GANDHI SCHOOL OF ENGINEERING
BHABANDHA, BERHAMPUR

BRANCH- CIVIL ENGINEERING

SEMESTER- 4th

SUBJECT- Th1. STRUCTURAL DESIGN – I

NAME OF THE FACULTY- Er. ALOKA RANJAN SAHU

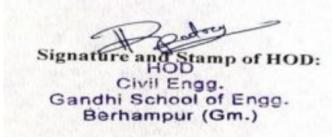|			TOPICS TO BE TAKEN		ACTUALLY TOPIC TAKEN			
Sl. No	Topic/ Module	No of Periods	Details of the Topics	Date	Topic no.	Topic Name	Date	Remark
1	Working stress method (WSM)	5	1.1 Objectives of design and detailing. State the different methods of design of concrete structures. 1.2 Introduction to reinforced concrete, R.C. sections their behavior, grades of concrete and steel. 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.	13.02.2023 - 15.02.2023	1.1 1.2 1.3 1.4 1.5	Objectives of design and detailing. State the different methods of design of concrete structures. Introduction to reinforced concrete, R.C. sections their behavior, grades of concrete and steel. Flexural design and analysis of single reinforced sections from first principles. Concept of under reinforced, over reinforced and balanced sections. Advantages and disadvantages of WSM, reasons for its obsolescence.	13.02.2023 14.02.2023 15.02.2023	
2	Philosophy of Limit state method (LSM)	3	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 etc. 2.3 Study of I.S specification regarding spacing of reinforcement in	17.02.2023 - 20.02.2023	2.1 2.2 2.3	Definition, Advantages of LSM over WSM, IS code suggestions regarding design philosophy. Types of limit states, partial safety factors for materials strength etc. Study of I.S specification regarding spacing of reinforcement in slab.	17.02.2023 20.02.2023	

| 3 | Analysis and design of singly and double reinforced sections (LSM) | 15 | 3.1 Limit state of collapse (flexure), Assumptions, Stress-Strain relationship for concrete and steel section etc.
3.2 Concept of under- reinforced, over-reinforced and limiting section,
3.3 Analysis and design.
3.4 Necessity of doubly reinforced section. | 21.02.2023 - 11.03.2023 | 3.1

3.2

3.3
3.4 | Limit state of collapse (flexure), Assumptions, Stress-Strain relationship for concrete and steel section etc.
Concept of under- reinforced, over-reinforced and limiting section,
Analysis and design.
Necessity of doubly reinforced section. | 21.02.2023
22.02.2023
24.02.2023
25.02.2023
28.02.2023
01.03.2023
03.03.2023
06.03.2023
10.03.2023
11.03.2023 | |
| 4 | Shear, Bond and Development Length (LSM) | 4 | 4.1 Nominal shear stress in R.C. section, design shear strength of concrete, maximum shear stress.
4.2 Bond and types of bond, bond stress, check for bond stress.
4.3 Numerical problems on deciding whether shear reinforcement is required or not, check for adequacy of the section in shear. | 14.03.2023 - 17.03.2023 | 4.1

4.2

4.3 | Nominal shear stress in R.C. section, design shear strength of concrete, maximum shear stress.
Bond and types of bond, bond stress, check for bond stress.
Numerical problems on deciding whether shear reinforcement is required or not, check for adequacy of the section in shear. | 14.03.2023

15.03.2023

16.03.2023 | |

5	Analysis and Design of T-Beam (LSM)	15	5.1 General features, advantages, effective width of flange as per IS: 456-2000 code provisions. 5.2 Analysis of singly reinforced T-Beam, strain diagram & stress diagram etc. 5.3 Simple numerical problems on deciding effective flange width.	18.03.2023 - 05.04.2023	5.1	General features, advantages, effective width of flange as per IS: 456-2000 code provisions.	18.03.2023 20.03.2023 24.03.2023 25.03.2023	
					5.2	Analysis of singly reinforced T-Beam, strain diagram & stress diagram etc.	27.03.2023 28.03.2023 31.03.2023	
					5.3	Simple numerical problems on deciding effective flange width.	03.04.2023 04.04.2023 05.04.2023	

| 6 | Analysis and Design of Slab and Stair case (LSM) | 15 | 6.1 Design of simply supported one-way slabs for flexure check for deflection control and shear.
6.2 Design of one-way cantilever slabs and cantilevers chajjas for flexure check for deflection control and check for development length and shear.
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. | 10.04.2023 - 28.04.2023 | 6.1

6.2

6.3

6.4
6.5 | Design of simply supported one-way slabs for flexure check for deflection control and shear.

Design of one-way cantilever slabs and cantilevers chajjas for flexure check for deflection control and check for development length and shear.
Design of two-way simply supported slabs for flexure with corner free to lift.
Design of dog-legged staircase
Detailing of reinforcement in stairs spanning longitudinally. | 10.04.2023
11.04.2023
12.04.2023
18.04.2023
19.04.2023
21.04.2023
24.04.2023
25.04.2023
26.04.2023
28.04.2023 | |

7	Design of Axially loaded columns and Footings (LSM)	18	7.1 Assumptions in limit state of collapse- compression. 7.2 Definition and classification of columns, effective length of column. 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.	29.04.2023 - 17.05.2023	7.1	Assumptions in limit state of collapse-compression.	29.04.2023 01.05.2023 02.05.2023	
					7.2	Definition and classification of columns, effective length of column.	03.05.2023 06.05.2023 08.05.2023	
					7.3	Analysis and design of axially loaded short square, rectangular and circular columns (with lateral ties only).	09.05.2023 10.05.2023 12.05.2023	
					7.4	Types of footing, Design of isolated square column footing of uniform thickness for flexure and shear.	15.05.2023 16.05.2023 17.05.2023	

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