Lesson Plan

Name of the Faculty : Sh. Rajender Kumar Tayal

Discipline : Mechanical Engineering

Semester : 3rd

Subject : Strength of Material (SOM)

Lesson Plan duration : 17 weeks (01.10.2021 to 28.01.2022)

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

Week	Theory	
	Lecture Day	Topic (Including assessment/test)
1st	1st	Subject introduction and overview
	2nd	**Unit 1: Stresses and Strains** Basic concept of load, stress and strain Tensile, compressive and shear stresses
	3rd	Linear strain, Lateral strain, Shear strain, Volumetric strain, Concept of Elasticity, Elastic limit and limit of proportionality
2nd	4th	Hook's Law and Elastic Constants,
	5th	Stress-strain curve for ductile and brittle materials, Nominal stress
	6th	Yield point, plastic stage, Ultimate stress and breaking stress, Percentage elongation
3rd	7th	Proof stress and working stress, Factor of safety, Poisson's Ratio
	8th	Thermal stress and strain, Longitudinal and circumferential stresses in seamless thin walled cylindrical shells
	9th	Introduction to Principal stresses
4th	10th	**Unit 2: Resilience** Strain Energy, Resilience, proof resilience and modulus of resilience
	11th	Strain energy due to direct stresses and Shear Stress
	12th	Stresses due to gradual, sudden and falling load
5th	13th	**Unit 3: Moment of Inertia** Concept of moment of inertia and second moment of area
	14th	Radius of gyration, Theorem of perpendicular axis and parallel axis (with derivation)

	15th	Second moment of area of common geometrical sections : Rectangle, Triangle, Circle (without derivation)
6th	16th	**Unit 4: Bending Moment and Shearing Force** Concept of various types of beams and form of loading, Concept of end supports-Roller, hinged and fixed
	17th	Concept of bending moment and shearing force, B.M. and S.F. Diagram for cantilever
	18th	Second moment of area for L,T and I section, Section modulus
7th	19th	**1st sessional test (Tentative)**
	20th	**Assessment**
	21st	B.M. and S.F. Diagram for cantilever and simply supported beams with and without overhang subjected to concentrated and U.D.L
8th	22nd	**Unit 5: Bending Stresses** Concept of Bending stresses
	23rd	Theory of simple bending, Derivation of Bending Equation, Use of the equation
	24th	Concept of moment of resistance
9th	25th	Bending stress diagram
	26th	Section Modulus for rectangular, circular and symmetrical I section
	27th	Calculation of maximum bending stress in beams of rectangular, circular, and T section
10th	28th	**Unit 6: Columns** Concept of column, modes of failure, Types of columns, modes of failure of columns
	29th	Buckling load, crushing load, Slenderness ratio,
	30th	Effective length, End restraints, Factors effecting strength of a column,
11th	31st	**2nd sessional test (Tentative)**
	32nd	**Assessment**
	33rd	Strength of column by Euler Formula without derivation, RankineGourdan formula (without derivation)
12th	34th	**Unit 7:Torsion** Concept of torsion, difference between torque and torsion
	35th	Derivation of Torsion Equation, use of torsion equation for circular shaft,

		(solid and hollow)
	36th	Numerical Problems
13th	37th	Comparison between solid and hollow shaft with regard to their strength and weight, Power transmitted by shaft
	38th	Concept of mean and maximum torque
	39th	**Unit 8: Spring** Introduction of spring
14th	40th	Closed coil helical springs subjected to axial load and calculation of: - Stress deformation
	41st	Closed coil helical springs subjected to axial load and calculation of: - Stress deformation
	42nd	- Stiffness and angle of twist and strain energy - Strain energy and proof resilience.
15th	43rd	Determination of number of plates of laminated spring (semi elliptical type only)
	44th	**3rd sessional test (Tentative)**
	45th	**Assessment**
16th	46th	Revision
	47th	Revision
	48th	Revision
17th	49th	Revision
	50th	Revision
	51st	Revision