Lesson Plan

Name of the Faculty : Sh Manvendra Nath Tripathi

Discipline : Mechanical Engineering

Semester : 3rd

Subject : Strength of Materials (SOM)

Lesson Plan duration : 15 weeks (01.09.2022 to 15.12.2023)

Work load per week : Lecture – 03, Practical – 02

Week	Theory		EXECUTION	
	Lecture Day	Topic (Including assessment/test)	Date	Sign.
1st	1st	Introduction about the subject & brief overview.		
	2nd	**Unit 1: Stresses and Strains** 1.1 Basic concept of load, stress and strain 1.2 Tensile, compressive and shear stresses		
	3rd	1.3 Linear strain, Lateral strain, Shear strain, Volumetric strain, 1.4 Concept of Elasticity, Elastic limit and limit of proportionality 1.5 Hook's Law and Elastic Constants,		
2nd	4th	1.6 Stress-strain curve for ductile and brittle materials, 1.7 Nominal stress		
	5th	1.8 Yield point, plastic stage, 1.9 Ultimate stress and breaking stress, 1.10 Percentage elongation		
	6th	1.11 Proof stress and working stress, 1.12 Factor of safety, 1.13 Poisson's Ratio		
3rd	7th	1.14 Thermal stress and strain, 1.15 Longitudinal and circumferential stresses in seamless thin walled cylindrical shells 1.16 Introduction to Principal stresses		
	8th	**Unit 2: Resilience** 2.1 Strain Energy, Resilience, proof resilience and modulus of resilience 2.2 Strain energy due to direct stresses and Shear Stress		
	9th	2.3 Stresses due to gradual, sudden and falling load		

4th	10th	**Unit 3: Moment of Inertia** 3.1 Concept of moment of inertia and second moment of area 3.2 Radius of gyration,		
	11th	3.3 Theorem of perpendicular axis and parallel axis (with derivation)		
	12th	3.4 Second moment of area of common geometrical sections : Rectangle, Triangle, Circle (without derivation);Second moment of area for L,T and I section, 3.5 Section Modulus		
5th	13th	**Unit 4: Bending Moment and Shearing Force** 4.1 Concept of various types of beams and form of loading, 4.2 Concept of end supports-Roller, hinged and fixed		
	14th	4.3 Concept of bending moment and shearing force 4.4 B.M. and S.F. Diagram for cantilever with and without overhang subjected to concentrated and U.D.L		
	15th	4.4 B.M. and S.F. Diagram for cantilever with and without overhang subjected to concentrated and U.D.L		
6th	16th	4.4 B.M. and S.F. Diagram for cantilever with and without overhang subjected to concentrated and U.D.L		
	17th	**1st sessional test (Tentative)**		
	18th	**Assessment**		
7th	19th	**Unit 5: Bending Stresses** 5.1 Concept of Bending stresses		
	20th	5.2 Theory of simple bending, Derivation of Bending Equation, 5.3 Use of the equation		
	21st	5.4 Concept of moment of resistance		
8th	22nd	5.5 Bending stress diagram		
	23rd	5.6 Section Modulus for rectangular, circular and symmetrical I section		
	24th	5.7 Calculation of maximum bending stress in beams of rectangular, circular, and T section		
9th	25th	**Unit 6: Columns** 6.1 Concept of column, modes of failure, 6.2 Types of columns, modes of failure of columns		
	26th	6.3 Buckling load, crushing load, 6.4 Slenderness ratio, 6.5 Effective length, 6.6 End restraints,		
	27th	6.7 Factors effecting strength of a column, 6.8 Strength of column by Euler Formula without derivation,		
10th	28th	6.9 Rankine Gourdan formula (without derivation)		

	29th	**2nd sessional test (Tentative)**		
	30th	**Assessment**		
11th	31st	**Unit 7:Torsion** 7.1 Concept of torsion, difference between torque and torsion		
	32nd	7.2 Derivation of Torsion Equation, use of torsion equation for circular shaft, (solid and hollow)		
	33rd	Numerical Problems		
12th	34th	7.3 Comparison between solid and hollow shaft with regard to their strength and weight,		
	35th	7.4 Power transmitted by shaft		
	36th	7.5 Concept of mean and maximum torque		
13th	37th	**Unit 8: Spring** 8.1 Closed coil helical springs subjected to axial load and calculation of: Stress deformation		
	38th	8.1 Closed coil helical springs subjected to axial load and calculation of: Stiffness and angle of twist and strain energy		
	39th	8.2 Determination of number of plates of laminated spring (semi elliptical type only)		
14th	40th	**3rd sessional test (Tentative)**		
	41st	**Assessment**		
	42nd	Revision		
15th	43rd	Revision		
	44th	Revision		
	45th	Revision		

Lesson Plan

Name of the Faculty : Sh Manvendra Nath Tripathi (G1), Sh Subhash Chander (G2)

Discipline : Mechanical Engineering

Semester : 3rd

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Lesson Plan duration : 15 weeks (01.09.2022 to 15.12.2023)

Work load per week : Lecture – 03, Practical – 02

Week			EXECUTION		
	Practical Day	Topic	G1	G2	Sign.
1st	1st	Introduction about the Lab & brief discussion over the Lab practical's to be conducted.			
2nd	2nd	1. Tensile test on bars of Mild steel and Aluminium			
3rd	3rd	2. Bending tests on a steel bar or a wooden beam			
4th	4th	3. Impact test on metals a) Izod test			
5th	5th	3. Impact test on metals a) Charpy test			
6th	6th	1st sessional test (Tentative			
7th	7th	4. Torsion test of solid specimen of circular section of different metals for determining modulus of rigidity			
8th	8th	4. Torsion test of solid specimen of circular section of different metals for determining modulus of rigidity			

9th	9th	5. To plot a graph between load and extension and to determine the stiffness of a helical spring			
10th	10th	2nd sessional test (Tentative)			
11th	11th	5. To plot a graph between load and extension and to determine the stiffness of a helical spring			
12th	12th	6. Hardness test on different metals			
13th	13th	6. Hardness test on different metals			
14th	14th	Checking of Practical file/ Evaluation			
15th	15th	3rd sessional test (Tentative) Checking of Practical file/ Evaluation			