NILASAILA INSTITUTE OF SCIENCE & TECHNOLOGY
SERGARH-756060, BALASORE (ODISHA)
(Approved by AICTE& affiliated to SCTE&VT, Odisha)

LESSON PLAN

SUBJECT : Th-1 (STRUCTURAL DESIGN-I)

CHAPTER WISE DISTRIBUTION OF PERIODS

Sl.No.	Name of the chapter as per the Syllabus	No. of Periods as per the Syllabus	No. of periods actually needed
1	Working stress method (WSM)	5	5
2	Philosophy of Limit state method (LSM)	3	3
3	Analysis and design of singly and double reinforced sections (LSM)	15	15
4	Shear, Bond and Development Length (LSM)	4	4
5	Analysis and Design of T-Beam (LSM)	15	15
6	Analysis and Design of Slab and Stair case (LSM)	15	15
7	Design of Axially loaded columns and Footings (LSM)	18	15
	Total Period:	75	72

Discipline: CIVIL ENGINEERING	Semester: 4TH	**Name of the Teaching Faculty:** Er. Kumar Swatiranjan
		SESSION : 2023-24 **EXAMINATION :** 2024(S)
Week	**Class Day**	**Topics to be Covered**
1st	**1st**	1 Working stress method (WSM) 1.1 Objectives of design and detailing. State the different methods of design of
	2nd	1.2 Introduction to reinforced concrete, R.C. sections their behavior, grades of concrete and steel. Permissible stresses, assumption in W.S.M.
	3rd	1.3 Flexural design and analysis of single reinforced sections from first principles.
	4th	1.4 Concept of under reinforced, over reinforced and balanced sections
	5th	1.5 Advantages and disadvantages of WSM, reasons for its obsolescence
2nd	**1st**	2 Philosophy Of Limit State Method (LSM) 2.1 Definition, Advantages of LSM over WSM, IS code suggestions regarding design philosophy.
	2nd	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
	3rd	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
	4th	3 Analysis and Design of Single and Double Reinforced Sections (LSM) 3.1 Limit state of collapse (flexure)
	5th	3.1Assumptions, Stress-Strain relationship for concrete and steel, neutral axis
3rd	**1st**	3.1 Stress block diagram and strain diagram for singly reinforced section.
	2nd	3.2 Concept of under- reinforced, over-reinforced and limiting section, neutral axis co-efficient.
	3rd	3.2limiting value of moment of resistance and limiting percentage of steel required for limiting singly R.C. section.
	4th	3.3 Analysis and design: determination of design constants, moment of resistance and area of steel for rectangular sections
	5th	3.3 Analysis and design: determination of design constants, moment of resistance and area of steel for rectangular sections
4th	**1st**	3.3 Analysis and design: determination of design constants, moment of resistance and area of steel for rectangular sections
	2nd	3.3 Analysis and design: determination of design constants, moment of resistance and area of steel for rectangular sections
	3rd	3.3 Analysis and design: determination of design constants, moment of resistance and area of steel for rectangular sections

4th	**4th**	3.3 Analysis and design: determination of design constants, moment of resistance and area of steel for rectangular sections
	5th	3.3 Analysis and design: determination of design constants, moment of resistance and area of steel for rectangular sections
5th	**1st**	3.3 Analysis and design: determination of design constants, moment of resistance and area of steel for rectangular sections
	2nd	3.4 Necessity of doubly reinforced section, design of doubly reinforced rectangular section
	3rd	3.4 Necessity of doubly reinforced section, design of doubly reinforced rectangular section
	4th	4 Shear, Bond and Development Length (LSM) 4.1 Nominal shear stress in R.C. section, design shear strength of concrete, maximum shear stress, design of shear reinforcement, minimum shear
	5th	4.2 Bond and types of bond, bond stress, check for bond stress, development length in tension and compression, anchorage value for hooks 900 bend and 450 bend standards lapping of bars, check for development length
6th	**1st**	4.3 Numerical problems on deciding whether shear reinforcement is required or not, check for adequacy of the section in shear.
	2nd	4.3Design of shear reinforcement; Minimum shear reinforcement in beams (Explain through examples only).
	3rd	5 Analysis and Design of T-Beam (LSM) 5.1 General features, advantages, effective width of flange as per IS: 456-2000 code provisions.
	4th	5 Analysis and Design of T-Beam (LSM) 5.1 General features, advantages, effective width of flange as per IS: 456-2000 code provisions.
	5th	5 Analysis and Design of T-Beam (LSM) 5.1 General features, advantages, effective width of flange as per IS: 456-2000 code provisions.
7th	**1st**	5 Analysis and Design of T-Beam (LSM) 5.1 General features, advantages, effective width of flange as per IS: 456-2000 code provisions.
	2nd	5 Analysis and Design of T-Beam (LSM) 5.1 General features, advantages, effective width of flange as per IS: 456-2000 code provisions.
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	4th	5 Analysis and Design of T-Beam (LSM) 5.1 General features, advantages, effective width of flange as per IS: 456-2000 code provisions.
	5th	5 Analysis and Design of T-Beam (LSM) 5.1 General features, advantages, effective width of flange as per IS: 456-2000 code provisions.
8th	**1st**	5.2 Analysis of singly reinforced T-Beam, strain diagram & stress diagram, depth of neutral axis.

