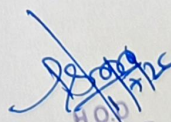


LESSON PLAN: Design of RCC structures CEPC303 Th2. FOR THE SESSION 2026-27(WINTER-2026) BATCH-2024-27
GOVT. POLYTECHNIC, KANDHAMAL



Discipline: Civil	Semester: 5th	Name of the Teaching Faculty -PRITHIRANJAN PRIYADARSHI PATRO, Sr.Lecturer in Civil Engg.
Subject: Design of RCC structures CEPC303 Th2	No. of days/ per week class allotted: 3	Semester From Date : 1/07/2026 to Date: 5/11/2026 No. of Weeks: 15
Week	Class Day	Theory/ Practical Topics
1st	1st	Introduction to RCC Design Philosophies• Objectives of RCC Design• Working Stress Method (WSM)• Ultimate Load Method (ULM)• Limit State Method (LSM)• Advantages of LSM
	2nd	Limit State Method• Limit States of Collapse and Serviceability• Partial Safety Factors• Characteristic Loads and Strengths• Assumptions in LSM
	3rd	Design of Singly Reinforced Beam (Theory)• Behaviour under Flexure• Neutral Axis• Limiting Moment of Resistance• Design Procedure
2nd	1st	Design of Singly Reinforced Beam (Numericals)• Design examples using LSM• Selection of reinforcement• Reinforcement detailing
	2nd	Design of Doubly Reinforced Beam• Need for doubly reinforced beams• Design procedure• Numerical problems
	3rd	Shear in RCC Beams• Nominal Shear Stress (τ_v)• Design Shear Strength of Concrete (τ_{cd})• Adequacy of Section for Shear
3rd	1st	Design of Shear Reinforcement• Vertical Stirrups• Inclined Stirrups• Bent-up Bars• Minimum Shear Reinforcement• Codal Provisions (IS 456:2000)
	2nd	Bond and Bond Stress• Types of Bond• Bond Stress• Check for Bond Stress• Codal Provisions
	3rd	Development Length and Anchorage• Development Length in Tension and Compression• Codal Provisions• Anchorage Value of 90° Hook• Lapping of Bars
4th	1st	Comprehensive Numerical Problems• Shear Reinforcement Design• Adequacy of Section• Development Length• Bond Stress
	2nd	Introduction to Serviceability Limit State• Deflection Control• Crack Width Control• Durability Considerations• Revision and Unit Test
	3rd	Introduction to RCC Columns• Definition of column• Classification of columns (Short, Long, Tied, Spiral, Axially Loaded, Eccentrically Loaded)
	4th	Limit State of Compression Members & Effective Length• Limit state concept• Effective length of columns• Slenderness ratio• Short and long columns
5th	1st	IS 456:2000 Provisions for RCC Columns• Minimum steel percentage• Maximum steel percentage• Minimum eccentricity• Clear cover• Lateral ties and spacing
	2nd	Design Procedure of Axially Loaded Short Columns• Design philosophy• Design equations• Design steps
	3rd	Design of Square Short Column
6th	1st	Design of Rectangular Short Column
	2nd	Design of Circular Short Column
	3rd	Revision, Design Practice & Evaluation• Comparison of square, rectangular and circular columns• Revision of IS provisions• Practice problems
7th	1st	Introduction to RC Flanged Beams• General features of T and L beams• Formation of T and L beams in RCC floors• Advantages over rectangular beams
	2nd	Effective Width of Flange (IS 456:2000)• Concept of effective flange width• Codal provisions for effective width of T and L beams• Factors affecting effective width
	3rd	Stress and Strain Distribution in T Beams• Assumptions in Limit State Method• Stress and strain diagrams• Behaviour of flanged beams under bending
8th	1st	Neutral Axis and Moment of Resistance• Depth of neutral axis• Calculation of moment of resistance• Neutral axis within flange
	2nd	Design of Singly Reinforced T Beam• Design procedure• Reinforcement calculation• Design steps as per IS 456:2000
	3rd	Design of L Beam• Design procedure• Comparison between T and L beams• Reinforcement detailing
9th	1st	Simple Numerical Problems• Location of neutral axis• Effective width of flange• Design practice

	2nd	Revision, Design Practice and Evaluation • Review of design procedure • Comparison of T and L beams • Doubt clarification • Unit test
	3rd	Introduction to RCC Slabs • Definition and classification of slabs • One-way and two-way slabs • Load transfer mechanism • Span criteria
10th	1st	Design of Simply Supported One-Way Slab – Design Steps • Design philosophy • Load calculations • Selection of slab thickness • Design procedure as per IS 456:2000
	2nd	Flexural Design of Simply Supported One-Way Slab
	3rd	Checks for Shear and Deflection in One-Way Slab • Shear stress check • Deflection control • Reinforcement detailing
11th	1st	Design of One-Way Cantilever Slab (Chajjas) • Behaviour of cantilever slabs • Design procedure • Loading and reinforcement
	2nd	Checks for Cantilever Slabs • Development length • Shear stress check • Reinforcement detailing
	3rd	Introduction to Two-Way Slabs • Behaviour of two-way slabs • Load distribution • Aspect ratio • Corner conditions
12th	1st	Design of Simply Supported Two-Way Slab – Part I • Design moments • Moment coefficients • Reinforcement calculation
	2nd	Design of Simply Supported Two-Way Slab – Part II • Detailing of reinforcement • Checks for spacing and cover • Complete design example
	3rd	Introduction to Dog-Legged Staircases • Components of staircases • Types of staircases • Structural behaviour of dog-legged staircases • Basic design concepts
13th	1st	Revision, Design Practice and Evaluation • Revision of slab design procedures • Comparison of one-way and two-way slabs • Practice problems • Doubt clarification and unit test
	2nd	Introduction to RCC Footings • Definition and function of footing • Types of footings • Design considerations • Loads acting on footings
	3rd	Design Principles of Isolated Footings • Soil bearing capacity (SBC) • Load transfer mechanism • Design philosophy as per IS 456:2000
14th	1st	Design of Footing for Axially Loaded Column – Part I • Selection of footing size • Calculation of soil pressure • Determination of bending moments
	2nd	Design of Footing for Axially Loaded Column – Part II • Flexural design • Reinforcement calculation • Reinforcement detailing
	3rd	Checks in Footing Design • One-way shear • Two-way (Punching) shear • Bearing stress at column-footing interface
15th	1st	Minimum Eccentricity and Its Effect • Concept of minimum eccentricity • Codal provisions • Pressure distribution under eccentric loading
	2nd	Design of Footing for Uni-Axial Bending – Part I • Column subjected to axial load and uniaxial moment • Design methodology • Pressure distribution
	3rd	Design of Footing for Uni-Axial Bending – Part II • Reinforcement design • Shear and development length checks • Reinforcement detailing


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