Maulana Abul Kalam Azad University of Technology, West Bengal

(Formerly West Bengal University of Technology)

SYLLABUS FOR BACHELOR OF TECHNOLOGY IN MECHANICAL ENGINEERING

(Effective from academic session 2018-19)

Subject Code : PC-ME502	**Category:** Professional Core Courses
Subject Name : Solid Mechanics	**Semester** : Fifth
L-T-P : 3-1-0	**Credit: 4**
Pre-Requisites: Engineering Mechanics	

Course Objectives:

The objective is to present the mathematical and physical principles in understanding the linear continuum behaviour of solids.

Course Contents:

Module No.	Description of Topic	Contact Hrs.
1	Introduction to Cartesian tensors, Strains: Concept of strain, derivation of small strain tensor and compatibility, Stress: Derivation of Cauchy relations and equilibrium and symmetry equations, principal stresses and directions	12
2	Constitutive equations: Generalized Hooke's law, Linear elasticity, Material symmetry; Boundary Value Problems: concepts of uniqueness and superposition.	10
3	Plane stress and plane strain problems, introduction to governing equations in cylindrical and spherical coordinates, axisymmetric problems.	10
4	Application to thick cylinders, rotating discs, torsion of non-circular cross-sections, stress concentration problems, thermo-elasticity, 2-D contact problems.	9
5	Solutions using potentials. Energy methods. Introduction to plasticity.	7

Course Outcomes:

Upon completion of this course, students will be able understand the deformation behavior of solids under different types of loading and obtain mathematical solutions for simple geometries.

Learning Resources:

1. G.T. Mase, R.E. Smelser and G.E. Mase, Continuum Mechanics for Engineers, 3rd Edition, CRC Press, 2004.
2. Y.C. Fung, Foundations of Solid Mechanics, Prentice Hall International, 1965.
3. L.E. Malvern, Introduction to Mechanics of a Continuous Medium, Prentice Hall International, 1969.