國立清華大學
National Tsing Hua University

PME 235002 Mechanics of Materials

Spring 2012

Instructor:	Prof. Jen-Yuan (James) Chang	Credits:	3 credits.
Class meetings:	**T3T4R3**	Office hours:	Thursdays 16:00-17:00

Course description: This course is a foundation to many advanced techniques that allow engineers to design structures, predict failures and understand the physical properties of materials. Mechanics of Materials gives students basic tools for stress, strain and strength analyses. The course is designed to introduce basic principles of statics for rigid and deformable bodies. The main objective of this course is to help the students develop engineering intuition for equilibrium, properly constrained systems, and deformation under external loadings. Methods for determining the stresses, strains and deflections produced by applied loads are learned through analyzing and designing structural members subjected to tension, compression, torsion and bending using fundamental concepts of stress, strain, and elastic behavior. It is also anticipated that theory and design approaches for the mechanics of deformable bodies will help prepare students for complex systems that will be encountered in advanced design courses such as mechanical designs, manufacturing, and micro-electro-mechanical systems (MEMS).

Textbook: F. P. Beer, E. R. Johnston, Jr., J. T. DeWolf, and D. F. Mazurek, Mechanics of Materials, 5th Eidtion in SI units, McGraw-Hill, New York, NY, USA, 2009.

References: J.M. Gere, "Mechanics of Materials", 7th ed., Brooks/Cole-Thomson Learning, Belmont, CA, USA, 2009.
R. C. Hibbeler, Mechanics of Materials, 8th Edition, Taiwan Adapted Version, Pearson/Prentice Hall, Taiwan, 2011.

Teaching Method: Classroom lectures will be offered in English with teaching materials posted in Moodle. In addition to lectures, in-class exercise sessions will be arranged and carried by teaching assistants.

Assessments:

Quizzes	20%
Two Midterm Exams	40% (each 20%)
Term project	10%
Final Exam	30%

Topic Covered:

(1) Introduction-Concept of Stress
(2) Stress and Strain-Axial Loading
(3) Torsion
(4) Pure Bending
(5) Analysis and Design of Beams for Bending
(6) Shearing Stresses in Beams and Thin-Walled Members
(7) Transformations of Stress and Strain
(8) Deflections of Beams
(9) Columns

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