SEMESTER VII

Sr No	Course Code	Course Title	Hours per Week			Credits	Maximum Marks		
			L	T	P		Continual Assessment	End Sem Examination	Total
1	22CV701T	Estimation & Costing	3	-	-	3	30	70	100
2	22CV701P	Estimation & Costing Lab	-	-	2	1	25	25	50
3	22CV702T	Construction Management & Law	3	-	-	3	30	70	100
4	22CV703T	Professional Elective – IV	2	-	-	2	30	70	100
5	22CV704T	Professional Elective – V	3	-	-	3	30	70	100
6	22CV761O	Open Elective - III	4	-	-	4	30	70	100
7	22CV705P	Project – II	-	-	8	4	50	50	100
8	22CV706P	Summer / Winter Internship *	-	-	-	2	50	-	50
9	22CV707P	Capstone Course – II **	-	-	2	1	50	-	50
Total			**15**	**-**	**12**	**23**	**325**	**425**	**750**

* Summer / Winter Internship (Evaluation of Four weeks Internship Completion till 6th Semester)

** Capstone Course – II (Comprehensive knowledge gained in Civil Engineering)

22CV703T	Professional Elective - IV
22CV703T(i)	PE-IV Advanced Concrete Structures
22CV703T(ii)	PE-IV Traffic Engineering
222CV703T(iii)	PE-IV Remote Sensing & GIS

22CV704T	Professional Elective - V
22CV704T(i)	PE-V Ground Improvement
22CV704T(ii)	PE-V Pavement Design
22CV704T(iii)	PE-V Advanced Steel Structures

22CV761O	Open Elective - III
22CV761O	OE-III Transportation Systems

SEVENTH SEMESTER

Course Code	Course Name	Th	Tu	Pr	Credits	Evaluation		
						CA	ESE	Total
22CV701T	Estimating and Costing	3	-	-	3	30	70	100

Course Objectives	Course Outcomes
1. To understand various types of estimates 2. To interpret drawings and estimate the quantities of various items in civil engineering projects 3. To prepare detailed schedules for reinforcing steel bars in concrete structures 4. To prepare specification for construction projects 5. To analyze rates for different items of work 6. To apply valuation methods for buildings and other properties	At the end of the course, students will be able to: 1. Explain the importance and purpose of estimation in civil engineering, including understanding of units of measurement, items of work, and their descriptions 2. Apply various methods of preliminary and detailed estimation and compute material quantities with accuracy 3. Explain the necessity and types of specifications and describe the need to prepare tender documents and types of contract 4. Perform rate analysis for major civil engineering items using current market rates of materials and labour 5. Explain the purpose and principles of valuation and identify factors affecting property value

Unit I	**[8 Hrs]**
Introduction: Importance and Purpose of Estimation in Civil Engineering, Units of measurement, Items of work and their description, Administrative Approval and Technical Sanction. **Bar Bending Schedule:** Calculation of reinforcing steel for various components of building.	
Unit II	**[8 Hrs]**
Preliminary Estimation: Objectives and its methods, Earthwork estimates in roads, hill roads and canals. **Detailed Estimation:** Methods, Estimation of Load bearing and framed structures	
Unit III	**[8 Hrs]**
Specifications: Necessity, Importance and Types, Writing detailed specifications of important Items of work. **Tenders:** Necessity, Tender documents, Notice Inviting Tender, Methods for Carrying out tender Work. **Contract:** Essentials, Types, Contract documents, General & Special Conditions of Contract.	
Unit IV	**[8 Hrs]**
Rate Analysis: Necessity, Introduction, Procedure, Factors deciding Rate Analysis, Labour Guidelines from National Building Code, Market rates of Material and Labour, Rate Analysis of major items of work.	
Unit V	**[8 Hrs]**
Valuation: Introduction, Purpose, Factors affecting value of property, Types of Value, Calculation of Depreciation and its methods, Capitalised value, Year's Purchase, Sinking Fund, Net & Gross income, Rent fixation.	

