

**Indian Institute of Engineering Science and Technology, Shibpur**  
 Course Structure for Two-Year M.Tech Program (From 2019 Onward)  
**Department of Civil Engineering**

**Specialization: Environmental Engineering**

**1<sup>st</sup> Semester**

Sl. No	Course Name	Course code	Class Load/Week			Credit	Marks
			L	T	P		
1.	Paper I: Chemistry for Environmental Engineering	CE 5110	3	0	0	3	100
2.	Paper II: Biological Processes in Wastewater Treatment	CE 5111	3	0	0	3	100
3.	Paper III: Physico-Chemical Processes in Water and Wastewater Treatment	CE 5112	3	0	0	3	100
4.	Paper IV: (Dep. Elective)		3	0	0	3	100
5.	Paper V: (Open Elective)		3	0	0	3	100
	<b>Theory Sub-total</b>		15	0	0	15	500
6.	Water Quality Analysis Lab	CE5180	0	0	3	2	50
7.	Physicochemical Process Lab	CE5181	0	0	3	2	50
8.	Biological Process Lab	CE5182	0	0	3	2	50
	<b>Practical Sub-total</b>		NIL	NIL	9	6	150
	1st Semester Total					21	650

**2<sup>nd</sup> Semester**

Sl. No	Course Name	Course code	Class Load/Week			Credit	Marks
			L	T	P		
1.	Paper VI: Industrial Pollution Control	CE5210	3	0	0	3	100
2.	Paper VII: Air Pollution and Control	CE5211	3	0	0	3	100
3.	Paper VIII: Solid and Hazardous Waste Management	CE5212	3	0	0	3	100
4.	Paper IX (Dep. Elective)		3	0	0	3	100
5.	Paper X (Open Elective)		3	0	0	3	100
	<b>Theory Subtotal</b>		10	1	0	15	500
6.	M. Tech Project Part - I (Term Paper)	CE5291	0	0	2	4	200
7.	Term Paper Seminar & Viva-voce	CE5292	0	0	0	2	100
	<b>Practical Subtotal</b>		0	0	0	6	300
	2 <sup>nd</sup> Semester Total					21	800

<b><u>Paper IV [Departmental Elective]</u></b>		<b><u>Paper IX [Departmental Elective]</u></b>	
<b><u>Course Code</u></b>	<b><u>Course Title</u></b>	<b><u>Course Code</u></b>	<b><u>Course Title</u></b>
CE5145	Rural Water Supply and Sanitation	CE5245	Process and Hydraulic Design of Water and Wastewater Systems
CE5146	Environmental Management and legislation	CE 5246	Environmental Biotechnology
CE5147	Energy Evolution from Waste Material		

## Specialization: Geotechnical Engineering

### 1<sup>st</sup> Semester

Sl. No	Course Name	Course code	Class Load/Week			Credit	Marks
			L	T	P		
1.	Paper I: Advanced Soil Mechanics	CE 5104	3	0	0	3	100
2.	Paper II: Foundation Engineering	CE 5105	3	0	0	3	100
3.	Paper III: Dynamics of Soils and Machine Foundations	CE 5106	3	0	0	3	100
4.	Paper IV: (Dept. Elective)		3	0	0	3	100
5.	Paper V:(Open Elective)		3	0	0	3	100
	<b>Theory Sub-total</b>		15	0	0	15	500
6.	Advanced Geotechnical Engineering Laboratory	CE5174	0	0	3	2	50
7.	Geotechnical Model Laboratory	CE5175	0	0	3	2	50
8.	Advanced Geotechnical Engineering Project	CE5176	0	0	3	2	50
	<b>Practical Sub-total</b>		NIL	NIL	9	6	150
	1st Semester Total					21	650

### 2<sup>nd</sup> Semester

Sl. No	Course Name	Course code	Class Load/Week			Credit	Marks
			L	T	P		
1.	Paper VI: Applied Geotechnical Engineering	CE5204	3	0	0	3	100
2.	Paper VII: Analysis and Design of Special Foundations	CE5205	3	0	0	3	100
3.	Paper VIII: Elasticity and Plasticity	CE5206	3	0	0	3	100
4.	Paper IX (Dep. Elective)		3	0	0	3	100
5.	Paper X (Open Elective)		3	0	0	3	100
	<b>Theory Subtotal</b>		10	1	0	15	500
6.	M. Tech Thesis (Term Paper)	CE5291	0	0	2	4	200
7.	Term Paper Seminar & Viva-voce	CE5292	0	0	0	2	100
	<b>Practical Subtotal</b>		0	0	0	6	300
	2 <sup>nd</sup> Semester Total					21	800

