

ME 621

ENERGY METHODS IN MECHANICAL DESIGN

Textbook:–Applied Elasticity – C.T. Wang

References:

- a) Advanced Strength and Applied Elasticity – A. C. Ugural and S.K. Fenster, Prentice-Hall, 4th Edition.
- b) Strength of Materials, Vol. I and II – S. Timoshenko, D. Van Nostrand.
- c) Introduction to Mechanics of Solids – E. Popov, Prentice-Hall.

Week	Subject	Pages	Problems
1	Review of classical beam theory, Conventions, notations	9.1, 9.2	--
2	Stability of columns, general solution for buckling	9.4 11.1-11.5 (Ugural)	1,2
3	Large deformation (nonlinear) and curved columns	9.3,9.7 11.7 (Ugural)	3,4
4	Energy techniques; conservation of energy	3.5	5,6
5-6	Principle of Minimum Potential Energy	7.1, 10.5 (Wang) 10.9- 10.11, 11.9 (Ugural)	7,8
7	MID-TERM EXAM		
8	Principle of Minimum Complementary Energy; Castigliano's theorem	7.2, 7.3, 7.4 10.4, 10.5, 10.7 (Ugural)	9,10
9	Approximate solutions of beams and columns	13.1-13.4 (Popov)	11,12
10	Inelastic, variable cross-section, and statically indeterminate structures	Timoshenko Vol. I, Art. 72	13
11	Failure theories in design	4.1-4.12 (Ugural)	14,15
12	Solutions of plate problems using differential equations	11.1-11.3	16
13-14	Solutions of plate problems using energy methods	11.4	Wang – Page 286-#1 Wang Page 291-#1,2
15	Final Exam		

Homework will be assigned, collected and graded.

Grading will be based on the Mid-term Exam (40%)

Final Exam (40%), and homework/Classwork (20%)

The NJIT Honor Code and Professional Conduct will be strictly enforced.