

Departmental UG Curriculum Implementation Committee
DEPARTMENT OF CIVIL ENGINEERING, IIT DELHI

Structure for BTech Degree in Civil Engineering

(i) Credits distribution **170 (155 + 15 non graded core)**

1. Departmental credits	77
a. Core	63
b. Elective	14
2. Outside department credits	68
a. BS	22
b. EAS	18
c. HuSS	15
d. Programme linked	13
i. Civil Engg Materials	3 credits (3-0-0)
ii. Mechanics of Fluids	5 credits (3-1-2)
iii. Mechanics of Solids	5 credits (3-1-2)
3. Open category credits	10
4. Non-graded core requirement	15

(ii) Proposed slotting pattern for core + Elective + Programme Linked + Open Cat courses

III (25)	PLC1- CEL141 (3-0-0)	DC1- CEL121 (3-0-0)	DC2- CEL111 (3-0-2)	PLC2- AMLXX (3-1-2)	PLC3- AMLXX (3-1-2)	HuSS1 (3-1-0)	Intro Dept, CEP121
IV (23)	DC3- CEL242 (3-0-0)	DC4- CEL222 (3-0-0)	DC5- CEL281 (3-1-0)	DC6- CEL261 (3-0-0)	EnvSt- CEL100 (2-0-0)	HuSS2 (3-1-0)	CEP242, CEP222, CEP281, CEP261
V (22.5)	DC7- CEL245 (2-0-0)	DC8- CEL321 (3-1-0)	DC9- CEL282 (3-0-2)	DC10- CEL341 (3-0-0)	DC11- CEL243 (3-0-0)	Biology (3-0-2)	CEP243, CEP321,
VI (21)	DC12- CEL342 (3-0-0)	DC13- CEL244 (2-0-0)	DC14- CEL381 (3-0-2)	DC15- CEL212 (3-0-2)	OC (3-0-0)	HuSS3 (3-1-0)	CEP342
VII (15.5)	DE1 (3-0-0/2-0-2)	DE2 (3-0-0/2-0-2)	DE3/OC (3-0-0/2-0-2)	DE4 (2-0-0)	DE5/OC (2-0-0)	HuSS4 (3-0-0)	CEP441, CED411 (0-0-8)
VIII (14)	DE6 (3-0-0/2-0-2)	DE7 (3-0-0/2-0-2)	DE8/OC (3-0-0/2-0-2)	DE9 (2-0-0)	DE10/OC (2-0-0)	OC (3-0-0/2)	CED411, CED412 (0-0-12)

(iii) List of core courses

SNo	Course type	Course Number	Credit	Name of Course
Lecture (with/without Lab) Courses				
1	PLC1	CEL141	3 (3-0-0)	Civil Engineering Materials
2	PLC2	AMLXX	5 (3-1-2)	Mechanics of Fluids
3	PLC3	AMLXX	5 (3-1-2)	Mechanics of Solids
4	DC1	CEL121	3 (3-0-0)	Engineering Geology
5	DC2	CEL111	4 (3-0-2)	Elements of Surveying
6	DC3	CEL242	3 (3-0-0)	Structural Analysis I
7	DC4	CEL222	3 (3-0-0)	Soil Mechanics
8	DC5	CEL281	4 (3-1-0)	Hydraulics
9	DC6	CEL261	3 (3-0-0)	Introduction to Transportation Engineering
10	DC7	CEL245	2 (2-0-0)	Construction Management
11	DC8	CEL321	4 (3-1-0)	Geotechnical Engineering
12	DC9	CEL282	4 (3-0-2)	Engineering Hydrology
13	DC10	CEL341	3 (3-0-0)	Structural Analysis II
14	DC11	CEL243	3 (3-0-0)	RC Design
15	DC12	CEL342	3 (3-0-0)	Steel Design
16	DC13	CEL244	2 (2-0-0)	Construction Practices
17	DC14	CEL381	4 (3-0-2)	Design of Hydraulic Structures
18	DC15	CEL212	4 (3-0-2)	Environmental Engineering
Separate Lab/Project Courses				
1	DCP1	CEP121	1 (0-0-2)	Engineering Geology Lab
2	DCP2	CEP242	1 (0-0-2)	Structural Analysis Lab
3	DCP3	CEP222	1 (0-0-2)	Soil Mechanics Lab
4	DCP4	CEP281	1 (0-0-2)	Hydraulics Lab
5	DCP5	CEP261	1 (0-0-2)	Transportation Engineering Lab
6	DCP6	CEP321	1 (0-0-2)	Geotechnical Engineering Lab
7	DCP7	CEP243	1.5 (0-0-3)	Structures & Material (Concrete) Lab
8	DCP8	CEP342	1 (0-0-2)	Structures & Material (Steel) Lab
9	DCP9	CEP441	1.5 (0-0-3)	Structural Design & Detailing
10	DCP10	CED411	4 (0-0-8)	BTech Project Part 1
11	DCP11	CED412	6 (0-0-12)	BTech Project Part 2