8th	**2nd**	5.2 Analysis of singly reinforced T-Beam, strain diagram & stress diagram, depth of neutral axis.
	3rd	5.2 Analysis of singly reinforced T-Beam, strain diagram & stress diagram, depth of neutral axis.
	4th	5.2 Moment of resistance of T-beam section with neutral axis lying within the flange.
	5th	5.2 Moment of resistance of T-beam section with neutral axis lying within the flange.
9th	**1st**	5.3 Simple numerical problems on deciding effective flange width. (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).
	2nd	5.3 Simple numerical problems on deciding effective flange width. (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).
	3rd	6 Analysis and Design of Slab and Stair case (LSM) 6.1 Design of simply supported one-way slabs for flexure check for deflection control and shear.
	4th	6 Analysis and Design of Slab and Stair case (LSM) 6.1 Design of simply supported one-way slabs for flexure check for deflection control and shear.
	5th	6 Analysis and Design of Slab and Stair case (LSM) 6.1 Design of simply supported one-way slabs for flexure check for deflection control and shear.
10th	**1st**	6.2 Design of one-way cantilever slabs and cantilevers chajjas for flexure check for deflection control and check for development length and shear.
	2nd	6.2 Design of one-way cantilever slabs and cantilevers chajjas for flexure check for deflection control and check for development length and shear.
	3rd	6.2 Design of one-way cantilever slabs and cantilevers chajjas for flexure check for deflection control and check for development length and shear.
	4th	6.3 Design of two-way simply supported slabs for flexure with corner free to lift.
	5th	6.3 Design of two-way simply supported slabs for flexure with corner free to lift.
11th	**1st**	6.3 Design of two-way simply supported slabs for flexure with corner free to lift.
	2nd	6.4 Design of dog-legged staircase
	3rd	**INTERNAL ASSESMENT.**
	4th	**INTERNAL ASSESMENT.**
	5th	6.4 Design of dog-legged staircase
12th	**1st**	6.4 Design of dog-legged staircase

12th	**2nd**	6.5 Detailing of reinforcement in stairs spanning longitudinally.
	3rd	6.5 Detailing of reinforcement in stairs spanning longitudinally.
	4th	6.5 Detailing of reinforcement in stairs spanning longitudinally.
	5th	7.Design of axially loaded columns and footings(LSM)
13th	**1st**	7.1 Assumptions in limit state of collapse- compression.
	2nd	7.2 Definition and classification of columns, effective length of column.
	3rd	7.2Specification for minimum reinforcement; cover, maximum reinforcement, number of bars in rectangular,square and circular sections, diameter and spacing of lateral ties
	4th	7.2Specification for minimum reinforcement; cover, maximum reinforcement, number of bars in rectangular,square and circular sections, diameter and spacing of lateral ties
	5th	7.3 Analysis and design of axially loaded short square, rectangular and circular columns (with lateral ties only).
14th	**1st**	7.3 Analysis and design of axially loaded short square, rectangular and circular columns (with lateral ties only).
	2nd	7.3 Analysis and design of axially loaded short square, rectangular and circular columns (with lateral ties only).
	3rd	7.3 Analysis and design of axially loaded short square, rectangular and circular columns (with lateral ties only).
	4th	7.3 Analysis and design of axially loaded short square, rectangular and circular columns (with lateral ties only).
	5th	7.4 Types of footing, Design of isolated square column footing of uniform thickness for flexure and shear.
15th	**1st**	7.4 Types of footing, Design of isolated square column footing of uniform thickness for flexure and shear.
	2nd	7.4 Types of footing, Design of isolated square column footing of uniform thickness for flexure and shear.
	3rd	7.4 Types of footing, Design of isolated square column footing of uniform thickness for flexure and shear.
	4th	7.4 Types of footing, Design of isolated square column footing of uniform thickness for flexure and shear.
	5th	Revision