

(PC/CE/14-T) DESIGN OF CONCRETE STRUCTURES-I

Week	Lecture No.	Topic	Remarks
1	1	Introduction to Concrete Technology: Overview of physical requirements of cement, aggregate, admixture, and reinforcement	
	2	Properties of Concrete: Strength, durability, shrinkage, and creep	
	3	Design of Concrete Mixes: Introduction and acceptability criteria	
2	4	IS Specifications for Concrete and Overview of Design Philosophies	
	5	Design Philosophies: Working Stress vs. Limit State Methods	
	6	Characteristic Strength and Loads: Normal distribution curve and partial safety factors	
3	7	Stress-Strain Relationship for Concrete and Steel	
	8	Working Stress Method: Basic Assumptions and Permissible Stresses	
	9	Design of Singly Reinforced Beams using Working Stress Method	
4	10	Design of Doubly Reinforced Beams using Working Stress Method	
	11	Limit State Method: Basic Assumptions and Minimum/Maximum Reinforcement Requirements	
	12	Analysis and Design of Singly Reinforced Beams using Limit State Method	
5	13	Analysis and Design of Doubly Reinforced Beams using Limit State Method	
	14	Shear in Concrete Sections: Diagonal Tension and Shear Reinforcement	
	15	Bond and Anchorage: Development Length and Flexural Bond	
6	16	Torsion in Concrete: Torsional Stiffness and Equivalent Shear	
	17	Design of Torsional Reinforcement: Design Examples	
	18	Columns: Effective Length and Minimum Eccentricity	
7	19	Minor Test	
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8	22	Design of Short Columns under Axial Compression	
	23	Design of Columns under Uniaxial and Biaxial Bending	
	24	Slender Columns: Analysis and Design	
9	25	Footings: Design of Isolated and Wall Footings	
	26	Serviceability Limit State: Control of Deflection and Cracking	
	27	Deflection and Moment Relationships: Limiting Values of Span to Depth	
10	28	Limit State of Crack Width: Design Examples	
	29	One-Way Slabs: General Considerations and Design for Distributed Loads	
	30	One-Way Slabs: Design for Concentrated Loads	
11	31	Two-Way Slabs: General Considerations and Design for Distributed Loads	
	32	Two-Way Slabs: Design for Concentrated Loads	
	33	Non-Rectangular Slabs: Design Considerations	
12	34	Retaining Walls: Classification and Forces	
	35	Retaining Walls: Stability Requirements and Proportioning	
	36	Design of Cantilever Retaining Walls	
13	37	Design of Counter-fort Retaining Walls	
	38	Concrete Reinforcement Detailing: Requirements of Good Detailing	
	39	Cover and Spacing of Reinforcement	
14	40	Minor Test	
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15	43	Reinforcement Splicing and Anchorage	
	44	Curtailment of Reinforcement in Flexure and Shear	
	45	Comprehensive Design Examples and Summary	