KIIT POLYTECHNIC, BHUBANESWAR

LESSON PLAN

Session: 2023-24

Discipline: Civil Engineering	**Semester:** 4th, S/2024	**Name of the Faculty:** Mr. Abhijeet Prasad Dash, lecturer **E-mail ID:** abhijitfce@kp.kiit.ac.in
Subject: Structural Design-l (Th-l)	**No. Of Days/Week** **Class Allotted**-5	**Start Date:** 16.01.2024 **End Date:** 26.04.2024
Week	**Class Day**	**Theory**
1st	1st	Objectives of design and detailing. State the different methods of design of concrete structures.
	2nd	Introduction to reinforced concrete, R.C. sections their behaviour, 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	Definition, Advantages of LSM over WSM, IS code suggestions regarding design philosophy.
	2nd	Types of limit states, partial safety factors for materials strength,
	3rd	characteristic load, design load, loading on structure as per I.S. 875
	4th	Study of I.S specification regarding spacing of reinforcement in slab
	5th	cover to reinforcement in slab, beam column & footing
3rd	1st	minimum reinforcement in slab, beam & column, lapping, anchorage, effective span for beam & slab.
	2nd	Limit state of collapse (flexure), Assumptions
	3rd	Stress-Strain relationship for concrete and steel, neutral axis,
	4th	stress block diagram and strain diagram for singly reinforced section.
	5th	Concept of under- reinforced, over-reinforced and limiting section,
4th	1st	neutral axis co-efficient,
	2nd	limiting value of moment of resistance and limiting percentage of steel required for limiting singly R.C. section
	3rd	Analysis and design: determination of design constants
	4th	moment of resistance and area of steel for rectangular sections
	5th	Necessity of doubly reinforced section
5th	1st	design of doubly reinforced rectangular section

	2nd	Problem
	3rd	Problem
	4th	Revise
	5th	Quiz test
6th	1st	Nominal shear stress in R.C. section,
	2nd	design shear strength of concrete, maximum shear stress,
	3rd	design of shear reinforcement, minimum shear reinforcement,
	4th	forms of shear reinforcement.
	5th	Bond and types of bonds, bond stress
7th	1st	check for bond stress, development length in tension and compression,
	2nd	anchorage value for hooks 900 bend and 450 bend standards lapping of bars, check for development length
	3rd	Numerical problems on deciding whether shear reinforcement is required or not,
	4th	check for adequacy of the section in shear. Design of shear reinforcement
	5th	Minimum shear reinforcement in beams (Explain through examples only).
8th	1st	Problem
	2nd	Problem
	3rd	Revise
	4th	Class test
	5th	Analysis and Design of T-Beam (LSM) General features, advantages,
9th	1st	effective width of flange as per IS: 456-2000 code provisions.
	2nd	Analysis of singly reinforced T-Beam
	3rd	strain diagram & stress diagram, depth of neutral axis,
	4th	moment of resistance of T-beam section with neutral axis lying within the flange.
	5th	Problem
10th	1st	Problem
	2nd	Problem
	3rd	Revise
	4th	Quiz test
	5th	Simple numerical problems on deciding effective flange width.

11th	1st	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	Problem
	3rd	Problem
	4th	Design of simply supported one-way slabs for flexure check for deflection control and shear.
	5th	Design of one-way cantilever slabs and cantilevers chajjas for flexure check for deflection control and check for development length and shear

12th	1st	Design of two-way simply supported slabs for flexure with corner free to lift.
	2nd	problem
	3rd	problem
	4th	Design of dog-legged staircase
	5th	Problem
13th	1st	Detailing of reinforcement in stairs spanning longitudinally.
	2nd	problem
	3rd	Assumptions in limit state of collapse- compression
	4th	Definition and classification of columns
	5th	effective length of column. Specification for minimum reinforcement;
14th	1st	cover, maximum reinforcement, number of bars in rectangular,
	2nd	square and circular sections, diameter and spacing of lateral ties.
	3rd	Analysis and design of axially loaded short square,
	4th	rectangular and circular columns (with lateral ties only).
	5th	problem
15th	1st	problem
	2nd	Types of footing, Design of isolated square column footing of uniform thickness for flexure and shear.
	3rd	Problem
	4th	problem
	5th	Revision