DEPARTMENT OF CIVIL ENGINEERING
GANAPATI INSTITUTE OF ENGINEERING AND TECHNOLOGY, JAGATPUR, CUTTACK

LESSON PLAN OF 4TH SEMESTER(2023-24) CIVIL ENGINEERING

Discipline: CIVIL ENGG.	Semester:- 4TH	Name of the Teaching Faculty BIBHU RANJAN SAMAL
Subject:- STRUCTURAL DESIGN- I(Th.1)	No of Days/per Week Class Allotted :-05	Semester From:- 16/01/2024 To:- 26/04/2024 No of Weeks:- 15
Week	**Class Day**	**Theory / Practical Topics**
1st	1st	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.
	3rd	Flexural design and analysis of single reinforced sections from first principles.
	4th	Concept of under reinforced, over reinforced and balanced sections.
	5th	Advantages and disadvantages of WSM, reasons for its obsolescence.
2nd	1st	Philosophy of Limit state method (LSM) : Definition, Advantages of LSM over WSM, IS code suggestions regarding design philosophy.
	2nd	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	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	Analysis and design of singly and double reinforced sections (LSM)
	5th	Limit state of collapse (flexure),
3rd	1st	Assumptions,
	2nd	Stress-Strain relationship for concrete and steel, neutral axis, stress block diagram and strain diagram for singly reinforced section.
	3rd	Numerical
	4th	Concept of under- reinforced, over-reinforced and limiting section,
	5th	neutral axis co-efficient, limiting value of moment of resistance and limiting percentage of steel required for limiting singly R.C. section.
4th	1st	Numerical
	2nd	Analysis and design: determination of design constants,
	3rd	Numerical
	4th	moment of resistance and area of steel for rectangular sections
	5th	Numerical
5th	1st	Necessity of doubly reinforced section,
	2nd	design of doubly reinforced rectangular section
	3rd	Numerical
	4th	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.
	5th	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	Numerical problems on deciding whether shear reinforcement are 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
	3rd	Analysis and Design of T-Beam (LSM)
	4th	General features, advantages, effective width of flange as per IS: 456-2000 code provisions.
	5th	General features, advantages, effective width of flange as per IS: 456-2000 code provisions.
7th	1st	Analysis of singly reinforced T-Beam,
	2nd	strain diagram & stress diagram, depth of neutral axis
	3rd	moment of resistance of T-beam section with neutral axis lying within the flange.
	4th	Numerical
	5th	Numerical
8th	1st	Numerical
	2nd	Numerical
	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).
	4th	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).
	5th	Numerical
9th	1st	Numerical
	2nd	Numerical
	3rd	Analysis and Design of Slab and Stair case (LSM)
	4th	Design of simply supported one-way slabs for flexure check for deflection control and shear.
	5th	Design of simply supported one-way slabs for flexure check for deflection control and shear.
10th	1st	Design of simply supported one-way slabs for flexure check for deflection control and shear.
	2nd	Numerical
	3rd	Numerical
	4th	Design of one-way cantilever slabs and cantilevers chajjas for flexure check for deflection control and check for development length and shear.
	5th	Numerical
11th	1st	Design of two-way simply supported slabs for flexure with corner free to lift.
	2nd	Design of two-way simply supported slabs for flexure with corner free to lift.
	3rd	Design of dog-legged staircase
	4th	Design of dog-legged staircase
	5th	Detailing of reinforcement in stairs spanning longitudinally.
12th	1st	Detailing of reinforcement in stairs spanning longitudinally.
	2nd	Numerical
	3rd	Design of Axially loaded columns and Footings (LSM)
	4th	Assumptions in limit state of collapse- compression.
	5th	Assumptions in limit state of collapse- compression.
13th	1st	Definition and classification of columns, effective length of column.

	2nd	Specification for minimum reinforcement; cover, maximum reinforcement,
	3rd	number of bars in rectangular, square and circular sections, diameter and spacing of lateral ties.
	4th	number of bars in rectangular, square and circular sections, diameter and spacing of lateral ties.
	5th	numerical
14th	1st	numerical
	2nd	Analysis and design of axially loaded short square
	3rd	rectangular and circular columns (with lateral ties only).
	4th	rectangular and circular columns (with lateral ties only).
	5th	numerical
15th	1st	numerical
	2nd	Types of footing.
	3rd	Design of isolated square column footing of uniform thickness for flexure and shear.
	4th	Design of isolated square column footing of uniform thickness for flexure and shear.
	5th	numerical

13.01.24
Signature of Faculty

13.01.24
Signature of H.O.D