ADVANCED STRENGTH OF MATERIALS

Course Code	19ME4501B	Year	III	Semester	I
Course Category	Program Elective-I	Branch	ME	Course Type	Theory
Credits	3	L – T – P	3 – 0 – 0	Prerequisites	Nil
Continuous Internal Evaluation	30	Semester End Evaluation	70	Total Marks	100

Course Outcomes		Levels
After successful completion of the course, the student will be able to		
CO1	Calculate deflections in fixed and continuous beams.	L3
CO2	Determine the stresses in thick cylinders.	L3
CO3	Analyse the curved beams for stresses with different cross sections.	L4
CO4	Calculate the stresses in rotating disks.	L3
CO5	Determine the Strain Energy under various loading conditions.	L3

Contribution of Course Outcomes towards achievement of Program Outcomes & Strength of correlations (3-High, 2: Medium, 1: Low)														
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	3	1								2	3	1
CO2	3	3	3	1								2	3	1
CO3	3	3	3	1								2	3	1
CO4	3	3	3	1								2	3	1
CO5	3	3	3	1								2	3	1

Syllabus		
Unit No.	Contents	Mapped COs
I	**FIXED BEAMS AND CONTINUOUS BEAMS:** Introduction, analysis of fixed beams by Macaulay's method, Clapeyron's theorem of three moments, Beams with constant moments of inertia.	CO1
II	**THICK CYLINDERS:** Introduction, Stresses in thick cylindrical shell (Lame's theory), Radial Deflection, Stresses in Compound Cylinders.	CO2
III	**CURVED BEAMS:** Stresses in Beams of small and large initial curvature, The Winkler-Bach theory, Assumptions for stresses in the bending of curved bars, Stresses in Crane Hook and C-Clamp with Rectangular, circular and trapezoidal cross sections.	CO3
IV	**CENTRIFUGAL STRESSES**: Introduction, Rotating Ring, Rotating Disc, Rotating Disc of uniform strength.	CO4
V	**STRAIN ENERGY:** Resilience, Proof Resilience, Strain energy stored in a body when the load is applied gradually, Load is applied suddenly, Load is applied with impact, Strain energy stored in a body due to shear stress.	CO5

Learning Recourse(s)
Text Books
1. James M. Gere, "Mechanics of Materials", 7th edition, Cengage learning India, 2010. 2. S.S. Rattan, "Strength of Materials", 2nd edition, Tata Mc-Graw Hill Private Limited, New Delhi, 2012. 3. S. B. Junarkar, Mechanics of Structures, Charotar Publishers, 2010
Reference Books
1. Adarsh Swaroop, "Mechanics of Materials" 1st edition, New Age International Pvt. Ltd, 2012. 2. Popov, Mechanics of Solids, 2/e, New Pearson Education, 2015.
e- Resources & other digital material
1. https://nptel.ac.in/courses/112/101/112101095/