Text Books

S.N	Title	Authors	Edition	Publisher
1	Estimating and Costing in Civil Engineering (Theory and Practice)	B.N. Dutta	28th	CBS Publishers
2	Estimating, Costing, Specification & Valuation In Civil Engineering	M. Chakraborti	15th	Chakraborti
3	A Textbook of Estimating and Costing (Civil)	D.D. Kohli, Ar. R.C. Kohli	13th	S Chand
4	Civil Estimating & Costing	A.K. Upadhyay	5th	Katson Books
5	Estimating, Costing And Valuation	Rangwala	4th	Charotar Publishing

Reference Books

S.N	Title	Authors	Edition	Publisher
1	National Building Code of India 2016	BIS	Volume 1 & 2	Bureau of Indian Standards
2	CPWD Schedule of Rates	CPWD	Edition 12	Government of India
3	IS 1200 Series	BIS	Volume 1 & 2	Bureau of Indian Standards

		July 2025	1.0	Applicable for 2025-26
Chairman - BoS	Dean – Academics	Date of Release	Version	

SEVENTH SEMESTER

Course Code	Course Name	Th	Tu	Pr	Credits	Evaluation		
						CA	ESE	Total
22CV701P	Estimating and Costing Lab	-	-	2	1	25	25	50

Course Objectives	Course Outcomes
1. Understand the fundamentals of estimating and costing 2. Apply knowledge to prepare Bar Bending Schedules by calculating reinforcement quantities 3. Develop skills to apply various methods of preliminary and detailed estimation for civil engineering works 4. Analyze and perform rate analysis by considering labor, material, equipment costs, and relevant guidelines from the National Building Code 5. Explain the principles and methods of valuation of properties	At the end of the course, students will be able to: 1. Prepare and interpret Bar Bending Schedules for different structural components such as footings, columns, beams, and slabs, and calculate the quantity of reinforcement steel 2. Apply standard methods to prepare estimates of quantities and costs for various civil engineering works 3. Perform rate analysis for major items of civil engineering work by applying standard procedures 4. Develop detailed specifications for important items of civil engineering works following standard codes and practices 5. Apply standard methods to calculate standard rent of residential and commercial properties based on net and gross income, market trends, and legal guidelines

Expt. No.	Title of the experiment
1	Estimation of quantity of reinforcing steel using bar bending schedule.
2	Calculation of preliminary estimate using plinth area method.
3	Calculation of detailed estimate of earthwork of roads/canals.
4	Detailed estimation by centre line method.
5	Detailed estimation by long wall – short wall method.
6	Draft detailed specification for various items of civil engineering work.
7	Analyse the unit rate of major items of civil engineering work.
8	Fixation of standard rent of property.

Text Books

S.N	Title	Authors	Edition	Publisher
1	Estimating and Costing in Civil Engg	B.N. Dutta	28th	CBS Publishers
2	Civil Estimating & Costing	A.K. Upadhyay	5th	Katson Books
3	Estimating, Costing And Valuation	Rangwala	4th	Charotar Publishing

Chairman - BoS	Dean – Academics	July 2025 Date of Release	1.0 Version	Applicable for 2025-26

SEVENTH SEMESTER

Course Code	Course Name	Th	Tu	Pr	Credits	Evaluation		
22CV702T	Construction Management & Law	3	-	-	3	CA	ESE	Total
						30	70	100

Course Objectives	Course Outcomes
1.Gain a comprehensive understanding of the various phases of construction projects, including planning, design, procurement, construction, and project completion. 2.Learn project management methodologies and techniques tailored to the construction industry, including scheduling, budgeting, resource allocation, risk management, and quality control. 3.Explore the legal framework governing construction projects, including contract, property act, and regulations specific to the construction industry.	At the end of the course, students will be able to: 1.Describe project characteristics and various stages of a project. 2.Create a construction project plan, project schedules, and application of information system in management of construction projects. 3.Classify various types of equipment's to be used in the construction and its operational cost estimates, understand manpower requirement, planning, resources utilization and management. 4.Identify the quality control aspects in planning & management, safety provisions and safety equipments. 5.Describe the legal aspects in construction projects through the understanding of various acts pertaining to civil engineering and architectural planning & sanctioning, provisions of arbitration and litigations.

