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 TeachingFaculty -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 (τv)• Design Shear Strength of Concrete (τc)• 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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