

ME 223 Solid Mechanics - II (3-0-0-6)

Prerequisite: ME 212 Solid Mechanics – I or Equivalent

Review on 3D state of stress in solids; review on 3D state of strain in solids; Saint-Venant's principle; principle of superposition; boundary value problems: stress formulation, displacement formulation, Beltrami-Michell equations, Navier's equations; methods of solution; plane problems: plane stress and plane strain problems; solution of plane problems using Airy stress function: straight beams, curved beams; unsymmetrical bending of beam elements; shear centre and shear flow in thin-walled beams; axisymmetric problems: thick-walled cylinders, rotating disk and cylinders; stress analysis of a plate with a circular/non-circular hole, torsion of non-circular bar; energy methods: principle of virtual work, minimum potential energy.

Texts:

- [1] S. P. Timoshenko and J. N. Goodier, Theory Of Elasticity, McGraw Hill International, 2010.
- [2] L. S. Srinath, Advanced Mechanics Of Solids, Tata McGraw -Hill, 2008.

References:

- [1] M. H. Sadd, Elasticity: Theory, Applications and Numerics, Elsevier, 2005.
- [2] S. H. Crandall, N. C. Dahl and T. J. Lardner, An Introduction to the Mechanics of Solids, TMH, 2008.
- [3] S. P. Timoshenko, Strength of Materials, Vols. 1 and 2, CBS Publishers, 1986.
- [4] H. Shames and J. M. Pitarresi, Introduction to Solid Mechanics, Prentice Hall of India, 2003.
- [5] A. C. Ugural and S. K. Fenster, Advanced Strength and Applied Elasticity, 3rd Ed., Prentice Hall, 1994.
- [6] A. P. Boresi, R. J. Schmidt and O. M. Sidebottom, Advanced Mechanics Of Materials, John Wiley, 1993.
- [7] Y. C. Fung, Foundations of Solid Mechanic