Lesson Plan

Name of faculty:- Sh. Sahil (Theory and Practical)

Discipline:- Mechanical Engineering

Semester:- 3rd

Subject:- STRENGTH OF MATERIAL (SOM)

Lesson Plan Duration:- 15 weeks (from Sept.2024 to Dec.2024)

Work Load:- Lectures-3, Practicals-2

WEEK	THEORY		PRACTICAL	
	LECTURE DAY	TOPIC	PRACTICAL DAY	TOPIC
1st	1st	Introduction to the subject	1st	Significance of practical work and Preparation of file
	2nd	Stresses and Strains:- Basic concept of load, stress and strain		
	3rd	Tensile, compressive and shear stresses Linear strain, Lateral strain, Shear strain	2nd	Significance of practical work and Preparation of file
2nd	1st	Volumetric strain, Stress-strain curve for ductile materials	1st	Tensile test on bars of Mild steel and Aluminium
	2nd	Stress-strain curve for brittle materials,		
	3rd	Nominal stress, Yield point, Ultimate stress and breaking stress	2nd	Tensile test on bars of Mild steel and Aluminium
3rd	1st	Percentage elongation, Proof stress and working stress, Factor of safety	1st	Bending tests on a steel bar or a wooden beam
	2nd	Poisson's Ratio, Thermal stress and strain		
	3rd	Longitudinal and circumferential stresses in seamless thin walled cylindrical shells.	2nd	Bending tests on a steel bar or a wooden beam
4th	1st	Introduction to Principal stresses	1st	Impact test on metals a) Izod test
	2nd	Revision		
	3rd	Resilience:- Strain Energy, Resilience, proof resilience and modulus of resilience	2nd	Impact test on metals a) Izod test
5th	1st	Strain energy due to direct stresses and Shear Stress	1st	Impact test on metals b) Charpy test
	2nd	Stresses due to gradual, sudden and falling load		
	3rd	Revision	2nd	Impact test on metals b) Charpy test

WEEK	THEORY		PRACTICAL	
	LECTURE DAY	TOPIC	PRACTICAL DAY	TOPIC
6th	1st	**1st Sessional**		
	2nd			
	3rd			
7th	1st	Moment of Inertia : Concept of moment of inertia and second moment of area, Radius of gyration.	1st	Torsion test of solid specimen of circular section of different metals for determining modulus of rigidity
	2nd	Theorem of perpendicular axis and parallel axis (with derivation)		
	3rd	Second moment of area of common geometrical sections : Rectangle, Triangle, Circle (without derivation)	2nd	Torsion test of solid specimen of circular section of different metals for determining modulus of rigidity
8th	1st	Second moment of area for L,T and I section	1st	To plot a graph between load and extension
	2nd	Section modulus		
	3rd	Bending Moment and Shearing Force: Concept of various types of beams and form of loading	2nd	To plot a graph between load and extension
9th	1st	B.M. and S.F. Diagram for cantilever and simply supported beams with and without overhang subjected to concentrated and U.D.L	1st	File Checking
	2nd	Bending stresses: Concept of Bending stresses, Theory of simple bending, Derivation of Bending Equation		
	3rd	Use of the equation $\frac{M}{I} = \frac{\sigma}{y} = \frac{E}{R}$	2nd	
10th	1st	**Sessional 2nd**		
	2nd			
	3rd			
11th	1st	Concept of moment of resistance, Bending stress diagram	1st	To determine the stiffness of a helical spring.
	2nd	Section modulus for rectangular, circular and symmetrical I section		
	3rd	Calculation of maximum bending stress in beams of rectangular, circular, and T section	2nd	To determine the stiffness of a helical spring.
12th	1st	Columns: Concept of column, modes of failure, Buckling load, crushing load	1st	Hardness test on different metals

WEEK	THEORY		PRACTICAL	
	LECTURE DAY	**TOPIC**	**PRACTICAL DAY**	**TOPIC**
	2nd	Slenderness ratio, Effective length, Factors effecting strength of a column		
	3rd	Strength of column by Euler Formula without derivation	2nd	Hardness test on different metals
13th	1st	Torsion: Derivation of Torsion Equation, use of torsion equation for circular shaft	1st	File Checking
	2nd	Comparison between solid and hollow shaft with regard to their strength and weight		
	3rd	Power transmitted by shaft, Concept of mean and maximum torque	2nd	
14th	1st	Springs: Closed coil helical springs subjected to axial load and calculation of: Stress deformation - Stiffness and angle of twist and strain energy	1st	Internal Viva Voce
	2nd	- Strain energy and proof resilience.		
	3rd	Determination of number of plates of laminated spring (semi elliptical type only)	2nd	
15th	1st	**Sessional 3rd**		
	2nd			
	3rd			