Students opting for Specialisation only are allowed to register CED411 (Project Part 1) in VII Semester as Core and rest students have to take CED411 (Project Part1) in VIII Semester as core, also students doing Specialisation will register CED412 (Project Part 2) in VIII Semester as Core.

(iv) Distribution of Core Credits among various Sections

SNo	Section	Core Credits
1	Structural Engineering	24 (21+3 PLC)
2	Geotechnical Engineering	13
3	Water Resources Engineering	13
4	Environmental Engineering	04
5	Transportation Engineering	04
6	Surveying	04
7	BTP (Project)	04
	Total Core Credits	66 (63+3 PLC)

Environmental Engg section has got 2 credits load as Institute Core (Environmental Studies) course.

(v) Proposed Slots for Electives – 14 credits

SNo	Course type	Credits	Slots in Semester
1	DE1, DE2, DE3	3 (3-0-0/2-0-2)	3 slots in VII Semester
2	DE4, DE5	2 (2-0-0)	2 slots in VII Semester
3	DE6, DE7, DE8	3 (3-0-0/2-0-2)	3 slots in VIII Semester
4	DE9, DE10	2 (2-0-0)	2 slots in VIII Semester

(vi) List of Elective courses (DE)

SNo	Course Number	Credits	Name of Course
			Environmental Engineering
1	CEL311	3-0-0 (3)	Industrial Waste Management
2	CEL312	3-0-0 (3)	Environmental Assessment Methodologies
3	CEL313	3-0-0 (3)	Air and Noise Pollution
4	CEL794	3-0-0 (3)	Solid & Hazardous Waste Management (PG)
5	CEL797	3-0-0 (3)	Environmental Impact Assessment (PG)
6	CEL886	3-0-2 (4)	Environmental Systems Analysis (PG)
7	CEL889	3-0-0 (3)	Emerging Technologies for Environmental Management (PG)
8	CEL891	3-0-0 (3)	Thermal Techniques for Waste Management (PG)
9	CEL895	3-0-0 (3)	Ecology & Eco-system Dynamics (PG)
10	CEL896	3-0-0 (3)	Design of Water & Waste Water Facilities (PG)
11	CEL898	3-0-0 (3)	Life Cycle Analysis & Design for Environment (PG)
12	CEL899	3-0-0 (3)	Environmental Risk Assessment (PG)
			Geotechnical Engineering
13	CEL421	3-0-0 (3)	Ground Engineering
14	CEL422	3-0-0 (3)	Rock Engineering
15	CEL423	3-0-0 (3)	Soil Dynamics
16	CEL424	3-0-0 (3)	Environmental Geotechniques & Geosyntheses
17	CEL431	3-0-0 (3)	Design of Foundations & Retaining Structures
18	CEL432	2-0-0 (2)	Stability of Slopes
19	CEL433	3-0-0 (3)	FEM in Geotechnical Engineering
20	CEP434	0-0-4 (2)	Geotechnical Design Studio
21	CEL435	2-0-0 (2)	Underground Structures
			Structural Engineering
22	CEL344	3-0-0 (3)	Construction Project Management
23	CEL441	3-0-0 (3)	Structural Design
24	CEL442	3-0-0 (3)	Structural Analysis III
25	CEL443	3-0-0 (3)	Prestressed Concrete & Industrial Structures
26	CEL717	3-0-0 (3)	Advanced Structural Analysis (PG)
27	CEL718	2-1-0 (3)	Design of Steel Structures (PG)
28	CEL719	3-0-0 (3)	Structural Dynamics (PG)
29	CEL721	2-1-0 (3)	Design of Concrete Structures (PG)
30	CEL722	3-0-0 (3)	Solid Mechanics in Structural Engineering (PG)
31	CEL724	3-0-0 (3)	Earthquake Analysis and Design (PG)
32	CEL727	2-1-0 (3)	Design of Industrial Structures (PG)
33	CEL729	2-1-0 (3)	Advanced Design of Bridges (PG)
34	CEL731	3-0-0 (3)	Prestressed/Composite Structures (PG)
35	CEL733	2-1-0 (3)	Finite Element Method in Structural Engineering (PG)
36	CEL734	2-1-0 (3)	Mathematical and Numerical Methods (PG)
37	CEL766	3-0-0 (3)	Systems Design and Value Analysis (PG)
38	CEL767	3-0-0 (3)	Construction and Contract Management (PG)
39	CEL768	3-0-0 (3)	Recent Advances in Construction Materials (PG)

