BHUBANANANDA ODISHA SCHOOL OF ENGINEERING, CUTTACK
DEPARTMENT OF CIVIL ENGINEERING

LESSON PLAN

SUBJECT: STRACTURAL MACHANICS (TH 1)   ACCADEMIC SESSION: 2022-23

FACULTY: MISS MANISHA PRIYADARSHINEE TRIPATHY   SEMESTER: 3RD

SEC: B

Sd/-
H O D (Civil Engg.)

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LESSON PLAN

Discipline: Civil Engineering	Semester: 3rd B		Name of the teaching faculty: Miss Manisha Priyadarshinee Tripathy
Subject: Structural Mechanics	No. of Days/ per week class allotted: 05periods per week (Tue-1 period, Wed-1 period,Thu-1 period, Fri-1 period, Sat-1 period)		Semester From Date: 15-09-2022 To Date: 22-12-2022 No. of weeks: 14 weeks
Week	Class Day	No of period available	Theory Topics
1ST	15/09/2022	1	**1.0 Review of Basic Concepts** **1.1** Basic Principle of Mechanics: Force, Moment, support conditions,
	16/09/2022	1	**1.0 Review of Basic Concepts** **1.1** Basic Principle of Mechanics: Force, Moment, support conditions
	17/09/2022	1	**1.1** Conditions of equilibrium, C.G & MI, Free body diagram
2ND	20/09/2022	1	**1.2** Review of CG of different sections
	21/09/2022	1	**1.2** Review of CG of different sections
	22/09/2022	1	**1.2** Review of MI of different sections
	23/09/2022	1	**1.2** Review of MI of different sections
	24/09/2022	1	**2.0Simple And Complex Stress, Strain** **2.1 Simple Stresses and Strains** Introduction to stresses and strains: Mechanical properties of materials – Rigidity, Elasticity, Plasticity, Compressibility, Hardness, Toughness, Stiffness, Brittleness, Ductility, Malleability, Creep, Fatigue, Tenacity, Durability,
3RD	27/09/2022	1	2.1 Types of stresses -Tensile, Compressive and Shear stresses, Types of strains -Tensile, Compressive and Shear strains,
	28/09/2022	1	2.1 Complimentary shear stress - Diagonal tensile / compressive Stresses due to shear, Complimentary shear stress - Diagonal tensile / compressive Stresses due to shear, Elongation and Contraction,

	29/09/2022	1	2.1Longitudinal and Lateral strains, Poisson's Ratio, Volumetric strain, computation of stress, strain, Poisson's ratio, change in dimensions and volume etc.,
	30/09/2022	1	2.1Hooke's law - Elastic Constants, Derivation of relationship between the elastic constants
	01/10/2022	1	. **2.2 Application of simple stress and strain in engineering field:** Behavior of ductile and brittle materials under direct loads, Stress Strain curve of a ductile material
4TH	11/10/2022	1	2.2 Limit of proportionality, Elastic limit, Yield stress, Ultimate stress, Breaking stress, Percentage elongation, Percentage reduction in area, Significance of percentage elongation and reduction in area of cross section
	12/10/2022	1	2.2 Limit of proportionality, Elastic limit, Yield stress, Ultimate stress, Breaking stress, Percentage elongation, Percentage reduction in area, Significance of percentage elongation and reduction in area of cross section
	13/10/2022	1	2.2 Deformation of prismatic bars due to uniaxial load,
	14/10/2022	1	2.2. Deformation of prismatic bars due to its self-weight
	15/10/2022	1	Monthly class Test-1
5TH	18/10/2022	1	**2.3 Complex stress and strain** Principal stresses and strains: Occurrence of normal and tangential stresses, Concept of Principal stress and Principal Planes, major and minor principal stresses and their orientations
	19/10/2022	1	2.3 Mohr's Circle and its application to solve problems of complex stresses
	20/10/2022	1	2.3 Mohr's Circle and its application to solve problems of complex stresses
	21/10/2022	1	**3.0Stresses In Beams and Shafts** **3.1 Stresses in beams due to bending:** Bending stress in beams – Theory of simple bending – Assumptions
	22/10/2022	1	3.1 Moment of resistance – Equation for Flexure– Flexural stress distribution –
6TH	25/10/2022	1	3.1 Curvature of beam – Position of N.A. and Centroidal Axis – Flexural rigidity – Significance of Section modulus

