कार्यालय प्राचार्य, शासकीय पॉलीटेक्निक जशपुर (छ.ग.)

ग्राम–झरगॉव, पोस्ट– घोलेंग, तह. जशपुर , जिला– जशपुर (छ.ग.) पिन कोड –496338

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LESSON PLAN SESSION JUL – DEC 2024

SUBJECT: **STRENGTH OF MATERIAL**   SEMESTER: 3ᴿᴰ   BRANCH: - **MECHANICAL ENGINEERING**

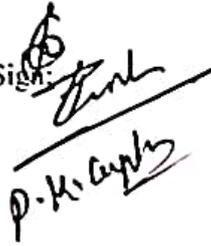| UNIT NUMBER	NAME OF THE TOPIC	NO OF CLASS REQUIRED	REMARK
UNIT 01: **Direct Stresses and Strains in Components**	1.1 Different types of structures and load		
	1.2 Different types of Structures and Loads, Direct Stress, linear Strain, Hook's Law, Calculation of Direct Stress and Linear Strain, Stress- Strain curve of Mild Steel, Modulus of Elasticity, Yield, Breaking and Ultimate Stress and factor of Safety.	04	
	1.3&1.4 Lateral Strain and Poisson's ratio, Temperature Stresses and Strain with and without yielding.	02	
	1.5&1.6 Shear Stress, Shear Strain and Shear Modulus, Bulk Modulus and Volumetric Strain	02	
	1.7 Differentiate Sudden, Gradual and Impact Load, Strain Energy and Proof Resilience for Sudden, Gradual and Impact Load with numerical problems.	01	
Unit 02: **Shear Force and Bending Moments in Beam type components**	2.1 & 2.2 Statically Determinate Beams like Cantilever, Simply Supported and Over Hang Beam, Relation between Shear Force and Bending Moment.	01	
	2.3& 2.4 Sagging and Hogging Bending Moment and its importance, Point of Contra flexure and its importance.	01	
	2.5 S.F & B.M Diagram for Cantilever, Simply Supported and Over Hang Beam.	04	
	2.6 Components like shaft, axle spindle subjected to point load and or Uniformly distributed load.	02	
Unit 03: **Bending stresses and shear stresses in beam type components**	3.1 Bending Theory Equation Bending stress , Sectional Modulus	02	
	3.2 Neutral Axis, application of Bending theory to Statically determinate beams elements like shaft, axle, and spindle, pulley arm having rectangular or circular section to find out stresses.	03	
	3.3 Structural components subjected to Axial Eccentric Loads.	01	
	3.4 Shear stress-Average and Maximum shear stress for rectangular, circular section.	02	
Unit 04: **Deflection of beam type components**	4.1 Slope and deflection.	02	
	4.2 Deflection Formulae for Cantilever Beam subjected to Point Load at free end and with full UDL.	04	
	4.3 Formulae for Simply supported Beam subjected to Point Load at Mid Span and with full UDL.	02	
Unit 05: **Springs**	5.1 Definition, types and use of springs.	01	
	5.2 Spring classification based on size, shape and load- leaf spring, helical and spiral spring	02	
	5.3 Stiffness, deflection and maximum stress in helical open and closed coil springs and leaf springs.	04	
Unit 06: **Principal Stresses and Strains**	6.1 & 6.2 Multi load situations and need of estimating principal stresses, Definition of principal plane and principal stresses.	02	
	6.3,6.4 &6.5 Expression for normal and tangential stress, maximum shear stress, Stresses on inclined planes, Position of principal planes and planes of maximum shear	02	

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	6.6 Graphical solution using Mohr's circle of Stresses.	03	
Unit-7.0 Buckling stresses in Columns and Struts type components	7.1,7.2,7.3&7.4 Column and Strut, Short and Long Column, End Condition of Column, Effective Length of Column and Modes of Failure in column.	02	
	7.5 &7.6 Radius of Gyration, Slenderness Ratio, and Euler's Crippling Load and its application.	02	
	7.7 Rankin's load / Buckling Load and its application in screw of screw jack.	02	
Unit-8.0 Torsion of Shaft	8.1 &8.2 Torsion, Angle of Twist, Polar Moment of Inertia, Tensional Rigidity, Formula of Tensional Stress.	04	
	8.3 Formula for Power Transmitted/Consumed for shaft, spindle and axle of solid and hollow sections subjected to Torsion.	03	
	Total Class Required	60	

Lecturer Name & Sign:

for HOD Sign