Lesson Plan

Name of the faculty: Sh. Mohit Kadyan, Lecturer in Mechanical Engg.

Discipline: Mechanical

Semester: 3rd Mechanical A & B

Subject: STRENGTH OF MATERIALS

Lesson Plan Duration: 15 weeks

Work Load (Lecture/ Practical) per week (in hours): Lectures- 03, Practicals-02

Week	Theory		Practical	
	Lecture day	**Topic (including assignment / test)**	**Practical Day**	**Topic**
1st	1st	Basic concept of load, stress and strain.	1st & 2nd	Tensile test on bars of Mild steel and Aluminium.
	2nd	Tensile, compressive and shear stresses		
	3rd	Linear strain, Lateral strain, Shear strain, Volumetric strain. Concept of Elasticity, Elastic limit and limit of proportionality		
2nd	1st	Hook's Law and Elastic Constants Stress-strain curve for ductile andbrittle materials	1st & 2nd	Tensile test on bars of Mild steel and Aluminium.
	2nd	Nominal stress Yield point, plastic stage Ultimate stress and breaking stress		
	3rd	Percentage elongation Proof stress and working stress, Factor of safety		
3rd	1st	Poisson's Ratio Thermal stress and strain	1st & 2nd	Bending tests on a steel bar or a wooden beam.
	2nd	Longitudinal and circumferential stresses in seamless thin walled cylindrical shells.		
	3rd	Introduction to Principal Stresses, Numerical Problems.		
4th	1st	Strain Energy, Resilience, proof resilience and modulus of resilience	1st & 2nd	Impact test on metals a) Izod test b) Charpy test
	2nd	Strain energy due to direct stresses and Shear Stress		
	3rd	Stresses due to gradual, sudden and falling load.		
5th	1st	Concept of moment of inertia and second moment of area		
	2nd	Radius of gyration, Theorem of perpendicular axis and parallel axis (with derivation).		

	3rd	Second moment of area of common geometrical sections		
6th	1st	Rectangle, Triangle, Circle (without derivation);	1st & 2nd	Impact test on metals a) Izod test b) Charpy test
	2nd	Second moment of area for L,T and I section		
	3rd	Section modulus and Numerical Problems		
7th	1st	Concept of various types of beams and form of loading	1st & 2nd	Torsion test of solid specimen of circular section of different metals for determining modulus of rigidity.
	2nd	Concept of end supports-Roller, hinged and fixed		
	3rd	Concept of bending moment and shearing force, B.M. and S.F. Diagram forcantilever		
8th	1st	simply supported beams with and without overhang subjected to concentrated and U.D.L.		
	2nd	Concept of Bending stresses		
	3rd	Theory of simple bending Derivation of Bending Equation Use of the equation $$\frac{M}{I} = \frac{\sigma}{y} = \frac{E}{R}$$		
9th	1st	Concept of moment of resistance $\frac{M}{I} \quad \frac{E}{R}$	1st & 2nd	To plot a graph between load and extension and to determine the stiffness of a helical spring.
	2nd	Bending stress diagram Section modulus for rectangular,circular and symmetrical I section.		
	3rd	Calculation of maximum bending stress in beams of rectangular section		
10th	1st	Calculation of maximum bending stress in beams circular, and T section.		
	2nd	Numerical Problems		
	3rd	Concept of column, modes of failure, Types of columns, modes offailure of columns		
11th	1st	Buckling load, crushing load	1st & 2nd	Hardness test on different metals.
	2nd	Slenderness ratio		
	3rd	Effective length and End restraints		
12th	1st	Factors effecting strength of a column		
	2nd	Strength of column by Euler Formula without derivation		
	3rd	Rankine Gourdan formula (without derivation)		
13th	1st	Concept of torsion, difference		

		between torque and torsion.		
	2nd	Derivation of Torsion Equation,use of torsion equation for circular shaft(solid and hollow)		

	3rd	Comparison between solid and hollow shaft with regard to their strength and weight. Power transmitted by shaft		
14th	1st	Concept of mean and maximum torque		
	2nd	Numerical Problems		
	3rd	Closed coil helical springs subjected to axial load and calculation of: Stress deformation		
15th	1st	Stiffness and angle of twist and strain energy		
	2nd	Strain energy and proof resilience		
	3rd	Determination of number of plates of laminated spring (semi elliptical type only)		