Unit I	**[8Hrs]**
BASIC STUDIES IN CONSTRUCTION PROJECT Type of Project & its Financing, Detailed Project Report Analysis and Feasibility, Time of Completion, Provisions of Escalation in Time and Cost, Choice of Technology and Construction Methodologies &Techniques, Site Planning (Case Studies).	
Unit II	**[9 Hrs]**
CONSTRUCTION SCHEDULING Network Analysis:- The Critical Path Method (CPM) and Project Evaluation and Review Technique (PERT),Bar Chart, Resource Oriented Scheduling, Allocation, Leveling, Crashing and Time/Cost Tradeoffs, Line of Balance. MIS in Construction Project, Project Management System-MS Project, BIM.	
Unit III	**[8 Hrs]**
MANPOWER – Requirement and methods of calculating Productivity, Staffing, planning, directing & controlling. Organizational Charts, Duties and Responsibility of Personal Manager **MATERIAL** – Requirement, Procuring, Storing & Delivery. Quality Checks, Inventory Control techniques, construction Waste generation and Management. **MACHINERY** – Different type of construction equipment and their applications- Excavators, Dozer, Rollers, Hoisting and Hauling equipments, Cost & Working Hour analysis, Depreciation analysis.	
Unit IV	**[7 Hrs]**
QUALITY AND SAFETY MANAGEMENT Concept of Total Quality Management, Safety Provisions as per National Building Code of India, Safety equipment. Advanced Techniques of Monitoring & Assessment.	
Unit V	**[8 Hrs]**
LEGAL ASPECTS IN CONSTRUCTION PROJECTS AND VARIOUS RELATED ACTS Town Planning Requirements, Acts and codes related to planning, Regional Town Planning, Housing Development Act, Highway Act, Irrigation Act, Local Acts (Gunthewari), Environmental (Protection) Act, Forest Conservation - Water Pollution and air pollution, Transfer of property Act– Sale, purchase, lease. Land Acquisition and Rehabilitation Act, Indian Contract Act.	

Text Books

S.N	Title	Authors	Edition	Publisher
1	Construction Planning and Management	Peurifoy	-	McGraw-Hill Education
2	Construction Planning and Management	Dr U K Shrivastava, Galgotia Publ.	-	Galgotia Publications Pvt Ltd
3	Laws related to buildings and engineering contracts in India	Gajaria G T, LexisNexis	-	Butterworths India Publisher, 2000

Reference Books

S.N	Title	Authors	Edition	Publisher
1	Project Planning & Management	B C Punmia	-	Laxmi Publications Pvt Ltd

SEVENTH SEMESTER

Course Code	Course Name	Th	Tu	Pr	Credits	Evaluation		
						CA	ESE	Total
22CV703T(i)	PE - IV Advanced Concrete Structures	3	-	-	3	30	70	100

Course Objectives	Course Outcomes
1. Design interior panel of flat slab 2. To identify and design the slender column 3. To design combined footing - Rectangular and Raft 4. To design Water tank resting on ground	At the of the course, students will be able to: 1. Design interior panel of fat slab 2. Design the slender column 3. Design the combined footing 4. Design water tank resting on ground

Unit I	**[10 Hrs]**
Design of interior panel of Flat slab using Direct Design Method: Limitations, Components,Total Design moment,Distribution of moments,Shear in Flat Slab,Check for shear as per IS456:2000 Detailing of reinforcement	
Unit II	**[11 Hrs]**
Design of Slender Columns: Identify slender columns,minimum eccentricity,Additional Moments,Bi-axial moments,Safety conditions as per IS456:2000	
Unit III	**[12 Hrs]**
Design of combined footing - Rectangular type and Raft: Need,Situation,Concept,Area of footing,design for bending moment,shear force,detailing of reinforcement	
Unit IV	**[12 Hrs]**
Design of circular water tank resting on ground: Components - roof slab/ roof dome,ring beam,wall,base slab - design using IS3370 : 2021 Detailing of Reinforcement	

Text Books

S.N	Title	Authors	Edition	Publisher
1	Limit State Design of Reinforced Concrete (As per IS456:2000)	Dr.B.C.Punmia,Ashok Kumar Jain,Arun Kumar Jain	----	Laxmi Publications (P) Limited,New Delhi
2	Limit State Theory and Design of Reinforced Concrete.IS456:2000	Dr.V.L.Shah,Late Dr S.R.Karve	-----	Structures Publications,Pune
3	Advanced R.C.C.Design (R.C.C.Volume-II)	S.S.Bhavikatti	-----	New Age International (P) Limited,New Delhi

