.0
6	CVL2044: Construction Contracts and Practices	2-0-0	2.0
6	CVL2042: Structural Analysis-I + CVP2042: Structures Analysis Lab	3-0-2	4.0
7	CVL2045: Modern Construction Management	3-0-0	3.0
8	CVL2061: Introduction to Highway Engineering + CVP2061: Highway Materials Laboratory	3-0-2	4.0
9	CVL3043: Design of Concrete Structures	2-1-0	3.0
10	CVL2081: Hydraulics + CVP2081: Hydraulics Lab	3-0-2	4.0
11	CVL1021: Geological Engineering + CVP1021: Geological Engineering Lab	2-0-2	3.0
12	CVL3021: Geotechnical Engineering - II & CVP3021: Geotechnical Engineering Lab	3-1-2	5.0
13	CVL3041: Structural Analysis using ANN	2-0-0	2.0
14	CVL3044: Design of Steel Structures + CVP3045: Structural Engineering Lab	2-1-2	4.0
15	CVL2082: Engineering Hydrology	2-0-2	3.0
16	CVL2022: Geotechnical Engineering - I + CVP2022: Soil Mechanics Lab	3-0-2	4.0

17	CVL4012: Environmental Pollution and Climate	2-0-2	3.0	
18	BTP-Part I/Capstone Project	0-0-6	3.0	
19	CVL3081: Irrigation and Design of Hydraulic Structures or CVL1021: Geological Engineering & CVP1021: Geological Engineering Lab	3-0-2	4.0	
20	CVL3061: Traffic Engineering and Transportation Planning	2-0-2	3.0	

21	CVL3081: Irrigation and Design of Hydraulic Structures	2-0-2	3.0

**Total 65.0
Credits**

Department Elective (DE): Total 07 Credits

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S. No.	Course title	L-T-P	Credits
1.	CVL4046: Advanced Structural Mechanics	3-0-0	3.0
2.	CVL4047: Advance Structural Design	3-0-0	3.0
3.	CVL4048: Prestressed Concrete & Industrial Structures	3-0-0	3.0
4.	CVL4049: Data Driven Modelling in Civil Engineering	3-0-0	3.0
5.	CVL7057: Finite Element Methods in Structural Engineering	2-0-2	3.0
6.	CVL7058: Solid Mechanics in Structural Engineering	3-0-0	3.0
7.	CVL7059: Dynamics of Structures	3-0-0	3.0
8.	CVL7062: Earthquake Resistant Design of Structures	3-0-0	3.0
9.	CVL7065: Concrete Mechanics	3-0-0	3.0
10.	CVL7066: Design of Bridge Structures	3-0-0	3.0
11.	CVL7069: Design of Tall Buildings	3-0-0	3.0
12.	CVL7071: Advanced Concrete Technology	3-0-0	3.0
13.	CVL8057: Structural Safety and Reliability	3-0-0	3.0
14.	CVL8058: Infrastructure for Green and Renewable Energy	3-0-0	3.0
15.	CVL8067: Atomistic & Multiscale Modelling of Materials	3-0-0	3.0
16.	CVL8069: Probabilistic Structural Dynamics	3-0-0	3.0
17.	CVL4021: Ground Engineering	3-0-0	3.0
18.	CVL4022: Rock Engineering	3-0-0	3.0
19.	CVL4023: Soil Dynamics	3-0-0	3.0
20.	CVL4024; Environmental Geotechnics and Geosynthetics	3-0-0	3.0
21.	CVL4031: Design of Foundations and Retaining Structures	3-0-0	3.0
22.	CVL4033: FEM Geotechnical Engineering	3-0-0	3.0
23.	CVL7XXX: Geo-Environmental Engineering	3-0-0	3.0
24.	CVL7XXX: Ground Improvement and Geosynthetics	3-0-0	3.0
25.	CVL7XXX: Slopes and Retaining Structures	3-0-0	3.0
26.	CVL7XXX: Slopes and Foundation	3-0-0	3.0
27.	CVL7XXX: Field Exploration and Geotechnical Processes	3-0-0	3.0
28.	CVL7XXX: Geological Fracture Mechanics	3-0-0	3.0
29.	CVL7XXX: Environmental Rock Engineering	3-0-0	3.0

