

Dicipline:	CIVIL	Semester: 4th	Name of the Teaching Faculty: Umakanta Pradhan.	
Subject:	SD-1 Structural Design-I	No of Days/Week Class Allotted: 5	Semester From date: 18/2/23 To date: 24/6/23	No. of Weeks: 14th

WEEK	Class Day	Theory Topics
1st	1st	Introduction to Structural Design.
	2nd	Methods of Design of Structure (RCC).
	3rd	Objective of Design & Detailing.
	4th	Introduction to Reinforce concrete, RC Sections their behavior, grades of Concrete and Steel.
	5th	Flexural Design of Single reinforcement section from 1st principle.
2nd	1st	Flexural Analysis of Single Reinforced section from 1st principle.
	2nd	Concept of under reinforced, over reinforced and balanced sections.
	3rd	Advantages and Disadvantages of WSM. Reasons for its obsolescence.
	4th	Definition, Advantages of LSM over WSM, IS Code Suggestions Regarding Design philosophy.
	5th	Types of Limit State, partial Safety factor. For materials strength. Characteristic strength.
3rd	1st	Study of IS Specification Regarding Spacing of Reinforcement in Slab, cover to R-C Slab.
	2nd	Limit state of collapse (flexure). Assumption.
	3rd	Stress-strain relationship for concrete and steel, neutral axis, stress block Diagram.
	4th	Strain Diagram for Singly Reinforced Section.
	5th	Concept of under Reinforced, over Reinforced and Limiting section.

WEEK	Class Day	Theory Topics
4th	1st	Neutral axis coefficient, Limiting value of moment of Resistance
	2nd	Limiting percentage of steel required for limiting singly R-C Section.
	3rd	Analysis and design: Procedure.
	4th	Determination of Design Constants, Moment of Resistance and area of Steel for Rect-section.
	5th	Necessity of doubly Reinforced Section; design of doubly Reinforced Rect. Section.
5th	1st	Nominal shear stress in RC Section, Design shear strength of concrete.
	2nd	Design of shear reinforcement, minimum shear reinforcement, forms of shear reinforcement.
	3rd	Bond and types of Bond, Bond stress, check for bond stress, development length.
	4th	Numerical problems on deciding whether shear reinforcement.
	5th	Design shear reinforcement, Minimum shear reinforcement in Beam.
6th	1st	General features, Advantages, effective width of Flange as per IS 456:2000.
	2nd	Analysis of singly reinforced T-Beam. Strain diagram & stress diagram.
	3rd	Depth of neutral axis.
	4th	Moment of Resistance of T-Beam Section.
	5th	MR of Tbeam Problem.

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Subject: SD-1 Structural Design	No of Days/Week Class Allotted: 5	Semester From date: 16/2/23 To date: 24/5/23	No. of Weeks: 11th	
WEEK	Class Day	Theory Topics		
4th	1st	MR of T-Beam with neutral axis lying within the flange.		
	2nd	Sample numerical problems on deciding eff. flange width.		
	3rd	Problem on finding Moment of Resistance of T-Beam when lies NA.		
	4th	Problem on finding Moment of Resistance of T-Beam when NA is below bottom of flange.		
	5th	mixed problem on Design of T-Beam.		
8th	1st	Design of simply supported one way slab for flexure.		
	2nd	check for deflection control & shear code provision.		
	3rd	Design of one way cantilever slab and cantilevers chajras for flexure check.		
	4th	Design of one way slab and for flexural check and check for development length.		
	5th	Design of 2-way simply supported slabs.		
9th	1st	Design of 2-way slab and flexure with corner free to lift.		
	2nd	Study on types of stair case.		
	3rd	Design of dog-legged stair case (procedure)		
	4th	Design of dog-legged stair case (problem)		
	5th	Detailing of reinforcement in stairs.		

WEEK	Class Day	Theory Topics
10th	1st	Detailing of Reinforcement in Slabs spanning longitudinally
	2nd	Problem on 1-way slab
	3rd	Problem on 2-way slab
	4th	problem on Stair Case.
	5th	problem on Stair Case.
11th	1st	Introduction to Column. Types of column.
	2nd	Introduction to Footing Types of footing.
	3rd	Assumptions in limit state of collapse - compression.
	4th	Definition and Classification of Column
	5th	Effective length of Column.
12th	1st	Specification for minimum Reinforcement cover, max. reinforcement
	2nd	Number of bars in rectangular, square and circular section, diameter & spacing
	3rd	Analysis of axially loaded short square column.
	4th	Design of axially loaded short square column
	5th	Analysis of axially loaded short rectangular column.

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WEEK	Class Day	Theory Topics
13th	1st	Design of axially loaded Rectangular column with lateral ties.
	2nd	Analysis of axially loaded circular column with lateral ties.
	3rd	Analysis of axially loaded circular column Design with lateral ties.
	4th	Types of Footing
	5th	Design of isolated square column footing
14th	1st	Design of isolated Footing of uniform thickness for Flexural and Shear.
	2nd	Question on Isolated footing.
	3rd	
	4th	
	5th	
	1st	
	2nd	
	3rd	
	4th	
	5th	

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