



**ASIAN SCHOOL OF TECHNOLOGY,
BHUBANESWAR**

DEPARTMENT OF CIVIL ENGINEERING

LESSON PLAN

Discipline: Civil engineering	Semester : 3 rd	No. of periods available: 51	Name of Teaching Faculty: Ankita Rath
Subject: Structural Design- I	No. of Days/ per week class allotted : 4 periods per week		No. of weeks : 13
Week	Class Day		Topics to be covered
1 st	1 st	1	Objectives of design and detailing. State the different methods of design of concrete structures.
	2 nd	1	Introduction to reinforced concrete, R.C. sections their behaviour, grades of concrete and steel. Permissible stresses, assumption in W.S.M.
	3 rd	1	Flexural design and analysis of single reinforced sections from first principles.
	4 th	1	Concept of under reinforced, over reinforced and balanced sections.
2 nd	5 th	1	Advantages and disadvantages of WSM, reasons for its obsolescence.
	6 th	1	Definition, Advantages of LSM over WSM, IS code suggestions regarding design philosophy.
	7 th	1	Types of limit states, partial safety factors for materials strength,
	8 th	1	characteristic load, design

			load, loading on structure as per I.S. 875
3 rd	9 th	1	Study of I.S specification regarding spacing of reinforcement in slab
	10 th	1	cover to reinforcement in slab, beam column & footing
	11 th	1	minimum reinforcement in slab, beam & column, lapping, anchorage, effective span for beam & slab.
	12 th	1	Limit state of collapse (flexure), Assumptions
4 th	13 th	1	Stress-Strain relationship for concrete and steel, neutral axis,
	14 th	1	stress block diagram and strain diagram for singly reinforced section.
	15 th	1	Concept of under-reinforced, over-reinforced and limiting section,
	16 th	1	neutral axis co-efficient,
5 th	17 th	1	limiting value of moment of resistance and limiting percentage of steel required for limiting singly R.C. section
	18 th	1	Analysis and design: determination of design constants
	19 th	1	moment of resistance and area of steel for rectangular sections
	20 th	1	Necessity of doubly reinforced section
6 th	21 st	1	design of doubly reinforced rectangular section
	22 nd	1	Problem
	23 rd	1	Problem
	24 th	1	Revise
7 th	25 th	1	Quiz test
	26 th	1	Nominal shear stress in R.C. section,
	27 th	1	design shear strength of

			concrete, maximum shear stress,
	28 th	1	design of shear reinforcement, minimum shear reinforcement,
8 th	29 th	1	forms of shear reinforcement.
	30 th	1	Bond and types of bonds, bond stress
	31 st	1	check for bond stress, development length in tension and compression,
	32 nd	1	anchorage value for hooks 900 bend and 450 bend standards lapping of bars, check for development length
9 th	33 rd	1	Numerical problems on deciding whether shear reinforcement is required or not,
	34 th	1	check for adequacy of the section in shear. Design of shear reinforcement
	35 th	1	Minimum shear reinforcement in beams (Explain through examples only).
	36 th	1	Problem
10 th	37 th	1	Problem
	38 th	1	Revise
	39 th	1	Class test
	40	1	Analysis and Design of T-Beam (LSM) General features , advantages,
11 th	41 st	1	effective width of flange as per IS: 456-2000 code provisions.
	42 nd	1	Analysis of singly reinforced T-Beam
	43 rd	1	strain diagram & stress diagram, depth of neutral axis,
	44 th	1	moment of resistance of T-beam section with

			neutral axis lying within the flange.
12 th	45 th	1	Problem
	46 th	1	Revise
	47 th	1	Quiz test
	48 th	1	Simple numerical problems on deciding effective flange width.
13 th	49 th	1	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).
	50 th	1	Design of simply supported one-way slabs for flexure check for deflection control and shear.
	51 st	1	Design of one-way cantilever slabs and cantilevers chajjas for flexure check for deflection control and check for development length and shear
	52 nd	1	Previous year Question