BHUBANANANDA ODISHA SCHOOL OF ENGINEERING, CUTTACK
DEPARTMENT OF CIVIL ENGINEERING

LESSON PLAN

SUBJECT: STRUCTURAL DESIGN - I (TH-1)

FACULTY: Dr. S K NAYAK

ACADEMIC SESSION: 2022-23 (SUMMER)

SEMESTER: 4TH

SECTION : A

Sd/-
H O D (Civil Engg.)

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Discipline: Civil Engineering	**Semester: 4th**		**Name of the teaching faculty: Dr. S K NAYAK**
Subject: STRUCTURAL DESIGN - I	**No. of Days/ per week class allotted: 05 periods per week. (Mon-2,Tue-1 and Sat-2periods)**		**Semester From Date: 14-02-2023** **To Date: 23-05-2023** **No. of weeks: 15 weeks**
Week	**Class Day**	**No of period available**	**Theory Topics**
1ST	14/02/23	2	1. Working stress method (WSM) 1.1 Objectives of design and detailing. State the different methods of design of concrete structures. 1.2 Introduction to reinforced concrete, R.C. sections their behavior, grades of concrete and steel. Permissible stresses, assumption in W.S.M.
	16/02/23	1	1.3 Flexural design and analysis of single reinforced sections from first principles.
	17/02/23	1	1.4 Concept of under reinforced, over reinforced and balanced sections. 1.5 Advantages and disadvantages of WSM, reasons for its obsolescence
2ND	20/02/23	1	2. Philosophy Of Limit State Method (LSM) 2.1Definition, Advantages of LSM over WSM, IS code suggestions regarding design philosophy.
	21/02/23	2	2.2 Types of limit states, partial safety factors for materials strength, characteristic strength, characteristic load, design load, loading on structure as per I.S. 875
	23/02/23	1	2.3 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. 3 Analysis and Design of Single and Double Reinforced Sections (LSM) 3.1 Limit state of collapse (flexure), Assumptions, Stress-Strain relationship for concrete and steel,.
	24/02/23	1	3.1 Neutral axis, stress block diagram and strain diagram for singly reinforced section

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3RD	27/02/23	1	3.2 Concept of under- reinforced, over-reinforced and limiting section, neutral axis co-efficient,
	28/02/23	2	3.2 limiting value of moment of resistance and limiting percentage of steel required for limiting singly R.C. section
	02/03/23	1	3.3 Analysis and design: determination of design constants for rectangular sections,Moment of resistance and area of steel for rectangular sections
	03/03/23	1	3.4 Necessity of doubly reinforced section,
4TH	06/03/23	1	3.4 Design of doubly reinforced rectangular section
	09/03/23	1	CLASS TEST-1
	10/03/23	2	3.4 design of doubly reinforced rectangular section
5TH	13/03/23	1	4 Shear, Bond and Development Length (LSM)
	14/03/23	2	4.1 Nominal shear stress in R.C. section, design shear strength of concrete, maximum shear stress, design of shear reinforcement, minimum shear reinforcement, forms of shear reinforcement
	16/03/23	1	4.2 Bond and types of bond, bond stress, check for bond stress, development length in tension and compression, anchorage value for hooks 90 degree bend and 45 degree bend standards lapping of bars, check for development length.
	17/03/23	1	4.3 Numerical problems on deciding whether shear reinforcement is required or not, check for adequacy of the section in shear. Design of shear reinforcement; Minimum shear reinforcement in beams
6TH	20/03/23	1	4.3 Numerical problems on deciding whether shear reinforcement is required or not, check for adequacy of the section in shear.
	21/03/23	2	4.3 Design of shear reinforcement; Minimum shear reinforcement in beams
	23/03/23	1	5 Analysis and Design of T-Beam (LSM) 5.1 General features, advantages, effective width of flange as per IS: 456-2000 code provisions.
	24/03/23	1	5.2 Analysis of singly reinforced T-Beam, strain diagram & stress diagram, depth of neutral axis

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7TH	27/03/23	1	5.2 moment of resistance of T-beam section with neutral axis lying within the flange
	28/03/23	2	5.3 Simple numerical problems on deciding effective flange width
	31/03/23	1	5.3 Simple numerical problems on deciding effective flange width
8TH	03/04/23	1	6AnalysisandDesignofSlabandStaircase(LSM) 6.1Designofsimplysupportedone-wayslabsforflexurecheckfordeflectioncontrolandshear.
	04/04/23	2	6.1 Design of simply supported one-way slabs for flexure check for deflection control and shear.
	06/04/23	1	CLASS TEST-2
9TH	10/04/23	1	6.1 Design of simply supported one-way slabs for flexure check for deflection control and shear.
	11/04/23	2	6.2 Design of one-way cantilever slabs and cantilevers chajjas for flexure check for deflection control and check for development length and shear.
	13/04/23	1	6.2 Design of one-way cantilever slabs and cantilevers chajjas for flexure check for deflection control and check for development length and shear.
10TH	17/04/23	1	6.2 Design of one-way cantilever slabs and cantilevers chajjas for flexure check for deflection control and check for development length and shear.
	18/04/23	2	6.2 Design of one-way cantilever slabs and cantilevers chajjas for flexure check for deflection control and check for development length and shear.
	20/04/23	1	6.3 Design of two-way simply supported slabs for flexure with corner free to lift
	21/04/23	1	6.3 Design of two-way simply supported slabs for flexure with corner free to lift
11TH	24/04/23	1	6.3 Design of two-way simply supported slabs for flexure with corner free to lift
	25/04/23	2	6.4 Design of dog-legged staircase
	27/04/23	1	6.5 Detailing of reinforcement in stairs spanning longitudinally
	28/04/23	1	INTERNAL ASSESSMENT

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12TH	01/05/23	1	7 Design of Axially loaded columns and Footings (LSM) 7.1 Assumptions in limit state of collapse- compression.
	02/05/23	2	CLASS TEST-3
	04/05/23	1	7.2 Definition and classification of columns, effective length of column. Specification for minimum reinforcement; cover, maximum reinforcement, number of bars in rectangular, square and circular sections, diameter and spacing of lateral ties
13TH	08/05/23	1	7.2 Maximum reinforcement, number of bars in rectangular, square and circular sections, diameter and spacing of lateral ties
	09/05/23	2	7.3 Analysis and design of axially loaded short square column(with lateral ties only)
	11/05/23	1	7.3 Analysis and design of axially loaded short square column(with lateral ties only)
	12/05/23	1	7.4 Types of footing, Design of isolated square column footing of uniform thickness for flexure and shear.
14TH	15/05/23	1	7.4 Types of footing, Design of isolated square column footing of uniform thickness for flexure and shear.
	16/05/23	2	REVISION
	18/05/23	1	REVISION
15TH	22/05/23	1	Previous Year Questions and Answers discussion
	23/05/23	2	Previous Year Questions and Answers discussion