BHUBANANANDA ODISHA SCHOOL OF ENGINEERING,
CUTTACK
DEPARTMENT OF CIVIL ENGINEERING

LESSON PLAN

SUBJECT: STRUCTURAL DESIGN - I (TH-1)

FACULTY: ABHIJIT SAHOO

ACADEMIC SESSION: 2022-23 (SUMMER)

SEMESTER: 4TH

SECTION : C

Sd/-
H O D (Civil Engg.)

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DISCIPLINE: CIVIL ENGINEERING	**SEMESTER:4TH C**		**NAME OF TEACHING FACULTY: ABHIJIT SAHOO**
Subject: SD I	**No. of Days / week class allotted: 05 periods per week (Mon-1, Wed-1, Thu-1 & Fri- 2 Period)**		**Semester From Date: 14-02-2023 To Date 23-05-2023** **No. of Weeks: 15**
Week	**Date**	**No. of periods available**	**Topics to be covered**
1ST	15/02/2023	1	1. WORKING STRESS METHOD (WSM) 1.1 Objectives of design and detailing. State the different methods of design of concrete structures.
	16/02/2023	1	1.2 Introduction to reinforced concrete, R.C. sections their behaviour, grades of concrete and steel. Permissible stresses, assumption in W.S.M.
	17/02/2023	2	1.3 Flexural design and analysis of single reinforced sections from first principles.
2ND	20/02/2023	1	1.4 Concept of under reinforced, over reinforced and balanced sections.
	22/02/2023	1	1.5 Advantages and disadvantages of WSM, reasons for its obsolescence.
	23/02/2023	1	2. PHILOSOPHY OF LIMIT STATE METHOD (LSM)
	24/02/2023	2	2.1Definition, Advantages of LSM over WSM, IS code suggestions regarding design philosophy.
3RD	27/02/2023	1	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
	01/03/2023	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.
	02/03/2023	1	3 ANALYSIS AND DESIGN OF SINGLE AND DOUBLE REINFORCED SECTIONS (LSM)

	03/03/2023	2	3.1 Limit state of collapse (flexure), Assumptions, Stress-Strain relationship for concrete and steel,
4TH	06/03/2023	1	3.1 Neutral axis, stress block diagram and strain diagram for singly reinforced section
	09/03/2023	1	3.2 Concept of under- reinforced, over-reinforced and limiting section, neutral axis co-efficient, limiting value of moment of resistance and limiting percentage of steel required for limiting singly R.C. section.
	10/03/2023	2	3.3 Analysis and design: determination of design constants for rectangular sections
5TH	13/03/2023	1	3.3 Moment of resistance and area of steel for rectangular sections
	15/03/2023	1	3.4 Necessity of doubly reinforced section, design of doubly reinforced rectangular section.
	16/03/2023	1	Monthly Class Test 1
	17/03/2023	2	3.4 design of doubly reinforced rectangular section
6TH	20/03/2023	1	4 SHEAR, BOND AND DEVELOPMENT LENGTH (LSM)
	22/03/2023	1	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.
	23/03/2023	1	4.2 Bond and types of bonds, 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.
	24/03/2023	2	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.
7TH	27/03/2023	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.
	29/03/2023	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
			5 ANALYSIS AND DESIGN OF T-BEAM (LSM)
	31/03/2023	2	5.1 General features, advantages, effective width of flange as per IS: 456-2000 code provisions.
8TH	03/04/2023	1	5.2 Analysis of singly reinforced T-Beam, strain diagram & stress diagram, depth of

			neutral axis.
	05/04/2023	1	5.2 moment of resistance of T-beam section with neutral axis lying within the flange
	06/04/2023	1	5.3 Simple numerical problems on deciding effective flange width
9TH	10/04/2023	1	5.3 Simple numerical problems on deciding effective flange width
	12/04/2023	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
	13/04/2023	1	Monthly Class Test 2
10TH	17/04/2023	1	6 ANALYSIS AND DESIGN OF SLAB AND STAIR CASE (LSM)
	19/04/2023	1	6.1 Design of simply supported one-way slabs for flexure check for deflection control and shear.
	20/04/2023	1	6.1 Design of simply supported one-way slabs for flexure check for deflection control and shear.
	21/04/2023	2	6.1 Design of simply supported one-way slabs for flexure check for deflection control and shear.
11TH	24/04/2023	1	6.1 Design of simply supported one-way slabs for flexure check for deflection control and shear.
	26/04/2023	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.
	27/04/2023	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.
	28/04/2023	2	INTERNAL ASSESSMENT
12TH	01/05/2023	1	6.3 Design of two-way simply supported slabs for flexure with corner free to lift
	03/05/2023	1	6.3 Design of two-way simply supported slabs for flexure with corner free to lift
	04/05/2023	1	6.4 Design of dog-legged staircase
13TH	08/05/2023	1	6.5 Detailing of reinforcement in stairs spanning longitudinally
	10/06/2023	1	7 DESIGNS OF AXIALLY LOADED COLUMNS AND FOOTINGS (LSM) 7.1 Assumptions in limit state of collapse- compression.
	11/05/2023	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.
	12/05/2023	2	7.3 Analysis and design of axially loaded short square column (with lateral ties only)

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14TH	15/05/2023	1	7.4 Types of footing, Design of isolated square column footing of uniform thickness for flexure and shear.
	17/05/2023	1	Monthly Class Test 3
	18/05/2023	1	Revision
15TH	22/05/2023	1	Previous Year Questions and Answers discussion