## Aerospace Engineering

**Course Title: Theory of Elasticity** **Number of Credits: 3**

## Course Topics:

- Review of Forces and Stress, Stress and Strain, Hydrostatic and Deviatoric strain
- Displacement and strain in Curvilinear Coordinates, Surface and Body forces, Hydrostatic and Deviatoric stress
- Principle stresses, Equilibrium Equations in Cylindrical and Spherical Coordinates
- Constitutive Equations of Elastic and Thermos-elastic Materials
- Elasticity, Constitutive Linearization, Material Symmetry, Isotropic Materials
- Linearized Elasticity Problems, Field Equations, Boundary Condition, Saint-Venant's Principle
- Useful Consequences of Linearity, Solution Methods, Two-Dimensional Problems, Virtual Work, Energy Theorems in Elasticity Anti-plane Strain Problems
- Plane Strain/Stress Problems, Airy Stress Function
- Kinematic Linearization, Cylindrical and Spherical Coordinates
- Solve using polynomial stress function and Fourier series
- Formulation of tension, pressure and torsion, solving torsion problems using the surface boundary equation, solving torsion problems using Fourier series, torsion of hollow sections, torsion of bars with varying diameter, bending formulation, bending without torsion**.**

## Reading Resources:

- Elasticity: Theory, Applications and Numerics; M.H.Sadd, 3rd ed. Academic Press 2014.
- Elasticity (Solid Mechanics and Its Applications); J.R.Barber, 3rd ed. Springer 2010
- Elasticity in Engineering Mechanics; A.P.Borsei, K.Chong and J.D.Lee, John Wiley and Sons 2010.

Theory of Elasticity; S.P.Timoshenko and J.N.Goodier, Mc-Graw Hill 1969, Digitized 2010

-
-