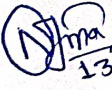# DEPARTMENT OF CIVIL ENGINEERING
GOVT. POLYTECHNIC, SAMBALPUR (RENGALI)
NAME OF THE FACULTY: Sri. NIRANJAN JENA (PTGF, CIVIL ENGG.)
LESSON PLAN OF SUBJECT: Th1.- STRUCTURAL DESIGN – I , 4TH SEM, SUMMER-23 W.E.F. 14.02.2023

DATE	WEEK NO.	TOPIC	PERIODS ASSIGNED PER TOPIC	PERIODS AVAILABLE PER WEEK
14.02.2023 TO 17.02.2023	W-1	**1. Working stress method (WSM)** 1.1 Objectives of design and detailing. State the different methods of design of concrete structures. 1.2 Introduction to reinforced concrete, R.C. sections their behavior, grades of concrete and steel. Permissible stresses, assumption in W.S.M. 1.3 Flexural design and analysis of single reinforced sections from first principles. 1.4 Concept of under reinforced, over reinforced and balanced sections. 1.5 Advantages and disadvantages of WSM, reasons for its obsolescence.	5	4+1 EXTRA CLASS
20.02.2023 TO 25.02.2023	W-2	**2 Philosophy Of Limit State Method (LSM)** 2.1 Definition, Advantages of LSM over WSM, IS code suggestions regarding design philosophy. 2.2 Types of limit states, partial safety factors for materials strength, characteristic strength, characteristic load, design load, loading on structure as per I.S. 875 2.3 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.	3	3
27.02.2023 TO 04.03.2023	W-3	**3. Analysis and Design of Single and Double Reinforced Sections (LSM)** 3.1 Limit state of collapse (flexure), Assumptions, Stress-Strain relationship for concrete and steel, neutral axis, stress block diagram and strain diagram for singly reinforced section.		5
06.03.2023 TO 11.03.2023	W-4	3.2 Concept of under- reinforced, over-reinforced and limiting section, neutral axis co-efficient, limiting value of moment of resistance and limiting	15	5

Date	Week	Topic		
		...units of efficient, limiting value of moment of resistance and limiting percentage of steel required for limiting singly R.C. section. 3.3 Analysis and design: determination of design constants, moment of resistance and area of steel for rectangular sections 3.4 Necessity of doubly reinforced section, design of doubly reinforced rectangular section		5
13.03.2023 TO 18.03.2023	W-5			
20.03.2023 TO 25.03.2023	W-6	**4. Shear, Bond and Development Length (LSM)** 4.1 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. 4.2 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. 4.3 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).	4	4
27.03.2023 TO 01.04.2023	W-7	**5 . Analysis and Design of T-Beam (LSM)** 5.1 General features, advantages, effective width of flange as per IS: 456-2000 code provisions.		5
03.04.2023 TO 08.04.2023	W-8	5.2 Analysis of singly reinforced T-Beam, strain diagram & stress diagram, depth of neutral axis, moment of resistance of T-beam section with neutral axis lying within the flange.	15	5
10.04.2023 TO 15.04.2023	W-9	5.3 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)..		5
17.04.2023 TO 22.04.2023	W-10	**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.		5
24.04.2023 TO 29.04.2023	W-11	6.2 Design of one-way cantilever slabs and cantilevers chajjas for flexure check for deflection control and check for development length and shear.		5

01.05.2023 TO 06.05.2023	W-12	6.3 Design of two-way simply supported slabs for flexure with corner free to lift. 6.4 Design of dog-legged staircase 6.5 Detailing of reinforcement in stairs spanning longitudinally.	15	5
08.05.2023 TO 13.05.2023	W-13	**7. Design of Axially loaded columns and Footings (LSM)** 7.1 Assumptions in limit state of collapse- compression.		5+1EXTRA CLASS
15.05.2023 TO 20.05.2023	W-14	7.2 Definition and classification of columns, effective length of column. Specification for minimum reinforcement; cover, maximum reinforcement, number of bars in rectangular, square and circular sections, diameter and spacing of lateral ties.	18	5+1EXTRA CLASS
22.05.2023 & 23.05.2023	W-15	7.3 Analysis and design of axially loaded short square, rectangular and circular columns (with lateral ties only). 7.4 Types of footing, Design of isolated square column footing of uniform thickness for flexure and shear.		5+1EXTRA CLASS
ONWARDS	W-16	**REVISION AND DISCUSS ON PREVIOUS YEAR QUESTION PAPER**		2

13/02/2023

(N. Jena, PTGF)

Signature of Concerned Faculty
Department of Civil Engineering

13/02/23

C/S of H.O.D.(HOD)
Department of Civil Engineering