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

NIST
POLYTECHNIC

LESSON PLAN

SUBJECT : Th-1 (STRUCTURAL DESIGN-!)

Name Of The Faculty :- Er. Kumar Swatiranjan
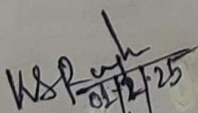**Branch :-** Civil Engineering   **Semester :-** 4TH
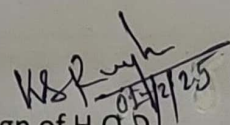**Session :-** 2024-25   **Examination :-** 2025 (S)

CHAPTER WISE DISTRIBUTION OF PERIODS

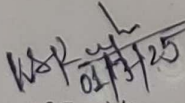| Sl.No.	Name of the chapter as per the Syllabus	No. of Periods as per the Syllabus	No. of periods actually needed
1	Working stress method (WSM)	5	5
2	Philosophy of Limit state method (LSM)	3	3
3	Analysis and design of singly and double reinforced sections (LSM)	15	15
4	Shear, Bond and Development Length (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

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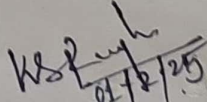
Discipline: CIVIL ENGINEERING	Semester: 4TH	Name of the Teaching Faculty: Er. Kumar Swatiranjan		
		SESSION : 2024-25	EXAMINATION : 2025(S)	
Week	Class Day	Topics to be Covered		
1st	1st	1 Working stress method (WSM) 1.1 Objectives of design and detailing. State the different methods of design of		
	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	3.1 Assumptions, 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	3.2 limiting 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	4.3 Design 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.
	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.
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	

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