LESSON PLAN FOR SUMMER SESSION (2024-25)

PROGRAMME : CIVIL ENGINEERING	NAME OF THE FACULTY: MR. ARABINDA SAHU
COURSE NAME : STRUCTURAL DESIGN-I	SESSION : 2024-25(S)
COURSE CODE : TH.1	DATE : 04/02/25 To 17/05/25
SEMESTER : 4TH	
PERIODS/WEEK: 5	
TOTAL PERIODS:75	

WEEK	PERIODS	UNITS	TOPICS
Feb. 1st Week	1	1	**1. Working stress method (WSM):** 1.1 Objectives of design and detailing. State Different methods of design of concrete structure.
	2	1	1.2 Introduction to reinforced concrete, R.C. sections their behavior,
	3	1	Grades of concrete and steel. Permissible stresses, assumption in W.S.M.
	4	1	1.3 Flexural design of single reinforced sections from first principles.
	5	1	Analysis of single reinforced sections from first principles.
Feb. 2nd Week	6	1	1.4 Concept of under reinforced,
	7	1	Concept over reinforced and balanced sections.
	8	1	1.5 Advantages and disadvantages of WSM, reasons for its obsolescence.
	9	1	1.5 Advantages and disadvantages of WSM, reasons for its obsolescence.
	10	2	**2. Philosophy Of Limit State Method (LSM)** 2.1 Definition, Advantages of LSM over WSM, IS code suggestions regarding design philosophy.
Feb. 3rd Week	11	2	2.2 Types of Limit states, partial safety factors for materials strength as per IS 875
	12	2	Characteristic strength,characteristic load, design load, loading on structure as per I.S. 875
	13	2	2.3 Study of I.S specification regarding spacing of reinforcement in slab, cover to reinforcement in slab, beam column & footing,
	14	2	Minimum reinforcement in slab, beam & column,
	15	2	Lapping, anchorage, effective span for beam & slab.
Feb. 4th Week	16	3	**3. Analysis and Design of single and Double reinforced section (LSM)** 3.1 Limit state of collapse (flexure), Assumptions,
	17	3	Stress-Strain relationship for concrete and steel, neutral axis,
	18	3	Stress block diagram and strain diagram for singly reinforced section.
	19	3	3.2 Concept of under- reinforced, over-reinforced and limiting section, neutral axis co-efficient,
	20	3	Limiting value of moment of resistance
Mar. 1st Week	21		**Monthly Test-1**
	22	3	Limiting percentage of steel required for limiting singly R.C. section.
	23	3	3.3 Analysis and design: determination of design constants,
	24	3	Moment of resistance and area of steel for rectangular sections
	25	3	3.4 Necessity of doubly reinforced section,
Mar. 2nd Week	26	3	Design of doubly reinforced rectangular section
	27	4	**4. Shear, Bond and Development Length (LSM)** 4.1 Nominal shear stress in R.C. section, design shear strength of concrete,
	28	4	Maximum shear stress, design of shear reinforcement,
	29	4	Minimum shear reinforcement, forms of shear reinforcement.
	30	4	4.2 Bond and types of bond, bond stress, check for bond stress,
Mar 3rd Week	31	4	Development length in tension and compression, anchorage value for hooks 90° bend
	32	4	Development length in tension and compression, anchorage value for hooks 90° bend
	33	4	Anchorage value for hooks 45° bend standards lapping of bars, check for development length.
	34	4	4.3 Numerical problems on deciding whether shear reinforcement is required or not
	35	4	Numrical problem on check for adequacy of the section in shear.
Mar. 4th Week	36	4	Design of shear reinforcement in beams (Explain through examples only).
	37	4	Design of Minimum shear reinforcement in beams (Explain through examples only).
	38		**Internal Assessment Exam**
	39	5	**5. Analysis and Design of T-Beam (LSM)** 5.1 General features, advantages
	40	5	Effective width of flange as per IS: 456-2000 code provisions.
Apr. 1st Week	41	5	5.2 Analysis of singly reinforced T-Beam, strain diagram & Stress diagram, depth of neutral axis
	42	5	5.2 Analysis of singly reinforced T-Beam, strain diagram & Stress diagram, depth of neutral axis
	43	5	5.2 Analysis of singly reinforced T-Beam, strain diagram & Stress diagram, depth of neutral axis
	44	5	Moment of resistance of T-beam section with neutral axis lying within the flange.
	45	5	Moment of resistance of T-beam section with neutral axis lying within the flange.
Apr. 2nd Week	46	5	Moment of resistance of T-beam section with neutral axis lying within the flange.
	47	5	5.3 Simple numerical problems on deciding effective flange width.
	48	5	5.3 Simple numerical problems on deciding effective flange width.
	49	6	**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.

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WEEK	PERIODS	UNITS	TOPICS
	50	6	6.1 Design of simply supported one-way slabs for flexure check for deflection control and shear.
Apr. 3rd Week	51	6	6.1 Design of simply supported one-way slabs for flexure check for deflection control and shear.
	52	6	6.2 Design of one-way cantilever slabs and cantilevers chajjas for flexure check for deflection control and check for development length and shear.
	53	6	6.2 Design of one-way cantilever slabs and cantilevers chajjas for flexure check for deflection control and check for development length and shear.
	54	6	6.3 Design of two-way simply supported slabs for flexure with corner free to lift.
	55	6	6.3 Design of two-way simply supported slabs for flexure with corner free to lift.
Apr. 4th Week	56	6	6.3 Design of two-way simply supported slabs for flexure with corner free to lift.
	57	6	6.4 Design of dog-legged staircase
	58	6	6.4 Design of dog-legged staircase
	59	6	6.5 Detailing of reinforcement in stairs spanning longitudinally
	60	6	6.5 Detailing of reinforcement in stairs spanning longitudinally
May. 1st Week	61	7	**7. Design of Axially loaded columns and Footings (LSM)** 7.1 Assumptions in limit state of collapse- compression.
	62	7	7.1 Assumptions in limit state of collapse- compression.
	63	7	7.2 Definition and classification of columns, effective length of column. Specification for minimum reinforcement; cover, maximum reinforcement,
	64	7	7.2 Definition and classification of columns, effective length of column. Specification for minimum reinforcement; cover, maximum reinforcement,
	65	7	7.2 Definition and classification of columns, effective length of column. Specification for minimum reinforcement; cover, maximum reinforcement,
May. 2nd Week	66	7	Number of bars in rectangular, square and circular sections, diameter and spacing of lateral ties.
	67	7	7.3 Analysis and design of axially loaded short square, rectangular and circular columns (with lateral ties only).
	68	7	7.3 Analysis and design of axially loaded short square, rectangular and circular columns (with lateral ties only).
	69	7	7.4 Types of footing, Design of isolated square column footing of uniform thickness for flexure and shear.
	70	7	7.4 Types of footing, Design of isolated square column footing of uniform thickness for flexure and shear.
May. 3rd Week	71	7	7.4 Types of footing, Design of isolated square column footing of uniform thickness for flexure and shear.
	72		**Monthly Test-2**
	73		**Doubt Clearing Class & Previous year question Paper discussion.**
	74		**Doubt Clearing Class & Previous year question Paper discussion.**
	75		**Doubt Clearing Class & Previous year question Paper discussion.**

Concern faculty

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