

ME503: Advanced Mechanics of Solids

Teaching Scheme			Credits	Marks Distribution				Total Marks
L	T	P		Theory Marks		Practical Marks		
				ESE	CE	ESE	CE	
3	2	0	5	70	30	30	20	150

Course Content:

Sr. No.	Topics	Teaching Hrs.
1	Analysis of Stresses and Strains in rectangular and polar coordinates: Cauchy's formula, Principal stresses and principal strains, 3D Mohr's Circle, Octahedral Stresses, Hydrostatic and deviatoric stress, Differential equations of equilibrium, Plane stress and plane strain, compatibility conditions.	10
2	Introduction to curvilinear coordinates. Generalized Hooke's law and theories of failure. Energy Methods.	04
3	Bending of symmetric and un-symmetric straight beams, effect of shear stresses, Curved beams, Shear center and shear flow, shear stresses in thin walled sections, thick curved bars.	10
4	Torsion of prismatic solid sections, thin walled sections, circular, rectangular and elliptical bars, membrane analogy.	07
5	Thick and thin walled cylinders, Composite tubes, Rotating disks and cylinders. Euler's buckling load, Beam.	06
6	Column equations. Strain measurement techniques using strain gages, characteristics, instrumentations, principles of photo-elasticity.	08
Total Hrs.		45

Reference Books:

1. L. S. Srinath, "*Advanced Mechanics of Solids*", 2nd Edition, TMH Publishing Co. Ltd., New Delhi, 2003.
2. R. G. Budynas, "*Advanced Strength and Applied Stress Analysis*", 2nd Edition, McGraw Hill Publishing Co, 1999.
3. A. P. Boresi and R. J. Schmidt, "*Advanced Mechanics of Materials*", 5th Edition, John Wiley and Sons Inc, 1993.
4. S. P. Timoshenko and J. N. Goodier, "*Theory of Elasticity*", 3rd Edition, McGraw Hill Publishing Co. 1970.

5. P. Raymond, "*Solid Mechanics for Engineering*", 1st Edition, John Willey & Sons, 2001.
6. J. W. Dally and W. F. Riley, "*Experimental Stress Analysis*", 3rd Edition, McGraw HillPublishing Co., New York, 1991.