Bachelor of Technology in Civil Engineering

Programme Level	Under Graduate
Year of Commencement	2015
Minimum Duration	4 Years (8 Semesters)
Maximum Duration	6 Years (12 Semesters)

Motivation

The development of a country primarily depends on the availability of physical infrastructure and facilities for civil society. These Infrastructures play a vital role in the improvement of the country's economic growth and standard of living. The adequate infrastructure in the form of road and railway transport system, ports, power plants, airports and their efficient working is also essential for integration of the country's economy with other economies of the world. A civil engineer plays an important role in developing and maintaining these infrastructures. Our country, which is investing significantly to improve its infrastructure facilities like metro rails, smart cities, express ways, highways, ports, airports, dedicated freight corridors, etc. to cope up with its ever-increasing needs, requires high quality civil engineers who can handle these specific projects. As one of the premium institutes in India, IIT Mandi offers both UG and PG programmes in civil engineering to train students who can take up the real-world challenges.

The undergraduate Civil Engineering programme at IIT Mandi is designed to recognize the modern pace of development in infrastructure across the world. This programme provides basic knowledge in engineering geology, construction materials, solid, fluid and soil mechanics, environmental science and engineering that helps in planning, design and construction of bridges, buildings, hydraulic structures, environmental systems, and transportation systems including highways, railways, airports etc. Along with this broad training, students are also encouraged to pursue elective courses in any specialized areas of Civil Engineering like structural engineering, geotechnical engineering, transportation engineering, and environmental engineering. A two–semester project during the fourth year of the B.Tech programme is intended to synthesize their knowledge in selected specialized area of Civil Engineering. Students are also encouraged to take up courses from other disciplines as open electives to carry out interdisciplinary projects during their due course of the programme. The students, who are equally inclined towards other disciplines, can take the necessary courses under relevant program and get a minor.

Objectives of the program

- To impart knowledge on application of principles of physics and mathematics, blended with modern data science, to provide solutions for common to most extraordinary problems of society.

- To train how to plan, analyse, design, execute and manage the civil engineering projects.

- To develop industry-ready manpower, who are capable to take up challenging and state-of-the-art infrastructure projects.

- To motivate the students for higher education and research to become experts in specialized fields in order to come up with innovative and economical solutions for real world problems.

List of Core Courses for Civil Engineering Program

(Total Credits for Discipline Core = 33)

Course No.	Course Title	Lecture	Tutorial	Practical	Total Credit	Semester
CE201	Surveying Traditional and Digital	2	0	2	3	3
CE251	Hydraulics Engineering	3	0	0	3	3
CE304P	Hydraulics Engineering Lab	0	0	2	1	3
CE301	Strength of Materials and Structures	3	0	2	4	4
CE302	Geotechnical Engineering	3	0	2	4	4
CE303	Water Resources Engineering	3	0	0	3	5
CE305P	Environment and Earth Science Lab	0	0	2	1	5
CE351	Design of Reinforced Concrete Structures	2	1	0	3	5
CE352	Transportation Engineering	3	0	0	3	5
CE353P	Civil Engineering Drawing	0	0	2	1	5
CE354P	Building and Pavement Materials Lab	0	0	2	1	6
CE401	Design of Steel Structures	2	1	0	3	6
CE403	Wastewater Engineering	3	0	0	3	6

Semester wise distribution of all courses
(Minimum credit requirements for B.Tech. degree 160 credits)

Abbreviations	
IC	Institute Core Subject (compulsory to all branches of B.Tech.)
DC	Discipline Core Subject (branch specific compulsory courses)
DE	Discipline Elective Subject (branch specific elective courses)
FE	Free Elective (elective open to all branches of B.Tech.)
MTP (total 8 credits)	Major Technical Project (optional, students may opt for courses instead)

1st Semester						
S. No.	Core/ Elective	Course Name	Lecture	Tutorial	Practical	Credit
1	IC110	Engineering Mathematics	2.5	0.5	0	3
2	IC152	Computing and Data science	3	0	2	4
3	IC160	Electrical Systems Around Us	2.5	0.5	0	3
4	IC160P	Electrical Systems Around Us Lab	0	0	3	2
5	IC140	Graphics for design	2	0	3	4
6	IC101P	Reverse Engineering	0	0	3	2
7	HS10X	Creative Understanding				1
8	HSXXX	HS Basket Course	3	0	0	3
					Total Credit	22

2nd Semester						
S. No.	Core/ Elective	Course Name	Lecture	Tutorial	Practical	Credit
1	IC111	Linear Algebra	2.5	0.5	0	3
2	IC141	Product Realization Technology	2	0	0	2
3	IC141P	Product Realization Technology Lab	0	0	3	2
4	IC161	Applied Electronics	3	0	0	3
5	IC161P	Applied Electronics Lab	0	0	3	2
6	IC142	Engineering Thermodynamics	3	0	0	3
7	IC252	Data Science II	3	0	2	4
8	HSXXX	HS Basket Course	3	0	0	3
					Total Credit	22

