ADVANCED MECHANICS OF SOLID

Module-I

Shear center and unsymmetrical bending. Beam columns; Beams on elastic foundations; curved beams, rotating discs and thick cylinders.

Module-II

Virtual work; Minimum potential energy; Hamilton's Principle. Plate theory: Formulation by Hamilton's principle: Bending and buckling of homogenous and Sandwich Plates. Shell theory: Introduction to theory of surface; Formulation by Hamilton's Principle; membrane, bending and buckling analysis of shells of revolution.

Module-III

Stress-strain relations for linearly elastic solids, Generalized Hooke's law. Analysis of three dimensional stresses and strains. Tensor character of stress. Strain-displacement relations, equilibrium equations, compatibility conditions and Airy's stress function, Plane stress and plane strain, simple problems in cartesian and polar co-ordinates.

Module-IV

Solution of axisymmetric problems, Bending of beams and plates, Kirkhhof and Mindlin concept. Torsion problem with St.Venant's approach-Prandtl's approach - Torsion of thin walled open and closed sections & thermal stress.

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Text Books

1. Advanced Mechanics of Materials - F. B. Seely and J. O. Smith. John Wiley and Sons Inc, 2nd edition, 1952.

2. Advanced Mechanics of Materials, 4th edition A. P. Boresi and O. M. Sidebottom. John Wiliey and Sons, 1985.

3. Advanced Mechanics of Solids - L. S. Srinath. Tata Mc-Graw Hill Co., 2005

Reference Books

1. Elementary Mechanics of Solids - P.N. Singh and P.K. Jha. New Age International, 2002.

2. Mechanics of Solids (Vol. 1& 2) - R. Baidyanathan, P.Perumal and S. Lingeswari. Scitch Publications.

3. Timoshenko, S. and Goodier J.N. Theory of Elasticity, McGraw Hill Book Co., Newyork, 1988.

4. J. Chakrabarty, Theory of Plasticity, McGraw-Hill Book Company, New York 1990

5. Irving H.Shames and James,M.Pitarresi, Introduction to Solid Mechanics,Prentice Hall of India Pvt. Ltd., New Delhi -2002.

6.E.P. Popov, Engineering Mechanics of Solids, 2nd Ed., Prentice Hall India, 1998.

7. W.F.Chen and D.J.Han., Plasticity for structural Engineers., Springer-Verlag., NY., 1988.

8. Hoffman and Sachs, *Theory of Plasticity* - McGraw Hill., 2nd ed. 1985

9. Johnson and Mellor, *Engineering Plasticity*- Van-Nostrand., 1st edition, 1983