<u>Paper IV [Departmental Elective]</u>		<u>Paper IX [Departmental Elective]</u>	
<u>Course Code</u>	<u>Course Title</u>	<u>Course Code</u>	<u>Course Title</u>
CE5129	Ground improvement Techniques and applications	CE5229	Geotechnical Earthquake Engineering
CE5130	Rock mechanics	CE5230	Environmental Geotechnics
CE5131	Unsaturated soil mechanics	CE5231	Physical modelling in Geotechnics
CE5132	Soil Exploration and Geo-Instrumentation	CE5232	Offshore Geotechnics
CE5133	Geomechanics in Soil-Structure Interaction	CE5233	Forensic Geotechnical Engineering
CE5134	Computational Geotechnics	CE5234	Tunnelling and Underground Space Technology

CE5135	Risk and Reliability in Geotechnical Engineering		
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<u>Paper IV [Open Elective]</u>		<u>Paper IX [Open Elective]</u>	
<u>Course Code</u>	<u>Course Title</u>	<u>Course Code</u>	<u>Course Title</u>

### **Specialization: Structural Engineering**

#### **1<sup>st</sup> Semester**

Sl. No	Course Name	Course code	Class Load/Week			Credit	Marks
			L	T	P		
1.	Paper I: Advanced Solid Mechanics	CE 5101	3	0	0	3	100
2.	Paper II: Computational Methods in Structural Analysis	CE 5102	3	0	0	3	100
3.	Paper III: Design of special reinforced Concrete Structures	CE 5103	3	0	0	3	100
4.	Paper IV: (Dep. Elective)		3	0	0	3	100
5.	Paper V: (Open Elective)		3	0	0	3	100
	<b>Theory Sub-total</b>		15	0	0	15	500
6.	Lab1: Structural Engineering Laboratory	CE 5171	0	0	3	2	50
7.	Lab 2: Structural Analysis and Design Software Laboratory	CE 5172	0	0	3	2	50
8.	Lab 3: Mini Project on Analysis and Design of Special Structures	CE 5173	0	0	3	2	50
	<b>Practical Sub-total</b>		0	0	9	6	150
	1st Semester Total					21	650

#### **2<sup>nd</sup> Semester**

Sl. No	Course Name	Course code	Class Load/Week			Credit	Marks
			L	T	P		
1.	Paper VI: Advanced Structural Mechanics	CE 5201	3	0	0	3	100
2.	Paper VII: Structural Dynamics	CE 5202	3	0	0	3	100
3.	Paper VIII: Design and Behavior of Metal Structures	CE 5203	3	0	0	3	100
4.	Paper IX (Dep. Elective)		3	0	0	3	100
5.	Paper X (Open Elective)		3	0	0	3	100
	<b>Theory Subtotal</b>		15	0	0	15	500
6.	Term Paper		0	0	2	4	200
7.	Term Paper Seminar & Viva-voce/mini Project		0	0	0	2	100
	<b>Practical Subtotal</b>		0	0	2	6	300
	2 <sup>nd</sup> Semester Total					21	800

<u>Paper IV [Departmental Elective]</u>		<u>Paper IX [Departmental Elective]</u>	
<u>Course Code</u>	<u>Course Title</u>	<u>Course Code</u>	<u>Course Title</u>

CE 5121	Structural Optimization	CE 5221	Reliability Based Analysis and Design
CE 5122	Pre-stressed Concrete Structures	CE 5222	Offshore Structures
CE 5123	Advanced Concrete Technology	CE 5223	Structures under Extreme Events
CE 5124	Experimental Methods in Structural Engineering	CE 5224	Bridge Engineering
CE 5125	Non-linear Structural mechanics	CE 5225	Tall Structures
CE 5126	Soil Structure Interaction	CE 5226	Composite Material and Structures
		CE 5227	Condition Assessment and Retrofitting of Structures
		CE 5228	Structural Vibration Control

<u>Paper IV [Open Elective ]</u>		<u>Paper IX [Open Elective]</u>	
<u>Course Code</u>	<u>Course Title</u>	<u>Course Code</u>	<u>Course Title</u>

### **Specialization: Transportation Engineering**

#### **1<sup>st</sup> Semester**

Sl. No	Course Name	Course code	Class Load/Week			Credit	Marks
			L	T	P		
1.	Paper I: Pavement Engineering I	CE 5107	3	0	0	3	100
2.	Paper II: Traffic System Analysis	CE 5108	3	0	0	3	100
3.	Paper III: Urban Transportation Planning	CE 5109	3	0	0	3	100
4.	Paper IV: (Dep. Elective)		3	0	0	3	100
5.	Paper V: (Open Elective)		3	0	0	3	100
	<b>Theory Sub-total</b>		<b>15</b>	<b>0</b>	<b>0</b>	<b>15</b>	<b>500</b>
6.	Lab1: Pavement Material Laboratory	CE5177	0	0	3	2	50
7.	Lab2: Traffic System Laboratory	CE5178	0	0	3	2	50
8.	Lab3: Mini project on Software Application in Transportation Engineering	CE5179	0	0	3	2	50
	<b>Practical Sub-total</b>		<b>0</b>	<b>0</b>	<b>9</b>	<b>6</b>	<b>150</b>
	1st Semester Total					21	650