40	CEL769	2-1-0 (3)	Project Planning and Control (PG)
41	CEL771	3-0-0 (3)	Civil Engineering Materials (PG)
42	CEL772	2-1-0 (3)	Quantitative Methods in Construction Management (PG)
43	CEL773	2-1-0 (3)	Management of Quality and Safety in Construction (PG)
44	CEL774	3-0-0 (3)	Construction Engineering Practices (PG)
45	CEL776	3-0-0 (3)	Functional Planning, Building Services and Main. Man (PG)
46	CEL777	3-0-0 (3)	Building Science (PG)
47	CEL778	3-0-0 (3)	Construction Methods and Equipment (PG)
48	CEL779	3-0-0 (3)	Construction Economics and Finance (PG)
49	CEL780	3-0-0 (3)	Formwork for Concrete Structures (PG)
50	CEL817	3-0-0 (3)	Structural Safety and Reliability (PG)
51	CEL818	2-1-0 (3)	Design of Plates and Shells (PG)
52	CEL819	3-0-0 (3)	Concrete Mechanics (PG)
53	CEL822	3-0-0 (3)	Stability Theory in Structural Engineering (PG)
54	CEL824	2-1-0 (3)	Design of Offshore Structures (PG)
55	CEL826	2-0-2 (3)	Advanced Finite Element Method and Programming (PG)
56	CEL828	3-0-0 (3)	Wind Resistant Design of Structures (PG)
57	CEL832	2-1-0 (3)	Design of Tall Buildings (PG)
58	CEL836	2-0-2 (3)	Structural Health Monitoring (PG)
59	CEL866	3-0-0 (3)	Infrastructure Development and Management (PG)
			Transportation Engineering
60	CEL361	3-0-0 (3)	Introduction to Railway Engineering
61	CEL461	3-0-0 (3)	Logistics and Freight Transport
62	CEL462	3-0-0 (3)	Introduction to Intelligent Transportation Systems
63	CEL781	2-0-2 (3)	Urban and Regional Transportation Planning (PG)
64	CEL782	2-0-2 (3)	Pavement Materials and Construction Techniques (PG)
65	CEL783	3-0-2 (3)	Traffic Engineering (PG)
66	CEL784	3-0-2 (3)	Design and Maintenance of Pavements (PG)
67	CEL785	2-0-2 (3)	Advanced Transportation Modelling (PG)
68	CEL786	2-0-2 (3)	Geometric Design of Streets and Highways (PG)
69	CEL788	3-0-0 (3)	Public Transportation Systems (PG)
70	CEL844	3-0-0 (3)	Transportation Economics and Finance (PG)
71	CEL845	3-0-0 (3)	Transportation and Traffic Infrastructure Design (PG)
72	CEL846	3-0-0 (3)	Airport Planning and Design (PG)
73	CEL8XX	3-0-0 (3)	Transportation Infrastructure Management (PG)
			Water Resources Engineering
74	CEL284	2-0-2 (3)	Fundamentals of Geographic Information Systems
75	CEL382	2-0-0 (2)	Groundwater
76	CEL383	2-0-0 (2)	Water Resources Systems
77	CEL384	2-0-0 (2)	Urban Hydrology
78	CEL385	2-0-0 (2)	Frequency Analysis in Hydrology
79	CEL386	2-0-2 (3)	Fundamentals of Remote Sensing
80	CEL481	3-0-0 (3)	Water Resources Management
81	CEL482	2-0-2 (3)	Water Power Engineering
82	CEL483	2-0-0 (2)	Groundwater & Surface-water Pollution
83	CEL484	1-0-4 (3)	Computational Aspects in Water Resources
84	CEL485	2-0-2 (3)	River Mechanics
85	CEL486	2-0-2 (3)	Geo-informatics
86	CEL7XX	3-0-0 (3)	Mechanics of Sediment Transport (PG)

(vii) Specialisation – 20 Credits (10 in Lieu of OC + 6 Additional as Project + 4)

Total Credits **180** (165 + 15 non graded core)