**3rd Semester**						
S. No.	**Core/ Elective**	**Course Name**	**Lecture**	**Tutorial**	**Practical**	**Credit**
1	IC240	Mechanics of Rigid Bodies	3	0	0	3
2	IC272	Data Science III	2	0	2	3
3	CE201	Surveying: Traditional and Digital	2	0	2	3
4	CE251	Hydraulics Engineering	3	0	0	3
5	CE304P	Hydraulics Engineering Lab	0	0	2	1
6	HSXXX	HSS basket Course	3	0	0	3
7	HSXXX	HSS basket Course	3	0	0	3
8	ICXXX	Science I Basket	3	0	0	3
					Total Credit	**22**

**4th Semester**						
S. No.	**Core/ Elective**	**Course Name**	**Lecture**	**Tutorial**	**Practical**	**Credit**
1	IC221	Foundations of Electrodynamics	3	0	0	3
2	IC222P	Physics Practicum/Practical	0	0	3	2
3	IC XXX	Science II Basket	3	0	0	3
4	IC201P	Design Practicum	0	0	6	4
5	CE301	Strength of Materials and Structures	3	0	2	4
6	CE302	Geotechnical Engineering	3	0	2	4
7	ICXXX	Eng. Sciences Basket	3	0	0	3
					Total Credit	**23**

**5th Semester**						
S. No.	**Core/ Elective**	**Course Name**	**Lecture**	**Tutorial**	**Practical**	**Credit**
1	CE303	Water Resources Engineering	3	0	0	3
2	CE351	Design of Reinforced Concrete Structures	2	1	0	3
3	CE352	Transportation Engineering	3	0	0	3
4	CE353P	Civil Engineering Drawing	0	0	2	1
5	CE305P	Environment and Earth Science Lab	0	0	2	1
6	FE – 1	Free Elective				3/4
7	CEXXX	Discipline Elective	3	0	0	3
8	FE – 2	Free Elective				3/4
					Total Credit	**20 - 21**

6th Semester						
S. No.	Core/ Elective	Course Name	Lecture	Tutorial	Practical	Credit
1	CE401	Design of Steel Structures	2	1	0	3
2	CE403	Wastewater Engineering	3	0	0	3
3	CE354P	Building and Pavement Materials Lab	0	0	2	1
4	CEXXX	Discipline Elective				3/4
5	FE – 3	Free Elective				3/4
6	HSXXX	HSS Elective				3/4
7	FE – 4	Free Elective				3/4
					Total Credit	19 - 23

7th Semester						
S. No.	Core/ Elective	Course Name	Lecture	Tutorial	Practical	Credit
1	CEXXX	Discipline Elective				3/4
2	CEXXX	Discipline Elective				3/4
3	FE – 5	Free Elective				3/4
4	HSXXX	HSS Elective				2/3
5	DP401P	MTP-I				3
6	ITXX1	Internship	0	0	2	2
					Total Credit	15-23

8th Semester						
S. No.	Core/ Elective	Course Name	Lecture	Tutorial	Practical	Credit
1	FE – 6	Free Elective				3/4
2	FE – 7	Free Elective				3/4
3	DP402P	MTP-II				5
					Total Credit	11-13

Tentative List of Discipline Elective Courses

S. No.	Course	Course Name	Lecture	Tutorial	Practical	Credit
Geology and Remote Sensing						
1	CE252	Geology and Geomorphology	2	0	2	3
2	CE508	Photogeology and Photogrammetry	2	0	2	3
3	CE501	Remote Sensing	2	0	2	3
4	CE601	Geo-Informatics	2	0	1	3
Geotechnical Engineering						
5	CE402	Geotechnical Engineering-II	2	1	0	3
6	CE504	Slope Stability and Retaining Structures	3	0	0	3
7	CE505	Engineering of Ground Modification	3	0	0	3
8	CE551	Geosynthetics and their applications	3	0	0	3
9	CE560	Soil Dynamics	3	0	0	3
10	CE512	Advanced Soil Mechanics	3	0	0	3
11	CE513	Advanced Foundation Engineering	3	0	0	3
12	CE606	Constitutive Modeling of Frictional Material	3	0	0	3
Structural Engineering						
13	CE506	Analysis of Indeterminate Structures	3	0	0	3
14	CE507	Advanced Concrete Science	3	0	0	3
15	CE509	Bridge Engineering	3	0	0	3
16	CE511	Structural Dynamics with Application to Earthquake Engineering	3	0	0	3
17	CE552	Concrete Technology	3	0	0	3
18	CE 554	Prestressed Concrete Structure	3	0	0	3
19	CE555	Advanced Design of Structures	3	0	0	3
20	CE556P	Structural Engineering Laboratory	0	0	4	2
21	CE557	Solid Mechanics in Structural Engineering	3	0	0	3
22	CE605	Engineering Seismology and Seismic Hazard Assessment	3	0	0	3
23	CE610	Analysis and Design for Earthquake Resistant Structures	3	0	0	3
24	CE611	Structural Health Monitoring	3	0	0	3
25	CE612	Theory of Plates and Shells	3	0	0	3
26	ME513	Finite Element Methods in Engineering	3	0	2	4
Water Resource and Environmental Engineering						
27	CE355	Hydrology	3	0	0	3
28	CE502	Groundwater Flow and Contaminant Transport Modeling	3	0	0	3
29	CE510	Modelling and Simulation in Water Resources Engineering	2	0	2	3
30	CE558	Air Pollution and its Mitigation	3	0	0	3
31	CE559	Biological Wastewater Treatment	3	0	0	3