Year &	Course	Course Name: Mechanics	No. of	L	T&PS	P
Sem:	Code:	of Solids	Credits: 4	2	2	0
E1S2	ME1201					

UNIT-I: Simple Stresses and Strains Elasticity and Plasticity, Basics of stress and strain, Types of stresses & strains, Hooks Law, Stress-strain behavior of different materials, Elastic constants and their relations, applications of normal stresses and strains – Homogenous and composite bars having uniform and varying cross sections subjected to axial and thermal loads. Strain energy, resilience, toughness, modulus of resilience, proof resilience, gradual, sudden, impact and shock loads. **Principal stresses** Two dimensional state of stress, normal and shear stresses on a plane, principal stresses and principal planes, Mohrs circle.

UNIT-II: Shear and Bending in beams Beams- Types of loads, supports, shear force and bending moment diagrams of statistically determinate beams with various loading conditions. Theory of simple bending, stress distribution in symmetrical and unsymmetrical sections due to bending moment and shear force.

UNIT-III: Deflection of beams Double integration method, Macaulay's method, Area moment method and conjugate beam method for determining slope and deflection of cantilever, simply supported and over hanging beams subjected to point load, UDL and UVL. Castigliano's theorem.

UNIT-IV: Torsion Torsion of circular solid and hollow shafts, torsional rigidity, combined bending moment and torsion of shafts, power transmitted by shafts, shafts in series and parallel, strain energy stored due to torsion.

UNIT-V: Thin cylinders and spheres Longitudinal and Hoop stresses, longitudinal, hoop and volumetric strains, change in dimensions due to internal pressure. Wire wound cylinders, spherical shells.

UNIT-VI: Columns and struts Buckling of columns, Euler's theory, effective length, rankine's formula, columns with eccentric load and initial curvature.

References/Text Books:

- 1. James M Gere, "Mechanics of materials", Thomson Learning Inc., Sixth Edition
- 2. P.Beer, E.R. Johnston, J.T.De Wolf and D.F.Mazurek, "Mechanics of materials", Mc Graw Hill, Sixth Edition
- 3. Y. C. Fung, "Foundations of solid mechanics", Printice Hall Inc.,

Lecture Plan: Unit-I & -II syllabus for MID-I, Unit-III & -IV syllabus for MID-II and Unit-V & -VI syllabus for MID-III examinations.