1. Departmental credits **97**
 - a. Departmental Core 63
 - b. Departmental Elective 10
 - c. Specialisation Core 10 in Lieu of OC
 - d. Specialisation Elective 8
 - e. Specialisation Project 6
2. Outside department credits (BS/EAS/HuSS/PLC) 68
3. Open category credits 0

SNo	Course type	Credits	Remarks
1	CED411 (Project Part 1)	4 (0-0-8)	VII Semester
2	CED412 (Project Part 2)	6 (0-0-12)	VIII Semester
3	Specialisation Core courses in Lieu of OC	10	From Basket of Core Courses of Specialisation
4	Specialisation Elective Courses	8	From Basket of Elective Courses of Specialisation
5	Departmental Core Courses	59	All Core Courses of the Department
6	Departmental Elective Courses	10	From list of Elective Courses of Department

18 credits (excluding Project Part 2 of 6 credits) of Specialisation Core + Elective courses should be from the basket of courses of that Specialisation, out of which minimum 10 credits should be core courses.

List of Specialisations

1. Environmental Engineering
2. Geotechnical Engineering
3. Structural Engineering
4. Transportation Engineering
5. Water Resources Engineering

(viii) Basket of Courses for Specialisation – 18 Credits (Core + Elective)

SNo	Course Number	Credits	Name of Course
A	Specialisation - Environmental Engineering		
	Core Courses		
1	CEL313	3-0-0 (3)	Air and Noise Pollution
2	CEL794	3-0-0 (3)	Solid & Hazardous Waste Management (PG)
3	CEL886	3-0-2 (4)	Environmental Systems Analysis (PG)
	Elective Courses		
1	CEL311	3-0-0 (3)	Industrial Waste Management
2	CEL312	3-0-0 (3)	Environmental Assessment Methodologies
3	CEL797	3-0-0 (3)	Environmental Impact Assessment (PG)
4	CEL889	3-0-0 (3)	Emerging Technologies for Environmental Management (PG)
5	CEL891	3-0-0 (3)	Thermal Techniques for Waste Management (PG)
6	CEL895	3-0-0 (3)	Ecology & Eco-system Dynamics (PG)
7	CEL896	3-0-0 (3)	Design of Water & Waste Water Facilities (PG)

8	CEL898	3-0-0 (3)	Life Cycle Analysis & Design for Environment (PG)
9	CEL899	3-0-0 (3)	Environmental Risk Assessment (PG)
B	Specialisation - Geotechnical Engineering		
	Core Courses		
1	CEL421	3-0-0 (3)	Ground Engineering
2	CEL422	3-0-0 (3)	Rock Engineering
3	CEL423	3-0-0 (3)	Soil Dynamics
4	CEL424	3-0-0 (3)	Environmental Geotechniques & Geosyntheses
			Elective Courses
1	CEL431	3-0-0 (3)	Design of Foundations & Retaining Structures
2	CEL432	2-0-0 (2)	Stability of Slopes
3	CEL433	3-0-0 (3)	FEM in Geotechnical Engineering
4	CEL434	0-0-4 (2)	Geotechnical Design Studio
5	CEL435	2-0-0 (2)	Underground Structures
C	Specialisation - Structural Engineering		
	Core Courses		
1	CEL441	3-0-0 (3)	Structural Design
2	CEL442	3-0-0 (3)	Structural Analysis III
3	CEL443	3-0-0 (3)	Prestressed Concrete & Industrial Structures
4	CEL722	3-0-0 (3)	Solid Mechanics in Structural Engineering (PG)
	Elective Courses		
1	CEL344	3-0-0 (3)	Construction Project Management
2	CEL717	3-0-0 (3)	Advanced Structural Analysis (PG)
3	CEL718	2-1-0 (3)	Design of Steel Structures (PG)
4	CEL719	3-0-0 (3)	Structural Dynamics (PG)
5	CEL721	2-1-0 (3)	Design of Concrete Structures (PG)
6	CEL724	3-0-0 (3)	Earthquake Analysis and Design (PG)
7	CEL727	2-1-0 (3)	Design of Industrial Structures (PG)
8	CEL729	2-1-0 (3)	Advanced Design of Bridges (PG)
9	CEL731	3-0-0 (3)	Prestressed/Composite Structures (PG)
10	CEL733	2-1-0 (3)	Finite Element Method in Structural Engineering (PG)
11	CEL734	2-1-0 (3)	Mathematical and Numerical Methods (PG)
12	CEL766	3-0-0 (3)	Systems Design and Value Analysis (PG)
13	CEL767	3-0-0 (3)	Construction and Contract Management (PG)
14	CEL768	3-0-0 (3)	Recent Advances in Construction Materials (PG)
15	CEL769	2-1-0 (3)	Project Planning and Control (PG)
16	CEL771	3-0-0 (3)	Civil Engineering Materials (PG)
17	CEL772	2-1-0 (3)	Quantitative Methods in Construction Management (PG)
18	CEL773	2-1-0 (3)	Management of Quality and Safety in Construction (PG)
19	CEL774	3-0-0 (3)	Construction Engineering Practices (PG)
20	CEL776	3-0-0 (3)	Functional Planning, Building Services and Main. Man (PG)
21	CEL777	3-0-0 (3)	Building Science (PG)
22	CEL778	3-0-0 (3)	Construction Methods and Equipment (PG)
23	CEL779	3-0-0 (3)	Construction Economics and Finance (PG)
24	CEL817	3-0-0 (3)	Structural Safety and Reliability (PG)
25	CEL818	2-1-0 (3)	Design of Plates and Shells (PG)
26	CEL819	3-0-0 (3)	Concrete Mechanics (PG)
27	CEL822	3-0-0 (3)	Stability Theory in Structural Engineering (PG)
28	CEL824	2-1-0 (3)	Design of Offshore Structures (PG)
29	CEL826	2-0-2 (3)	Advanced Finite Element Method and Programming (PG)
30	CEL828	3-0-0 (3)	Wind Resistant Design of Structures (PG)
31	CEL832	2-1-0 (3)	Design of Tall Buildings (PG)
32	CEL836	2-0-2 (3)	Structural Health Monitoring (PG)

