CEC30/MEC85 - Introduction to Solid Mechanics

COURSE SYLLABUS

Date	Topic	Reading
1/17	Introduction, review of vector algebra	1.1, 1.2
1/19	Forces and moments in two dimensions	1.3, 1.4
1/22	Moments in three dimensions	1.3, 1.4
1/24	Rigid bodies, force/moment equivalence	1.5
1/26	Particle statics	2.1
1/29	Equilibrium of rigid bodies in two dimensions	2.2
1/31	Constraints and free-body diagrams	2.2
2/2	Friction	2.2
2/5	Equilibrium of rigid bodies in three dimensions	2.3
2/7	Forces in two-dimensional trusses (method of joints)	3.1, 3.2
2/9	Forces in two-dimensional trusses (method of sections)	2.4, 3.2
2/12	Frames and machines, method of sections	3.4
2/14	Chains and cables	3.5
2/16	Normal stress, Saint-Venant's principle	4.1
2/21	Shear stress, stress-based design	4.2, 4.3
2/21	Midterm examination (through 2/12)	
2/23	Local equilibrium equations in 2 and 3 dimensions	4.4, 4.5
2/26	Stress transformation	4.6.1
2/28	Principal stresses and maximum shear in plane stress	4.6.2, 4.6.3
3/2	Mohr's circle and absolute maximum shear	4.6.4
3/5	Deformation and axial strain	5.1
3/7	Shear strain, general state of strain	5.2, 5.3
3/9	Strain transformation, principal strains, displacement	5.4
3/12	Linear elasticity, isotropy	6.1, 6.2
3/14	Elongation of axially loaded bars	6.3
3/16	Static indeterminacy	6.4
3/19	Thermal strains/stresses	6.6
3/21	Work and energy	6.5
3/23	Torsion of elastic circular bars	4.3.3, 7.1
4/2	Torsion of thin-walled tubes and composite shafts	7.2, 7.3
4/4	Shear and moment diagrams	8.1
4/4	Midterm examination (through 3/21)	
4/6	Pure bending of beams	8.2
4/9	Bernoulli–Euler beam theory	8.3
4/11	Deflection of beams	8.4
4/13	Deflection of beams with singular loads	8.4, App. A
4/16	Asymmetric bending of beams	9.2
4/18	Shear stresses in beams	9.3
4/20	Superposition; bending, shear and axial loading in beams	9.4
4/23	Stability of elastic systems	10.1, 10.2
4/25	Column buckling	10.3
4/27	Inelastic behavior and material failure	11.1, 11.2, 11.3
4/30	Review and closure	
5/8	Final examination	