

- Instructor: Professor Youn, Byeng Dong (301-1514, bdyoun@snu.ac.kr)
- Introduction: This course is concerned with the mechanics of rigid and deformable solids in equilibrium. The course contents include statics, analysis of deformable bodies, forces and moments, stress-strain-temperature relation, torsion, stress and displacement due to bending, and energy methods
- Textbook: Stephen H. Crandall, Norman C. Dahl, Thomas J. Lardner
-An Introduction to the Mechanics of Solids, 2nd ed. McGraw-Hill, 1978
- Reference Textbooks:
 - (1) Irving H. Shames
-Introduction to solid mechanics, 3rd ed. Prentice Hall International, Inc. 2000
 - (2) James M. Gere
-Mechanics of Materials, 6th ed. Pacific Grove, 2004
- Lecture Schedule:
 - Wk1 Chapter 1 Statics: Elements of Equilibrium
 - (1.1-1.8) -Review of Forces and Moments, Vectors, Equilibrium, Free-body Diagram, Force-Deformation, 1-D Force-Deformation Relationships; Truss Structures, Statically Determinate and Indeterminate Situations
 - Wk2 Chapter 2 Mechanics of Deformable Bodies: Introduction
 - (2.1-2.3) -Analysis of Deformable Bodies, Uniaxial Loading & Deformation, Statically Determinate Situation
 - (2.4-2.6) -Statically Indeterminate Situation, Elastic Energy; Castigliano's Theorem
 - Wk3 Chapter 3 Forces and Moments Transmitted by Slender Members
 - (3.1-3.4) -General Method, Distributed Load, Resultant of Distributed Load
 - (3.5-3.7) -Differential Equilibrium Relationship, Singularity Function, Fluid Force
 - Wk4 Chapter 4 Stress & Strain
 - (4.1-4.4) -Stress, Plane Stress, Equilibrium of a Differential Element in Plane Stress
 - (4.5-4.7) -Stress Components Associated with Arbitrarily Oriented Faces in Plane Stress, Mohr's Circle Representation of Plane Stress, Mohr's Circle Representation of General State of Stress
 - Wk5 Chapter 4 Stress & Strain
 - (4.8-4.12) -Analysis of Deformation, Definition of Strain Component, Relation between Strain & Displacement in Plane Strain, Mohr's Circle Representation of Plane Strain
 - Wk6 Chapter 5 Stress-Strain-Temperature Relations
 - (5.1-5.3) -Tensile Test, Idealization of Stress-Strain Curve
 - (5.4-5.6) -Elastic Stress-Strain Relations, Thermal Strain, Complete Equations of Elasticity
 - Wk7 Chapter 5 Stress-Strain-Temperature Relations
 - (5.7) -Complete Elastic Solution for a Thick-Walled Cylinder
 - (5.8-5.9) -Strain Energy in an Elastic Body, Stress Concentration
 - Wk8 Chapter 5 Stress-Strain-Temperature Relations
 - (5.11-5.12) -Criteria for Initial Yielding, Behavior Beyond Initial Yielding in the Tensile Test
 - 1st Exam (4/20, 6-8pm)**
 - Wk9 Chapter 6 Torsion
 - (6.1-6.5) -Geometry of Deformation of a Twisted Circular Shaft, Stresses Obtained from Stress-Strain Relation, Equilibrium Requirement, Stress & Deformation in a Twisted Elastic Circular Shaft
 - Wk10 Chapter 6 Torsion
 - (6.6-6.8) -Torsion of Elastic Hollow Circular Shafts, Stress Analysis in Torsion; Combine

- Stress, Strain Energy due to Torsion
 (6.9-6.11) -Onset of Yielding in Torsion, Plastic Deformation, Residual Stresses
- Wk11 Chapter 7 Stresses due to Bending
 (7.1-7.3) -Geometry of Deformation of a Symmetrical Beam Subjected to Pure Bending,
 Stress Obtained from Stress-Strain Relation, Equilibrium Requirement
 (7.4) -Strain Energy due to Bending, Onset of Yielding in Bending, Plastic Deformation
- Wk12 Chapter 7 Stresses due to Bending
 (7.5) -Stress & Deformation in Symmetrical Elastic Beam Subjected to Pure Bending
 (7.6) -Stress in Symmetrical Elastic Beam Transmitting both Shear Force & Bending
 Moment
- Wk13 Chapter 7 Stresses due to Bending
2nd Exam (5/25, 6-8pm)
 (7.8) - Strain Energy due to Bending
- Wk14 Chapter 7 Stresses due to Bending
 (7.9, 7.10) -Onset of Yielding in Bending, Plastic Deformation
 Chapter 8 Deformation due to Bending
 (8.1-8.3) -Moment – Curvature Relation, Integration of the Moment-Curvature Relation
- Wk15 Chapter 8 Deformation due to Bending
 (8.4-8.5) -Superposition, Load – Deflection Differential Equation
Final Exam (6/13, 6-8pm)

– Evaluation : 3 Exams (25% each), Homeworks (10%), 3 Pop-up Quizzes (5% each)

(003 Lecture)

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