

Discipline: Civil	Semester: 4th	Name of the Teaching Faculty G. P. Rajali Behera	
Subject: Structural Design-I	No of Days/Week Class Allotted: 05	Semester From date: _____ To date _____	No. of Weeks: 06

WEEK	Class Day	Theory Topics
1st	1st	Philosophy of Limit state Method - Definition Advantages of LSM over WSM, IS code suggestion regarding design philosophy
	2nd	Types of limit states, Partial safety factors.
	3rd	Characteristic strength, characteristic load, design load.
	4th	loading on structure as per IS 875, study of IS specification regarding spacing of reinforcement in slab.
	5th	Cover to reinforcement in slab, beam, column & footing, min ^m reinforcement in slab, beam, column.
2nd	1st	LSM:- Limit state of collapse, Assumptions stress-strain relationship for concrete & steel, neutral axis, stress block diagram.
	2nd	stress block diagram & strain diagram for singly reinforced beam.
	3rd	Concept of U/R, O/R and limiting sec ^d neutral axis coefficient.
	4th	Limiting value of moment of resistance and limiting % of steel required for limiting singly RC. section.
	5th	Analysis and design: MOR, determination of design constants & area of steel for rectangular sections.
3rd	2nd	Problem Practice.
	3rd	Problem Practice.
	4th	Problem Practice
	5th	Problem Practice.

WEEK	Class Day	Theory Topics
4th	1st	Problem Practice.
	2nd	Necessity of doubly reinforced section, design of doubly reinforced rectangular ^{secⁿ} .
	3rd	Problem Practice.
	4th	Problem Practice.
	5th	Problem Practice.
5th	1st	Problem Practice.
	2nd	Nominal shear stress in RC section, Design shear st. of concrete.
	3rd	Maximum shear stress, Design of shear reinforcement
	4th	Minimum shear reinforcement, forms of shear reinforcement
	5th	Bond and types of bond, bond stress.
6th	1st	Check for bond stress, check development length in tension & comp.
	2nd	Anchorage value of one hook 90° bend & 45° bend standard lapping basis.
	3rd	Check for development length. Numericals problems on shear
	4th	Numericals on deciding whether shear reinforcement is required or not
	5th	Check for adequacy of the sec ⁿ in Shear.

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WEEK	Class Day	Theory Topics
	1st	Problem Practice.
	2nd	Problem Practice.
	3rd	Problem Practice.
	4th	Problem Practice.
	5th	Problem Practice.
	1st	Analysis & Design of T Beam (LSM) - General features, advantages, eff. width of flange
	2nd	IS 456-2000 code provisions, Analysis of singly reinforced T-Beam.
	3rd	Strain diagram & stress diagram Depth of NA
	4th	Moment of Resistance of T-beam section with NA lying with flange.
	5th	Simple numerical problems on deciding effective flange width.
	1st	Problem Practice
	2nd	Problem Practice
	3rd	Problem Practice
	4th	Problem Practice
	5th	Problem Practice

WEEK	Class Day	Theory Topics
	1st	Column Assumptions in limit state of Collapse Definition & classification of columns
	2nd	Effective length of column. Specification for minimum reinforcement
	3rd	Cover, Maximum reinforcement No of bars in rectangular, square
	4th	Max reinforcement circular sec ⁿ Diameter and spacing of lateral ties
	5th	Analysis and design of axially loaded short square, rectangular & circular columns.
	1st	Problem practice
	2nd	Problem practice-
	3rd	Problem Practice.
	4th	Problem Practice.
	5th	Footing - Types of footing.
	1st	Design of isolated square column footing
	2nd	Design of isolated square column footing of uniform thickness for flexure & shear
	3rd	Design of isolated square column footing of uniform thickness for flexure & shear.
	4th	Design of isolated square column footing of uniform thickness for flexure & shear.
	5th	Design of isolated column footing of uniform thickness for flexure & shear.

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WEEK	Class Day	Theory Topics
	1st	Problem Practice.
	2nd	Problem Practice
	3rd	Problem Practice.
	4th	Design of simply supported one-way slabs for flexure check for deflection & control.
	5th	Problem Practice.
	1st	Design of oneway cantilevered slabs and chajja for flexure check for deflection
	2nd	check for development length & shear.
	3rd	Problem Practice.
	4th	Problem Practice.
	5th	Design of two-way simply supported slabs for flexure with corner free to lift.
	1st	Problem Practice.
	2nd	Problem Practice.
	3rd	Design of dog-legged staircase.
	4th	Detailing of reinforcement in stairs spanning longitudinally
	5th	Problem Practice.