

SYLLABUS /ASSIGNMENT SHEET DRAFT

ME 315 STRESS ANALYSIS**Fall 2015**Textbook: *Mechanics of Materials*, R. Craig (Wiley), 3rd edition

Pre-requisites: Math 222, Mech 237, ME 215

Week	Subject	Articles	Problems
1	Review of Fundamentals: Free-Body Diagrams, Axial loads, Torsion of circular shafts, Beams in Bending	Ch. 1 (1.1-1.5) + Ch. 4 (4.1-4.3);	1.4 (4, 5, 14, 19); 4.3 (11)
2	Bernoulli-Euler Beam Theory; Transverse Shear; Stress tensor, Equilibrium Equations;	Ch. 2 (2.12); Ch. 6 (6.8)	2.12 (1,2,3); 6.8(3, 7)
3	Strain Tensor	Ch. 3 (3.1-3.3; pgs. 118-131)	2.12 (9, 12); 3.3 (2, 3,5,8)
4	Stress-Strain Relations: Hooke's Law	Ch. 2 (2.11, 2.13)	2.13 (3,4,5,7, 8)
5	Plane Stress, Plane Strain (2D problems)	Ch. 6 (6.1- 6-3); Ch. 8 (8-2, 8-7)	6.2 (2, 4); 6.3 (4, 5)
6	3D Stress Transformations, 2D Stress Transformation	Ch. 8 (8.1-8.5)	8.3 (1,3,5,7,8,19); 8.4 (10,14)
7	Mohr's Circle; Principal Stress – Eigenvalue Approach; 3D Mohr's Circle	Ch. 8 (8.6-8.10);	8.5 (11,13,14) ; 8.6 (1,5)
8	Exam 1 (3 hours)		
9	2D Problems: Curved Beam, Plate with Hole, Load on Half-Space		
10	Thin & Thick-Walled Vessels, Shrink Fits, Rotating Disks	Ch. 9 (9.1, 9.2);	9.2 (1,2,6,8)
11	Theories of Failure & Applications	Ch. 12 (12.3)	11.3 (1,9,10,14,33, 35)
12	Exam 2 (3 hours)		
13	Energy Formulations	Ch. 11 (11.1 – 11.3, 11.6);	12.3 (1,2,3,6,12)
14	Betti's Reciprocity Theorem; Castigliano's 2 nd Theorem; Indeterminate Problems	Ch. 11 (11.5);	11.5 (3,4,13,17,18)
15	Elastic stability of columns	Ch. 10 (10.1 – 10.8);	10.1 (2, 3, 4)
	Final Exam		