Indian Standard Codes of Practice

S.N	Title	Publisher
1	IS 456:2000 - Plain and Reinforced Concrete - Code of Practice	Bureau of Indian Standards,New Delhi
2	IS 3370(Part1):2021 - Concrete Structures for Retaining Aqueous Liquids-Code of Practice - Part1General Requirements	Bureau of Indian Standards,New Delhi
3	IS 3370(Part2):2021 - Concrete Structures for Retaining Aqueous Liquids-Code of Practice - Part2 -Plain and Reinforced Concrete	Bureau of Indian Standards,New Delhi
4	IS 3370(Part4/Sec3):2021 - Concrete Structures for Retaining Aqueous Liquids-Code of Practice - Part4 -Design Tables - Section3 Circular Tanks	Bureau of Indian Standards,New Delhi
5	IS2950(Part I) - Code of Practice for Design and Construction of Raft Foundations - Part I :Design	Bureau of Indian Standards,New Delhi

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SEVENTH SEMESTER

Course Code	Course Name	Th	Tu	Pr	Credits	Evaluation		
						CA	ESE	Total
22CV703T(ii)	PE - IV Traffic Engineering	3	-	-	3	30	70	100

Course Objectives	Course Outcomes
1. To introduce the students with the principles and practice of transportation engineering which focuses on traffic and transportation engineering and highway engineering. 2. To enable the students to have a strong analytical and practical knowledge of planning, designing and solving the transportation problems. 3. To introduce the recent advancements in the field of sustainable urban development, traffic engineering and management, systems dynamics approach to transport planning, highway design and construction, economic and environment evaluation of transport projects. 4. To strength the student knowledge and technical knowhow to be efficient transport engineers.	At the end of the course: 1. Students should be able to understand the idea of urban transportation planning and related problem. 2. Students should be able to define and describe various traffic studies and highway capacity. 3. Students should be able to have knowledge of accident analysis. 4. Students should be able to explain various theories related to traffic flow. 5. Students should be able to have knowledge of statistical tools in traffic engineering.

Unit I	**[7 Hrs]**
Urban Transport Planning: Introduction to Urban transportation planning; systems approach to Urban transportation planning; Types of models; Concept of travel demand and supply; Mixed traffic flow, Urban transportation problem.	
Unit II	**[7 Hrs]**
Traffic Studies & Highway Capacity: Traffic studies, Methods of traffic forecast, Demand relationships, Design hourly volume, Critical hour concept, Capacity studies, Factors affecting capacity, Level of service.	
Unit III	**[7 Hrs]**
Accident Analysis: Accidents analysis, Methods of representing accident rate, Factors in traffic accidents, Traffic safety, Accident coefficients and Driver's strains due to roadway and traffic conditions.	
Unit IV	**[6 Hrs]**
Traffic Design: Intersections, Interchanges, Designs of Signals, Traffic Rotary, Design of Parking lot, Parking Study.	
Unit V	**[6 Hrs]**
Traffic Statistical methods: Statistical method for Interpretation, Regression, Application Of Binomial, Normal And Poisson's Distributions, Continuous Distribution Of Traffic Flow, Chi-Square & 'T 'test.	

Text Books

S.N	Title	Authors	Edition	Publisher
1	Transport planning and Traffic Engineering	C A O'Flaherty	I	Butterworth Heinemann
2	Introduction to Transportation Engineering	James H Bank	I	Tata McGraw Hill Publications
3	Transportation Engineering an Introduction	C. Jotin Khisty	I	PHI Publication

Reference Books

S.N	Title	Authors	Edition	Publisher
1	Highway Engineering	Khanna S.K. and Justo C.E.G	1991	Nem Chand & Bro
2	Traffic engineering and transportation planning	L.R. Kadiyali	1987	Khanna Publications

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SEVENTH SEMESTER

Course Code	Course Name	Th	Tu	Pr	Credits	Evaluation		
						CA	ESE	Total
22CV704T(i)	PE - V Ground Improvement	3	-	-	3	30	70	100

Course Objectives	Course Outcomes
1. To recognise the necessity of ground improvement. 2. To identify the suitability of ground improvement techniques. 3. To understand the emerging techniques of ground improvement.	At the of the course, students will be able to: 1. Explain the necessity of ground improvement techniques. 2. Explain the suitability of stone column techniques to improve soil properties. 3. Explain the suitability of reinforced soil and Geo Synthetics techniques to improve soil properties. 4. Explain the suitability of Ground Anchor and Soil Nailing techniques to improve soil properties. 5. Explain the suitability of Prefabricated Vertical Drains techniques to improve soil properties.

