GOVERNMENT CO-ED POLYTECHNIC RAIPUR (C.G)

DEPARTMENT OF MECHANICAL ENGINEERING

LESSON PLAN

Session: JUL-DEC 2024 | Session start as per university calendar:

Course Name: Strength of Materials | Course code : 2037372(037)

Name of Subject Teacher: MR. HEMSAGAR GUPTA | Lecturer plan Theory = 80

Discipline: Mechanical	Semester: 5th					
Lecture No.	**Unit No.**	**Topic to be covered under this unit**	**Total hours**	**Planned Date**	**Execution Date**	**Remarks if any**
1	1. Direct Stresses and Strains in components	1.1 Different types of Structures and Loads.	6	10/09/24	10/09/24	
2		1.2 Direct Stress, linear Strain, Hook's Law		10/09/24	10/09/24	
3		Calculation of Direct Stress and Linear Strain, Stress- Strain curve of Mild Steel,		11/09/24	11/09/24	
4		Modulus of Elasticity, Yield, Breaking and Ultimate Stress and factor of Safety. 1.3 Lateral Strain and Poisson's ratio.		12/09/24	12/09/24	
5		1.4 Temperature Stresses and Strain with and without yielding.		12/09/24	12/09/24	
6		1.5 Shear Stress, Shear Strain and Shear Modulus. 1.6 Bulk Modulus and Volumetric Strain		12/09/24	12/09/24	
7		1.7 Differentiate Sudden, Gradual and Impact Load, Strain Energy and Proof Resilience,		14/09/24	14/09/24	
8		for Sudden, Gradual and Impact Load with numerical problems.		17/09/24	14/09/24	
9	2. Shear Force and Bending Moments in Beam type components	2.1 Statically Determinate Beams like Cantilever, Simply Supported and Over Hang Beam.	7	17/09/24	17/09/24	
10		2.2 Relation between Shear Force and Bending Moment.		19/09/24	17/09/24	
11		2.3 Sagging and Hogging Bending Moment and its importance. 2.4 Point of Contra flexure and its importance.		19/09/24	19/09/24	
12		2.5 S.F and B.M Diagram for Cantilever Beam.		19/09/24	19/09/24	
13		S.F and B.M Diagram for Simply Supported beam		21/09/24	19/09/24	

14	components	2.6 Components like shaft,axle and spindle,subjected to Point Load and/ or Uniformly Distributed Load (UDL).		21/09/24	21/09/24	
15		Components like shaft,axle and spindle,subjected to Point Load and/ or Uniformly Distributed Load (UDL).		24/09/24	21/09/24	
16	3. Bending stresses and shear stresses in beam type components	3.1 Bending Theory Equation Bending stress , Sectional Modulus	10	24/09/24	24/09/24	
17		3.2 Neutral Axis, Neutral layer, Neutral Surface		26/09/24	24/09/24	
18		application of Bending theory to Statically determinate beams		26/09/24	26/09/24	
19		application of Bending theory to spindle , pulley arm having rectangular or circular section to find out stresses.		26/09/24	26/09/24	
20		application of Bending theory to spindle , pulley arm having rectangular or circular section to find out stresses.		01/10/24	26/09/24	
21		3.3 Structural components subjected to Axial Eccentric Loads.		01/10/24	01/10/24	
22		Structural components subjected to Axial Eccentric Loads.		03/10/24	01/10/24	
23		3.4 Shear stress-Average and Maximum shear stress for rectangular,circular section.		03/10/24	03/10/24	
24		Shear stress-Average and Maximum shear stress for rectangular,circular section.		03/10/24	03/10/24	
25		Shear stress-Average and Maximum shear stress for rectangular,circular section.		05/10/24	03/10/24	
26	4. Deflection of beam type components	4.1 Slope and Deflection.	12	05/10/24	05/10/24	
27		4.2 Deflection Formulae for Cantilever Beam subjected to Point Load at free end		08/10/24	05/10/24	
28		Deflection Formulae for Cantilever Beam subjected to full UDL.		08/10/24	08/10/24	
29		Deflection Numericals for Cantilever Beam subjected to Point Load at free end		09/10/24	08/10/24	
30		Deflection Numericals for Cantilever Beam subjected to full UDL.		12/10/24	09/10/24	
31		4.3 Formulae for Simply supported Beam subjected to Point Load at Mid Span		15/10/24	16/10/24	
32		Formulae for Simply supported Beam subjected to full UDL.		15/10/24	17/10/24	
33		Numericals for Simply supported Beam subjected to Point Load at Mid Span		16/10/24	17/10/24	
34		Numericals for Simply supported Beam subjected to full UDL.		17/10/24	17/10/24	
35		Numerical Problems		17/10/24	19/10/24	
36		Numerical Problems		17/10/24	19/10/24	

