LESSON PLAN

DEPARTMENT OF CIVIL ENGINEERING, ITT, CHOUDWAR

SUBJECT: STRUCTURAL DESIGN -I **Periods**: 5 per week **SEMESTER**: 4TH

NAME OF FACULTY: SUBHALAXMI GHADEI

Week	Class Day	Theory / Practical Topics
1st	1st	1.WORKING STRESS METHOD(WSM): Objectives of design and detailing. State the different methods of design of concrete structures
	2nd	Introduction to reinforced concrete, R.C. sections their behavior, grades of concrete and steel. Permissible stresses, assumption in W.S.M., Flexural design and analysis of single reinforced sections from first principles
	3rd	Concept of under reinforced, over reinforced and balanced sections, Advantages and disadvantages of WSM, reasons for its obsolescence.
2nd	1st	2. PHILOSOPHY OF LIMIT STATE METHOD (LSM): Definition, Advantages of LSM over WSM, IS code suggestions regarding design philosophy, Types of limit states, partial safety factors for materials strength, characteristic strength, characteristic load, design load,
	2nd	Definition, Advantages of LSM over WSM, IS code suggestions regarding design philosophy, Types of limit states, partial safety factors for materials strength, characteristic strength, characteristic load, design load,
	3rd	3.ANALYSIS AND DESIGN OF SINGLY AND DOUBLE REINFORCED SECTIONS(LSM): Limit state of collapse (flexure), Assumptions, Stress-Strain relationship for concrete and steel,
3rd	1st	Neutral axis, stress block diagram and strain diagram for singly reinforced section.
	2nd	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.
	3rd	Limiting percentage of steel required for limiting singly R.C. section. Analysis and design: determination of design constants, moment of resistance and area of steel for rectangular sections
4th	1st	Analysis and design: determination of design constants, moment of resistance and area of steel for rectangular sections
	2nd	Necessity of doubly reinforced section, design of doubly reinforced rectangular section
	3rd	Design of doubly reinforced rectangular section
5th	1st	Design of doubly reinforced rectangular section
	2nd	Design of doubly reinforced rectangular section
	3rd	4. SHEAR, BOND AND DEVELOPMENT LENGTH(LSM): 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. Bond and types of bonds, 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	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 (Explain through examples only).
	2nd	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 (Explain through examples only). 5.ANALYSIS AND DESIGN OF T- BEAM (LSM): General features, advantages, effective width of flange as per IS: 456-2000 code provisions.
	3rd	General features, advantages, effective width of flange as per IS: 456-2000 code provisions, Moment of resistance of T-beam section with neutral axis lying within the flange.
7th	1st	Moment of resistance of T-beam section with neutral axis lying within the flange. Simple numerical problems on deciding effective flange width
	2nd	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	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)..
8th	1st	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	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	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)..
9th	1st	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	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).. 6. ANALYSIS AND DESIGN OF SLAB AND STAIRCASE (LSM): Design of simply supported one-way slabs for flexure check for deflection control and shear.
	3rd	Design of simply supported one-way slabs for flexure check for deflection control and shear.
10th	1st	Design of one-way cantilever slabs and cantilevers chajjas for flexure check for deflection control and check for development length and shear
	2nd	Design of one-way cantilever slabs and cantilevers chajjas for flexure check for deflection control and check for development length and shear
	3rd	Design of two-way simply supported slabs for flexure with corner free to lift.

11th	1st	Design of two-way simply supported slabs for flexure with corner free to lift.
	2nd	Design of dog-legged staircase
	3rd	Design of dog-legged staircase, Design of dog-legged staircase
12th	1st	Design of dog-legged staircase
	2nd	Design of dog-legged staircase 7. DESIGN OF AXIALLY LOADED COLUMNS AND FOOTINGS(LSM): Assumptions in limit state of collapse- compression.
	3rd	Assumptions in limit state of collapse- compression. Definition and classification of columns, effective length of column.
	1st	Specification for minimum reinforcement; cover, maximum reinforcement, number of bars in rectangular, square and circular sections, diameter and spacing of lateral ties.
13th	2nd	Analysis and design of axially loaded short square, rectangular and circular columns (with lateral ties only).
	3rd	Analysis and design of axially loaded short square, rectangular and circular columns (with lateral ties only).
14th	1st	Analysis and design of axially loaded short square, rectangular and circular columns (with lateral ties only).
	2nd	Analysis and design of axially loaded short square, rectangular and circular columns (with lateral ties only).
	3rd	Types of footing, Design of isolated square column footing of uniform thickness for flexure and shear.
15th	1st	Design of isolated square column footing of uniform thickness for flexure and shear.
	2nd	Design of isolated square column footing of uniform thickness for flexure and shear.
	3rd	Design of isolated square column footing of uniform thickness for flexure and shear.