

# ME 315 STRESS ANALYSIS

**Textbook:**– Advanced Strength and Applied Elasticity 4<sup>th</sup> ed.

**By** A.C Ugural and S.K. Fenster, Prentice Hall, 2003

**Prerequisites:** Math 222, Mech 237, ME 215

Week	Subject	Articles	Problems
1	Introduction, stress tensor Equilibrium, transformation of stresses, principal stresses	1.1 to 1.7 1.8 to 1.10	1, 2 8, 9
2	Mohr's circle for stress Three-dimensional stresses	1.11 1.12 to 1.14	10, 11, 23 36, 47
3	Normal and shearing strains, strain tensor, compatibility Transformation of strains	2.1 to 2.4 2.5 to 2.7	1, 3, 5 6, 12, 14
4	Stress-strain relations Strain gages	2.8 to 2.10	25, 28, 29
5	Strain energy Saint Venant's principle	2.11 to 2.14	39, 41, 46
6	Problems Exam #1	----	----
7	Plane stress, plane strain Airy stress function, Thermoelasticity	3.1 to 3.4 3.5 to 3.7	1a, 3, 4 5, 10, 16
8	Stress and strain in polar coordinates Stress concentration	3.8 to 3.9 3.10 to 3.11	24 36
9	Yielding theories based on maximum shear stress and distortion energy Comparison of yielding criteria	4.1 to 4.8 4.9 to 4.12	3, 4, 6a 20
10	Axisymmetrically loaded members Shrink fit, composite cylinders	8.1 to 8.4 8.5	1, 4, 11, 13 21, 24
11	Rotating disks	8.6 to 8.8	26, 28
12	Problems Exam #2	----	----
13	Energy methods, Castigliano's Theorem Virtual Work, Ritz method	10.1 to 10.4 10.7 10.8 to 10.11	3, 4, 5 30, 32
14	Elastic stability of columns Actual columns	11.1 to 11.6 11.7 to 11.9	2, 3, 5 21
15	Final Exam		

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

**COURSE SUPERVISOR**

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