1998.

BOE011	Strength of Materials	3L:1T:0P	4 credits

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Objectives:

- To understand the nature of stresses developed in simple geometries such as bars, cantilevers, beams, shafts, cylinders and spheres for various types of simple loads
- To calculate the elastic deformation occurring in various simple geometries for different types of loading

Contents :

Deformation in solids- Hooke's law, stress and strain- tension, compression and shear stresses- elastic constants and their relations- volumetric, linear and shear strains- principal stresses and principal planes- Mohr's circle. **(8)**

Beams and types transverse loading on beams- shear force and bend moment diagrams- Types of beam supports, simply supported and over-hanging beams, cantilevers. Theory of bending of beams, bending stress distribution and neutral axis, shear stress distribution, point and distributed loads. **(8)**

Moment of inertia about an axis and polar moment of inertia, deflection of a beam using double integration method, computation of slopes and deflection in beams, Maxwell's reciprocal theorems.**(8)**

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Torsion, stresses and deformation in circular and hollow shafts, stepped shafts, deflection shafts fixed at both ends, stresses and deflection of helical springs. **(8)**

Axial and hoop stresses in cylinders subjected to internal pressure, deformation of thick a thin cylinders, deformation in spherical shells subjected to internal pressure **(8)**

(Total: 40 lectures + 12 tutorials)

Course Outcomes:

- After completing this course, the students should be able to recognise various types load applied on machine components of simple geometry and understand the nature of interna stresses that will develop within the components
- The students will be able to evaluate the strains and deformation that will result due to the elastic stresses developed within the materials for simple types of loading

Text Books:

1. Egor P. Popov, Engineering Mechanics of Solids, Prentice Hall of India, New Delhi, 2001.
2. R. Subramanian, Strength of Materials, Oxford University Press, 2007.
3. Ferdinand P. Been, Russel Johnson Jr and John J. Dewole, Mechanics of Materials, Tata McGrawHill Publishing Co. Ltd., New Delhi 2005.

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BOE013	Automobile Engineering	3L:0T:0P	3 credit