34		Numericals for Simply supported Beam subjected to full UDL.		17/10/24	17/10/24	
35		Numerical Problems		17/10/24	19/10/24	
36		Numerical Problems		17/10/24	19/10/24	
37		Numerical Problems		19/10/24	22/10/24	
38	5. Springs	5.1 Definition, types of springs.	10	19/10/24	22/10/24	
39		Types of springs.		22/10/24	09/11/24	
40		Uses of springs.		22/10/24	09/11/24	
41		5.2 Spring classification based on size, shape and load- leaf spring, helical and spiral spring.		23/10/24	14/11/24	
42		Spring classification based on size, shape and load- leaf spring, helical and spiral spring.		24/10/24	14/11/24	
43		5.3 Stiffness, deflection and maximum stress in helical open and closed coil springs and leaf springs.		24/10/24	14/11/24	
44		Stiffness, deflection and maximum stress in helical open and closed coil springs and leaf springs.		24/10/24	26/11/24	
45		Numericals on springs		29/10/24	26/11/24	
46		Numericals on springs		29/10/24	27/11/24	
47	6. Principal Stresses and Strains	6.1 Multi load situations and need of estimating principal stresses.	15	30/10/24	28/11/24	
48		Multi load situations and need of estimating principal stresses.		31/10/24	28/11/24	
49		6.2 Definition of principal plane and principal stresses.		31/10/24	28/11/24	
50		6.3 Expression for normal and tangential stress, maximum shear stress.		31/10/24	30/11/24	
51		Expression for normal and tangential stress, maximum shear stress.		05/11/24	02/12/24	
52		6.4 Stresses on inclined planes.		05/11/24	02/12/24	
53		Stresses on inclined planes.		07/11/24	09/12/24	
54		6.5 Position of principal planes and planes of maximum shear.		07/11/24	09/12/24	
55		Position of principal planes and planes of maximum shear.		07/11/24	11/12/24	
56		6.6 Graphical solution using Mohr's circle of Stresses.		09/11/24	19/12/24	
57		Graphical solution using Mohr's circle of Stresses.		14/11/24	19/12/24	
58		Numerical Problems of Mohr's circle		14/11/24	19/12/24	

59		Numerical Problems of Mohr's circle		14/11/24	21/12/24	
60		Numerical Problems of Mohr's circle		19/11/24	21/12/24	
61		Numerical Problems of Mohr's circle		19/11/24	23/12/24	
62	7. Buckling stresses in Columns and Struts type components	7.1 Column and Strut	10	20/11/24	23/12/24	
63		7.2 Short and Long Column.		21/11/24	26/12/24	
64		7.3 End Condition of Column		21/11/24	26/12/24	
65		End Condition of Column		21/11/24	26/12/24	
66		7.4 Effective Length of Column		21/11/24	28/12/24	
67		Modes of Failure in column.		26/11/24	28/12/24	
68		7.5 Radius of Gyration , Slenderness Ratio.		27/11/24	30/12/24	
69		Numerical Problems		28/11/24	30/12/24	
70		Numerical Problems		28/11/24	30/12/24	
71	8. Torsion of Shaft	8.1 Torsion, Angle of Twist	10	02/12/24	31/12/24	
72		Polar Moment of Inertia		02/12/24	31/12/24	
73		Polar Moment of Inertia of different sections		09/12/24	31/12/24	
74		Torsional Rigidity		09/12/24	31/12/24	
75		8.2 Formula of Torsional Stress		11/12/24	01/01/25	
76		8.3 Formula for Power Transmitted /Consumed for shaft, spindle and axle of solid and hollow sections subjected to Torsion.		19/12/24	01/01/25	
77		Formula for Power Transmitted /Consumed for shaft, spindle and axle of solid and hollow sections subjected to Torsion.		19/12/24	01/01/25	
78		Numerical Problems		21/12/24	01/01/25	
79		Numerical Problems		23/12/24	02/01/25	
80		Numerical Problems		26/12/24	02/01/25	

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