Unit I	**[9 Hrs]**
Introduction to ground improvement techniques: Need for ground improvement and ground improvement techniques, economic considerations and suitability **Grouting:** Materials and methods of grouting grout volume and grouting pressure, grout requirements and tests.	
Unit II	**[10 Hrs]**
Stone Column: Application, layout feature, procedures of installation, rammed & floated column, quality control in construction, methods of improving the effectiveness of stone column, skirted and cemented stone column technique, geosynthetic encased stone column	
Unit III	**[10 Hrs]**
. **Reinforced soil and Geo-synthetics:** Basic theory of reinforced soil, concept of reinforced soil wall and slope, geo-synthetics types, application and function in civil engineering, Application of Geofoam & Geocell.	
Unit IV	**[10 Hrs]**
Ground Anchor and Soil Nailing: Concept , Design features , types, construction procedure, Functions, Application, Advantages. Limitations of soil nailing system and ground anchor Construction sequence, cement slurry wall, Design features, Functions, applications, Case study on Diaphragm wall. **Deep soil mixing –** Concept, procedure, Advantages and limitations.	
Unit V	**[6 Hrs]**
Prefabricated Vertical Drains **Emerging & Innovative Topics:** Sustainable Development and energy geotechnology, Microbial Geotechnology and ground improvement, nan-technology in ground improvement and site remediation	

Text Books

S.N	Title	Authors	Edition	Publisher
1	Geotechnical Engineering, Principles & Practices of Soil Mechanics and Foundation Engineering	V N S Murthy	-	-
2	Soil Mechanics and Foundation Engineering:	K.R. Arora	-	Standard Publisher and Distributor
3	Soil Mechanics and Foundation Engineering	B.C. Punmia	-	Laxmi Publications Pvt. Ltd

Reference Books

S.N	Title	Authors	Edition	Publisher
1	Basic and Applied soil mechanics:	Gopal Ranjan & A.S. Rao	-	New Edge International Ltd.
2	https://nptel.ac.in/courses/105108075	Dr. G.L. Sivakumar Babu	-	NPTEL

SEVENTH SEMESTER

Course Code	Course Name	Th	Tu	Pr	Credits	Evaluation		
22CV761O	**OE – III Transportation Systems**	**3**			**3**	**CA**	**ESE**	**Total**
						30	**70**	**100**

Course Objectives	Course Outcomes
1. To understand the need of Transportation system. 2. To know various Transportation systems. 3. To compare suitability of various Transportation systems.	At the end of the course, the students will be able to, 1.Classify and plan the highways systems, basic geometrics. 2.Explain railway systems with basic geometrics 3.Describe airports and their basic systems. 4.Explain docks and harbours and their basic systems 5.Discuss modern transportation systems.

Unit I	**[8 Hrs]**
Highway Systems: Principle of highway planning, road development in India, classification of road, Planning and Geometrics required for a good highway.	
Unit II	**[8 Hrs]**
Railway Systems: Railway components, geometrics, hauling capacity of a locomotive, stations and yards, signalling.	
Unit III	**[8 Hrs]**
Airport systems: Components of an airport, Runway length, Runway orientation, Runway and Taxiway marking and lighting, Instrumental Landing System;	
Unit IV	**[8 Hrs]**
Docks and Harbour systems: Components of docks and harbours, jetties, navigational aids	
Unit V	**[6 Hrs]**
Modern Systems: BRTS, Metro Systems, Intelligent Transportation Systems and Case studies of BRTS.	

Text Books

S.N	Title	Authors	Edition	Publisher
1	Highway Engineering	Khanna and Justo	-	Tata McGraw Hill
2	Railway Engineering	Saxena and Arora	-	Dhanpat Rai and Sons
3	Airport Engineering	Saxena and Saxena		McGraw Hill
4	Docks and Harbours	Oza and Oza		Charotar Publications