33	CEL866	3-0-0 (3)	Infrastructure Development and Management (PG)
34	CEL780	3-0-0 (3)	Formwork for Concrete Structures (PG)
D	Specialisation - Transportation Engineering		
	Core Courses		
1	CEL781	2-0-2 (3)	Urban and Regional Transportation Planning (PG)
2	CEL782	2-0-2 (3)	Pavement Materials and Construction Techniques (PG)
3	CEL783	3-0-2 (4)	Traffic Engineering (PG)
	Elective Courses		
1	CEL361	3-0-0 (3)	Introduction to Railway Engineering
2	CEL461	3-0-0 (3)	Logistics and Freight Transport
3	CEL462	3-0-0 (3)	Introduction to Intelligent Transportation Systems
4	CEL784	3-0-2 (3)	Design and Maintenance of Pavements (PG)
5	CEL785	2-0-2 (3)	Advanced Transportation Modelling (PG)
6	CEL786	2-0-2 (3)	Geometric Design of Streets and Highways (PG)
7	CEL788	3-0-0 (3)	Public Transportation Systems (PG)
8	CEL844	3-0-0 (3)	Transportation Economics and Finance (PG)
9	CEL845	3-0-0 (3)	Transportation and Traffic Infrastructure Design (PG)
10	CEL846	3-0-0 (3)	Airport Planning and Design (PG)
11	CEL8XX	3-0-0 (3)	Transportation Infrastructure Management (PG)
E	Specialisation - Water Resources Engineering		
	Core Courses		
1	CEL382	2-0-0 (2)	Groundwater
2	CEL481	3-0-0 (3)	Water Resources Management
3	CEL482	2-0-2 (3)	Water Power Engineering
4	CEL483	2-0-0 (2)	Groundwater & Surface-water Pollution
	Elective Courses		
1	CEL284	2-0-2 (3)	Fundamentals of Geographic Information Systems
2	CEL383	2-0-0 (2)	Water Resources Systems
3	CEL384	2-0-0 (2)	Urban Hydrology
4	CEL385	2-0-0 (2)	Frequency Analysis in Hydrology
5	CEL386	2-0-2 (3)	Fundamentals of Remote Sensing
6	CEL484	1-0-4 (3)	Computational Aspects in Water Resources
7	CEL485	2-0-2 (3)	River Mechanics
8	CEL486	2-0-2 (3)	Geo-informatics
9	CEL7XX	3-0-0 (3)	Mechanics of Sediment Transport (PG)

(Prof B Bhattacharjee)
(Chairman)

(Prof B R Chahar)
(Convener & SI, WRE)

(Prof KS Rao)
(Member & SI, GE)

(Prof BJ Alappat)
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(Member & SI, TE)

Chairman DFB (Head), Civil Engineering