

Discipline	Semester	Name of the teaching faculty
Civil Engg	4th	Ms Meera Dehury.
Subject	No of day/ per week	Semester from date to date
Structural Design-I	class allotted 04	12/2/23 23/5/24
		No of week 15
WEEK	class day	Theory
1st	1st →	<u>Working stress method (WSM)</u> :- Objectives of design and detailing State the different methods of design of concrete structures
	2nd →	Introduction to reinforced concrete R.C. section their behavior, grades of concrete and steel, permissible stress
	3rd	assumption in W.S.M
	4th	Flexural design and analysis of single reinforced section from first principles
2nd	1st	Concept of under reinforced, over reinforced and balanced sections
	2nd	Advantages and disadvantages of WSM reasons for its obsolescence.

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		<p><u>Philosophy of Limit State Method (LSM)</u></p> <p>3rd Defination, Advantages of LSM over way</p> <p>4th Its code suggestion regarding design philosophy.</p>
3rd	1st	Types of Limit States, partial safety factors for material strength, characteristic strength, characteristic load, design load
	2nd	loading on structure as per IS 875.
	3rd	Study of I.S. specification regarding spacing of reinforcement in slab, cover to reinforcement in slab, beam column & footing, minimum reinforcement in slab, beam & column lapping, anchorage effective span for beam & slab.
4th		<p><u>Analysis and Design of Single and Double Reinforced sections (LSM):-</u></p> <p>1st Limit state of collapse (flexure)</p> <p>Assumptions, stress-strain relationship for concrete and steel, neutral axis</p> <p>2nd stress block diagram and strain diagram for singly reinforced section</p> <p>3rd Concepts of under-reinforced, over reinforced and limiting section, neutral axis coefficient, limiting value of moment of resistance and limiting percentage of steel required</p> <p>4th</p>

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		For limiting single R.C section
5th	1st	Analyse's and design, determination of design constants, moment of resistance and area of steel for rectangular section
	2nd	Need of doubly reinforced section design of doubly reinforced rectangular section
6th		<u>Shear Bond and Development Length (LSM)</u>
	1st	Nominal shear stress in RC section design shear strength of concrete. Maximum shear stress, design of shear reinforcement, minimum shear reinforcement, forms of shear reinforcement.
	2nd	Bond and types of bond stress. Check for bond stress development length in tension and compression anchorage value for hooks 90 bend and 450 bonds standard lapping of bars. Check for development length
7th	1st	Numerical problems on deciding
	2nd	whether shear reinforcement
	3rd	is required or not. Check for
	4th	adequacy of the section if shear

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		Design of shear reinforcement. Minimum shear reinforcement in beam (Example only)
8th	1st	<u>Analysis and Design of T-Beam (LSM)</u> General features, advantages, effective width of flange as per IS-456-2000 code provisions
	2nd	Analysis on singly reinforced T-beam, strain diagram & stress diagram. depth
	3rd	of neutral axis moment of resistance
	4th	of T-beam section with neutral axis lying within the flange
9th	1st	Simple numerical problems and deciding
	2nd	effective flange width (problems only on
	3rd	flexural moment of resistance of T beam
	4th	section with neutral axis lying within the flange. C. shall be asked in written examination.
10th		<u>Analysis and design of slab and stair case (LSM)</u>
	1st	Design of simply supported one-way slabs for flexure check for deflection
	2nd	control and shear
	4th	Design of one way cantilever slabs and cantilever chajja for flexure check for deflection control and check for development length in shear

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11th	1st	Design of two way simply supported slabs for flexure with corner
	2nd	face to left.
	3rd	Design of dog legged staircase
	4th	Detailing of reinforcement in stair spanning longitudinally
12th	<u>Design of Axially loaded Columns and Footings (LSM)</u>	
	1st	Assumptions in limit state of collapse - compression
	2nd	Definition and classification of columns. effective length of
	3rd	column, specification for minimum reinforcement, cover, maximum reinforcement numbers of bars in
	4th	rectangular, square and circular section, diameter and spacing of lateral ties
13th	1st	Analysis of design of axially loaded short square, rectangular and circular
	2nd	or columns (with lateral ties only)
	3rd	Types of footing, Design of isolated square column Footing of uniform
	4th	thickness of flexure and shear.

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