

Badriprasad Institute of Technology, Sambalpur

Lesson plan for Theory -1, Structural Design – I

Semester & Branch : 4th Sem Civil Engineering

Name of the faculty : Miss. Santosini Padhan

Total Periods-60

No of periods /week-4

WEEK	CLASS DAY	THEORY TOPICS
1ST	1st	Working stress method (WSM)
		Objectives of design and detailing. State the different methods of design of concrete structures.
	2nd	Introduction to reinforced concrete, R.C. sections their behavior, grades of concrete and steel. Permissible stresses, assumption in W.S.M.
	3rd	Flexural design and analysis of single reinforced sections from first principles.
	4th	Continue of 3rd class
2ND	1st	Concept of under reinforced, over reinforced and balanced sections.
	2nd	Advantages and disadvantages of WSM, reasons for its obsolescence.
	3rd	Continue of 2nd class
	4th	Philosophy Of Limit State Method (LSM) Definition, Advantages of LSM over WSM, IS code suggestions regarding design philosophy.
3RD	1st	Types of limit states, partial safety factors for materials strength, characteristic strength, characteristic load, design load, loading on structure as per I.S. 875
	2nd	Continue of 1st class
	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	Continue of 3rd class
4TH	1st	Analysis and Design of Single and Double Reinforced Sections (LSM) Limit state of collapse (flexure), Assumptions,
	2nd	Stress-Strain relationship for concrete and steel, neutral axis,
	3rd	stress block diagram and strain diagram for singly reinforced section.
	4th	Concept of under- reinforced, over-reinforced and limiting section,
5TH	1st	neutral axis co-efficient, limiting value of moment of resistance and
	2nd	limiting percentage of steel required for limiting singly R.C. section.
	3rd	Analysis and design:- determination of design constants,
	4th	Continue of 3rd class

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6TH	1st	moment of resistance and area of steel for rectangular sections
	2nd	Necessity of doubly reinforced section,
	3rd	design of doubly reinforced rectangular section
	4th	Continue of 3rd class
7TH	1st	Shear, Bond and Development Length (LSM) Nominal shear stress in R.C. section, design shear strength of concrete,
	2nd	maximum shear stress, 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 in tension and compression,
	4th	anchorage value for hooks 900 bend and 450 bend standards lapping of bars, check for development length.
8TH	1st	Numerical problems on deciding whether shear reinforcement is required or not,
	2nd	Continue of 1st class
	3rd	check for adequacy of the section in shear. Design of shear reinforcement;
	4th	Continue of 3rd class
9TH	1st	Minimum shear reinforcement in beams (Explain through examples only).
	2nd	Analysis and Design of T-Beam (LSM) General features, advantages, effective width of flange as per IS: 456-2000 code provisions.
	3rd	Analysis of singly reinforced T-Beam,
	4th	strain diagram & stress diagram, depth of neutral axis, moment of resistance of T-beam section with neutral axis lying within the flange.
10TH	1st	Simple numerical problems on deciding effective flange width.
	2nd	Continue of 1st class
	3rd	(Problems only on finding moment of resistance of T-beam section when N.A. lies within or up to the bottom of flange shall be asked in written examination)..
	4th	Continue of 3rd class
11TH	1st	Analysis and Design of Slab and Stair case (LSM) Design of simply supported one-way slabs for flexure check for deflection control and shear.
	2nd	Design of one-way cantilever slabs and
	3rd	cantilevers chajjas for flexure check for deflection control and check for development length and shear.
	4th	Design of two-way simply supported slabs for flexure with corner free to lift.

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12TH	1st	Continue of 4th class
	2nd	Design of dog-legged staircase
	3rd	Detailing of reinforcement in stairs spanning longitudinally.
	4th	Design of Axially loaded columns and Footings (LSM) Assumptions in limit state of collapse- compression.
13TH	1st	Continue of 4th class
	2nd	Definition and classification of columns, effective length of column.
	3rd	Specification for minimum reinforcement; cover, maximum reinforcement, number of bars in rectangular, square and circular sections, diameter and spacing of lateral ties.
	4th	Continue of 3rd class
14TH	1st	Analysis and design of axially loaded short square,
	2nd	Continue of 1st class
	3rd	rectangular and circular columns (with lateral ties only).
	4th	Types of footing,
15TH	1st	Design of isolated square column footing of uniform thickness for flexure and shear.
	2nd	Continue of 1st class
	3rd	Continue of 2nd class
	4th	Revision

Sign of Faculty

Sign of HOD