#### **2<sup>nd</sup> Semester**

Sl. No	Course Name	Course code	Class Load/Week			Credit	Marks
			L	T	P		
1.	Paper VI: Pavement Engineering II	CE5207	3	0	0	3	100
2.	Paper VII: Traffic System Design and Management	CE5208	3	0	0	3	100
3.	Paper VIII: Transport Economics and Project Evaluation	CE5209	3	0	0	3	100
4.	Paper IX (Dep. Elective)		3	0	0	3	100
5.	Paper X (Open Elective)		3	0	0	3	100
	<b>Theory Subtotal</b>		<b>15</b>	<b>0</b>	<b>0</b>	<b>15</b>	<b>500</b>
6.	Term Paper	CE5291	0	0	2	4	200

7.	Term Paper Seminar & Viva-voce/mini Project	CE5292	0	0	0	2	100
	<b>Practical Subtotal</b>		<b>0</b>	<b>0</b>	<b>2</b>	<b>6</b>	<b>300</b>
	2 <sup>nd</sup> Semester Total					21	800

<b>Paper IV [Departmental Elective]</b>		<b>Paper IX [Departmental Elective]</b>	
<b>Course Code</b>	<b>Course Title</b>	<b>Course Code</b>	<b>Course Title</b>
CE5137	Geometric Design and Road Safety	CE5237	Pavement Evaluation and Asset Management
CE5138	Analytical Techniques in Transportation Engineering	CE5238	Advanced Pavement Design and Construction Materials
CE5139	Geospatial Techniques in Transportation	CE5239	Intelligent Transportation Systems
CE5140	Airport Planning and Design	CE5240	Transportation in Logistics Management

<b>Paper V [Open Elective]</b>		<b>Paper X [Open Elective]</b>	
<b>Course Code</b>	<b>Course Title</b>	<b>Course Code</b>	<b>Course Title</b>

### **Specialization: Water Resources Engineering**

#### **1<sup>st</sup> Semester**

Sl. No	Course Name	Course code	Class Load/Week			Credit	Marks
			L	T	P		
1.	Paper I: Advanced Hydrology and Stochastic Analysis	CE 5113	3	0	0	3	100
2.	Paper II: Applied Hydrodynamics and Numerical Modeling	CE 5114	3	0	0	3	100
3.	Paper III: Water Resources Management with Remote Sensing, GIS and spatial statistics	CE 5115	3	0	0	3	100
4.	Paper IV: (Dep. Elective)		3	0	0	3	100
5.	Paper V: (Open Elective)		3	0	0	3	100
	<b>Theory Sub-total</b>		15	0	0	15	500
6.	Lab1 Advanced Hydrology Lab	CE5183	0	0	3	2	50
7.	Lab2 Computer Applications in Hydrodynamics and Hydrology	CE5184	0	0	3	2	50
8.	Lab3 Remote Sensing and GIS Lab	CE5185	0	0	3	2	50
	<b>Practical Sub-total</b>		0	0	9	6	150
	1st Semester Total					21	650

#### **2<sup>nd</sup> Semester**

Sl. No	Course Name	Course code	Class Load/Week			Credit	Marks
			L	T	P		
1.	Paper VI: Water Resources Planning and Management	CE5213	3	0	0	3	100
2.	Paper VII: Ground Water Hydrology and Water Resources Development	CE5214	3	0	0	3	100
3.	Paper VIII: Hydrology of Extreme Events and Mitigation Measures	CE5215	3	0	0	3	100
4.	Paper IX (Dep. Elective)		3	0	0	3	100
5.	Paper X (Open Elective)		3	0	0	3	100
	<b>Theory Subtotal</b>		15	0	0	15	500
6.	Term Paper	CE5291	0	0	2	4	200
7.	Term Paper Seminar & Viva-voce/mini Project	CE5292	0	0	0	2	100

	<b>Practical Subtotal</b>		0	0	2	6	300
	2 <sup>nd</sup> Semester Total					21	800

<b>Paper IV [Departmental Elective]</b>		<b>Paper IX [Departmental Elective]</b>	
<b>Course Code</b>	<b>Course Title</b>	<b>Course Code</b>	<b>Course Title</b>
CE5153	Climate Modeling in Water Resources	CE5253	Loose Boundary Hydraulics and Sediment Transport
CE5154	Advanced Hydraulic Structures	CE5254	Storm water Management
CE5155	Irrigation and Drainage Engineering	CE5255	Coastal Hydraulics and Port Management
CE5156	Soft Computing in Water Resources	CE5256	Optimization and Simulation in Water Resources
CE5157	Watershed Management and Sustainable Development	CE5257	River Mechanics and Control Structures
CE5158	Hydropower Development	CE5258	Environmental Hydraulics
CE5159	Spatial Statistics and GIS Modeling		
CE5160	Isotope Hydrology		

<b>Paper V [Open Elective ]</b>		<b>Paper X [Open Elective]</b>	
<b>Course Code</b>	<b>Course Title</b>	<b>Course Code</b>	<b>Course Title</b>
CE5161	Climate Change Impact Analysis		