30.	CVL4081: Water Resources Management	3-0-0	3.0
31.	CVL4XXX: Groundwater	2-0-0	2.0
32.	CVL4XXX: Water Resources Systems	2-0-0	2.0
33.	CVL4XXX: Urban Hydrology	2-0-0	2.0
34.	CVL4XXX: Frequency Analysis in Hydrology	2-0-0	2.0
35.	CVL4XXX: Groundwater and Surface Water Pollution	2-0-0	2.0
36.	CVL4XXX: Rainwater Harvesting	2-0-0	2.0
37.	CVL4XXX: Urban Drainage Design	2-0-0	2.0
38.	CVL4XXX: Water Power Engineering	2-0-2	3.0
39.	CVL4XXX: Computational Aspects in Water Resources Engineering	1-0-4	3.0
40.	CVL4XXX: River Mechanics	2-0-2	3.0
41.	CVL4XXX: Geo-informatics	2-0-2	3.0
42.	CVL4XXX: Artificial Intelligence and Machine Learning for Water and Climate	2-0-2	3.0
43.	CVL4XXX: Water Food Energy Nexus in Agricultural Systems	3-0-0	3.0
44.	CVL4XXX: Dam Safety and Maintenance	2-0-0	2.0
45.	CVL4XXX: Agricultural Water Management	2-0-0	2.0
46.	CVL4XXX: Climate Resilient Design & Management of Water Resources	2-0-0	2.0
47.	CVL3XXX: Introduction to Railway Engineering	3-0-0	3.0
48.	CVL3XXX: Applied Probability and Statistics for Civil Engineers	3-0-0	3.0
49.	CVL3XXX: Computer Applications in Transportation Engineering	1-0-4	3.0
50.	CVL3XXX: Introduction to Pavement Engineering	3-0-0	3.0
51.	CVL3XXX: Introduction to Public Transportation Systems	3-0-0	3.0
52.	CVL4XXX: Introduction to Airport Engineering	3-0-0	3.0
53.	CVL4XXX: Transportation System Analysis	3-0-0	3.0
54.	CVL4XXX: Introduction to Smart Mobility Systems	3-0-0	3.0
55.	CVL4XXX: Introduction to Transportation Logistics	3-0-0	3.0
56.	CVL4XXX: Introduction to Transportation Network Optimization	3-0-0	3.0
57.	CVL4XXX: Advance Water pollution monitoring Techniques	1-0-4	3.0
58.	CVL4XXX: Advance Air Pollution Monitoring Techniques	1-0-4	3.0
59.	CVL4XXX: Emerging Technologies for Environmental Management	3-0-0	3.0
60.	CVL4XXX: Aerosol Climate and Health	3-0-0	3.0
61.	CVL4XXX: Nature based Solutions for Pollution Control	3-0-0	3.0
62.	CVL4XXX: Life Cycle Analysis Assessment and Circular Economy	3-0-0	3.0
63.	CVL4XXX: Environmental Impact Assessment	3-0-0	3.0
64.	CVL4XXX: Environmetrics Techniques	2-0-0	2.0

65.	CVL4XXX: Industrial Waste Management	3-0-0	3.0
66.	CVL4XXX: Environmental System Analysis and Decision Making	3-0-0	3.0
67.	CVL4XXX: Solid Waste Engineering and Management	3-0-0	3.0
68.	CVL4XXX: Environmental Pollution Assessment	3-0-0	3.0
69.	CVL4XXX: Urban Environment	3-0-0	3.0
70.	CVL3044: Advanced Construction Project Management	3-0-0	3.0
71.	CVL7XXX: Artificial Intelligence and Machine Learning for Civil Engineering Applications	3-0-0	3.0
72.	CVL7XXX: Data Analytics for Civil Engineering Applications	2-0-0	2.0

[illegible]

4.38

23. Average Credit Students per Faculty per Semester, for this Programme

193.11

24. If the program is a revision of an existing program, please list the major changes made.	Yes The total number of DC credits has been decreased from 76 to 65. The DE credits have been increased from 14 to 18. New Courses: CVL3061: Advanced Traffic Engineering and Transportation Planning CVL4012: Advanced Environmental Pollution and Climate CVL3041: Structural Analysis using ANN Several other new courses and/or contents are introduced focusing on environment and sustainability; applications of artificial intelligence (AI) and machine learning (ML); data analytics and computational tools; automation using robotics; applications of unmanned aerial vehicles (UAVs); modern construction materials and structures.
25. Please elaborate on,	
a) how flexibility for the students has increased?	1. The DE credits have been increased from 14 to 18. The list of DE courses includes a basket of 72 courses. Based on interest, student will have a choice to take any one of these. 2. Many new courses available as electives

b) how engagement and interaction with the student have increased?	A total of 18 credits are allocated to laboratory courses with the objective of enhancing student engagement and promoting interactive learning. These lab sessions are designed to provide experiential learning opportunities, hands-on experience, allowing students to actively apply theoretical knowledge in a practical setting. Additionally, Departmental Core (DC) courses are structured to include a dedicated tutorial component, which is specifically designed to reinforce hands-on learning. The lab and tutorial components enable students to engage more deeply with the course material through the interaction with most of the faculty members in the Department.
c) how hands-on learning is emphasized in the program?	Some Departmental Core (DC) courses include a tutorial component designed to emphasize hands-on learning and practical application of theoretical concepts. Several courses have included fieldtrips, site works, data collection, and plant visits, reports on which are typically assessed through colloquium. Furthermore, the Capstone Project and the B.Tech Project are specifically structured to provide students with immersive, hands-on learning experiences, enabling them to apply their knowledge to real-world engineering problems.