	26/10/2022	1	**3.2 Shear stresses in beams:** Shear stress distribution in beams of rectangular, circular, and standard sections symmetrical about vertical axis.
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	28/10/2022	1	**3.3 Stresses in shafts due to torsion:** Concept of torsion, basic assumptions of pure torsion,
	29/10/2022	1	3.3 torsion of solid and hollow circular sections, polar moment of inertia torsional shearing stresses, angle of twist, torsional rigidity, equation of torsion
7TH	01/11/2022	1	Monthly Class Test-2
	02/11/2022	1	**3.4 Combined bending and direct stresses:** Combination of stresses, combined direct and bending stresses, Maximum and Minimum stresses in Sections, Conditions for no tension,
	03/11/2022	1	. **3.4 Combined bending and direct stresses:** Combination of stresses, combined direct and bending stresses, Maximum and Minimum stresses in Sections, Conditions for no tension
	04/11/2022	1	3.4 Limit of eccentricity, Middle third/fourth rule, Core or Kern for square, rectangular, and circular sections, chimneys, dams and retaining walls
	05/11/2022	1	Problem solving class
8TH	09/11/2022	1	**4.0Columns and Struts** **4.1** Columns and Struts, Definition, Short and Long columns, End conditions, Equivalent length / Effective length, Slenderness ratio,
	10/11/2022	1	4.1 Axially loaded short and long column, Euler's theory of long columns,
	11/11/2022	1	4.1 Axially loaded short and long column, Euler's theory of long columns
	12/11/2022	1	4.1 Critical load for Columns with different end conditions
9TH	15/11/2022	1	Internal Assessment
	16/11/2022	1	Internal Assessment

	17/11/2022	1	**5.0 Shear Force and Bending Moment** **5.1 Types of loads and beams:** Types of Loads: Concentrated (or) Point load, Uniformly Distributed load (UDL),
	18/11/2022	1	5.1 Types of Supports: Simple support, Roller support, Hinged support, Fixed support,
	19/11/2022	1	5.1Types of Reactions: Vertical reaction, Horizontal reaction, Moment reaction
10TH	22/11/2022	1	5.1Types of Beams based on support conditions: Calculation of support reactions using equations of static equilibrium.
	23/11/2022	1	5.1 Shear Force and Bending Moment: Signs Convention for S.F. and B.M, S.F and B.M of general cases of determinate beams with concentrated loads and Udl only
	24/11/2022	1	5.1 S. F and B.M diagrams for Cantilevers, simply supported beams and over hanging beams, Position of maximum BM
	25/11/2022	1	5.1 S. F and B.M diagrams for Cantilevers, simply supported beams and over hanging beams, Position of maximum BM
	26/11/2022	1	5.1 Point of contra flexure, Relation between intensity of load, S.F and B.M.
11TH	29/11/2022	1	**6.0Slope and Deflection** **6.1 Introduction:** Shape and nature of elastic curve (deflection curve);
	30/11/2022	1	6.1Relationship between slope deflection and curvature (No derivation), Importance of slope and deflection
	01/12/2022	1	**6.2** Slope and deflection of cantilever and simply supported beams under concentrated and uniformly distributed load (by Double Integration method, Macaulay's method).
	02/12/2022	1	**6.2** Slope and deflection of cantilever and simply supported beams under concentrated and uniformly distributed load (by Double Integration method, Macaulay's method).
	03/12/2022	1	**Problem solving**
12TH	06/12/2022	1	Question & Answers session
	07/12/2022	1	**7.0Indeterminate Beams** **7.1**Indeterminacy in beams, Principle of consistent deformation/compatibility
	08/12/2022	1	7.1 Analysis of propped cantilever, fixed and two span continuous beams by principle of superposition
	09/12/2022	1	7.1 SF and BM diagrams (point load and udl covering full span)
	10/12/2022	1	**8.0Trusses**

			8.1 Introduction: Types of trusses, statically determinate and indeterminate trusses
13TH	13/12/2022	1	**8.2 Analysis of trusses:** Analytical method (Method of joints, method of Section)
	14/12/2022	1	**8.2 Analysis of trusses:** Analytical method (Method of joints, method of Section)
	15/12/2022	1	Monthly Class Test-3
	16/12/2022	1	Revision
	17/12/2022	1	Revision
14TH	20/12/2022	1	Revision
	21/12/2022	1	Previous Year Questions Discussion
	22/12/2022	1	Previous Year Questions Discussion