BALASORE SCHOOL OF ENGINEERING, BALASORE

LESSON PLAN/SEMESTER:- 3RD

SUBJECT:- **STRUCTURAL MECHANICS** NAME OF THE FACULTY :- **D.Barik**

Branch-civil engg TH - 1

SL. No.	CH. NO.	Month	DATE	NAME OF THE CHAPTER/OBJECTIVES	NO. OF PERIOD AVAIL. AS PER SYLLABUS	NO. OF PERIODS AVAILABLE AS PER PLAN
1	CH-1	AUG	8/8/23	**Review Of Basic Concepts** 1.1 Basic Principle of Mechanics: Force, Moment, support conditions,	04	03
2			9/8/23	Conditions of equilibrium, C.G & MI, Free body diagram		
3			11/8/23	1.2 Review of CG and MI of different sections		
4	CH-2		12/8/23	**Simple And Complex Stress, Strain** 2.1 Simple Stresses and Strains Introduction to stresses and strains:	15	15
5			16/8/23	Mechanical properties of materials – Rigidity, Elasticity, Plasticity, Compressibility, Hardness, Toughness, Stiffness, Brittleness,		
6			18/8/23	Ductility, Malleability, Creep, Fatigue, Tenacity, Durability,		
7			19/8/23	Types of stresses -Tensile, Compressive and Shear stresses		
8			21/08/23	Types of strains - Tensile, Compressive and Shear strains, Complimentary shear stress - Diagonal tensile / compressive Stresses due to shear,		
9			22/8/23	Elongation and Contraction, Longitudinal and Lateral strains, Poisson's Ratio		
10			23/8/23	Volumetric strain,		
11			25/8/23	computation of stress, strain, Poisson's ratio, change in dimensions and volume etc, Hooke's law -		
12			26/8/23	Elastic Constants, Derivation of relationship between the elastic constants.		
13			28/8/23	2.2 Application of simple stress and strain in engineering field:		

				Behaviour of ductile and brittle materials under direct loads, Stress Strain curve of a ductile material, Limit of proportionality, Elastic limit, Yield stress		
14			1/9/23	Ultimate stress, Breaking stress, Percentage elongation, Percentage reduction in area, Significance of percentage elongation and reduction in area of cross section,		
15		SEP	2/9/23	Deformation of prismatic bars due to uniaxial load, Deformation of prismatic bars due to its self weight.		
16			4/9/23	2.3 Complex stress and strain Principal stresses and strains: Occurrence of normal and tangential stresses,		
17			5/9/23	Concept of Principal stress and Principal Planes, major and minor principal stresses and their orientations,		
18			8/9/23	Mohr's Circle and its application to solve problems of complex stresses		
19	CH-3		9/9/23	**Stresses In Beams and Shafts** 3.1 Stresses in beams due to bending: Bending stress in beams – Theory of simple bending – Assumptions –	10	12
20			11/9/23	Moment of resistance – Equation for Flexure– Flexural stress distribution – Curvature of beam		
21			12/9/23	Position of N.A. and Centroidal Axis – Flexural rigidity – Significance of Section modulus		
22			13/9/23	3.2 Shear stresses in beams: Shear stress distribution in beams of rectangular,		
23			22/9/23	circular and standard sections symmetrical about vertical axis.		
24			23/9/23	3.3 Stresses in shafts due to torsion: Concept of torsion, basic assumptions of pure torsion,		
25			25/9/23	torsion of solid and hollow circular sections, polar moment of inertia,		
26			28/9//23	torsional shearing stresses, angle of twist, torsional rigidity, equation of torsion		
27			27/9/23	3.4 Combined bending and direct stresses: Combination of stresses, Combined direct and bending stresses,		
28			29/9/23	Maximum and Minimum stresses in Sections, Conditions for no tension, Limit of eccentricity, Middle third/fourth rule,		
29			30/9/23	Core or Kern for square, rectangular and circular sections, chimneys,		
30		OCT	3/10/23	dams and retaining walls		
31	CH-4		4/10/23	**Columns and Struts** 4.1 Columns and Struts, Definition, Short and	04	03

				Long columns, End conditions, Equivalent length / Effective length, Slenderness ratio,		
32			6/10/23	Axially loaded short and long column, Euler's theory of long columns		
33			7/10/23	Critical load for Columns with different end conditions		
34	CH-5		9/10/23	**Shear Force and Bending Moment** 5.1 Types of loads and beams: Types of Loads: Concentrated (or) Point load, Uniformly Distributed load (UDL), Types of Supports: Simple support, Roller support, Hinged support, Fixed support	12	09
35			10/10/23	, Types of Reactions: Vertical reaction, Horizontal reaction, Moment reaction,		
36			11/10/23	Types of Beams based on support conditions: Calculation of support reactions using equations of static equilibrium.		
37			13/10/23	5.2 Shear force and bending moment in beams: -Shear Force and Bending Moment: Signs Convention for S.F. and B.M,		
38		NOV	1/11/23	S.F and B.M of general cases of determinate beams with concentrated loads and udl only,		
39			3/11/23	S.F and B.M diagrams for Cantilevers,		
40			4/11/23	Position of maximum BM, Point of contra flexure,		
41			6/11/23	Relation between intensity of load, S.F and B.M.		
42			7/11/23	Simply supported beams and Over hanging beams,		
43	CH-6		8/11/23	**Slope and Deflection** 6.1 Introduction: Shape and nature of elastic curve (deflection curve);	10	04
44			10/11/23	Relationship between slope, deflection and curvature (No derivation), Importance of slope and deflection		
45			15/11/23	6.2 Slope and deflection of cantilever and simply supported beams under concentrated and		
46			14/11/23	uniformly distributed load (by Double Integration method, Macaulay's method).		
47	CH-7		15/11/23	**Indeterminate Beams** 7.1 Indeterminacy in beams, Principle of consistent deformation/compatibility, Analysis of propped cantilever	10	04
48			17/11/23	fixed and two span continuous beams by principle of superposition,		
49			18/11/23	SF and BM diagrams (point load and udl covering full span		
50			20/11/23	trusses, degree of indeterminacy,		
51	CH-8		23/11/23	stable and unstable trusses, advantages of trusses. 8.2 Analysis of trusses	10	02
52			24/11/23	: Analytical method (Method of joints, method of Section		

53			16/12			
54			17/12			

Brief Summary of the Plan

SL NO	MONTH	UNITS/CHAPTER TO BE COVERED	% OF COVERAGE
1	AUG	Ch-1,CH-2.....	20%
2	SEP	Ch-2.....,CH-3	30%
3	OCT	CH-3 .....CH-4,CH-5	35%
4	NOV	CH-6,CH-7,CH-8	15%

Signature of the Faculty
Date 8.8.23

Signature of the Principal
Date 8/8/23