2012-13

PVP SIDDHARTHA INSTITUTE OF TECHNOLOGY

(COURSE STRUCUTRE FOR AUTONOMOUS SCHEME)

I Year M. Tech. (Machine Design) M.E.	**T**	**P**	**C**
	5	**0**	**4**

MEMD1T5B - CONTINUUM MECHANICS & TENSOR ANALYSIS

(Elective I)

Unit – I

Introduction: Eulerian and Lagrangian description of a continuous, discrete systems, continua, physical quantities and their derivatives. Rigid body motion, Relation between continuum models and real materials

Unit – II

Conservation laws in a continuum: Mass conservation in Lagrangen and Eulerian frames, Conservation of momentum in Lagrangen and Eulerian frames.

Unit – III

Conservation laws of Energy: Conservation in angular momentum in lagrengreen form. Conservation of energy in in Lagrangen and Eulerian frames.Strain and decomposition. Finite deformation, infinitesimal displacements

Unit – IV

Constitutive relations - I: Material frame indifference, Elastic Materials,

Unit - V

Constitutive relations - II: Viscous fluids, linear viscoelasticity

Unit - VI

Tensor analysis - I: Multi linear forms, Definition of Tensor over including vector spaces, Alternating tensors,determinants, orientation, tensor products.

Unit - VII

Tensor analysis – II: Rotation of tensors, calculations of tensors, internal calculations of tensors and Integral identities,

Unit – VIII

Tensor calculus: Tensor calculus.

TEXT BOOK

1. Continuous mechanics, George Backus, Samizdat Press, 1997

REFERENCES:

1. Mechanics of Continua, A.C. Eringan, 1962
2. Continuous Physics, Vol. 1, A.C. Eringan, 1967, Academic press

3. Introduction to Continuous Mechanics, B.L.N. Kennett
4. Quick introduction to Tensor analysis, R.Sharipov, 2004, Samizdat Press.
5. Non-linear continuum mech-win, SEACAS theory manuals part II,T.A.Laursen,S.W.Attaway and R.I.Zadoks