

COURSE SYLLABUS (2 Page)

Course Number: MEGR 2144 C01
Course Name: Introduction to Solid Mechanics

Credits and Contact Hours: 3

Instructor: Janos Gergely

Textbook: *Title:* Mechanics of Materials, 7th Edition
Authors: Beer, Johnston, DeWolf, and Mazurek
Year: 2015

Other Supplemental Materials: Handouts

Catalog Description: Engineering theory of deformable bodies and its applications. Stress and deformation resulting from axial, torsion and bending loads. Shear and moment diagrams. Mohr's circle for stress and strain and buckling of columns.
Most Recently Offered (Day): Spring 2016, Fall 2015, Summer 2015
Most Recently Offered (Evening): Course has not been offered in 3 years

Pre-Requisites/Co-Requisites: MEGR 2141 with a grade of C or above

Course is: Required (R)

Goals: Civil engineering students will be introduced to the fundamental concepts of solid mechanics. Upon completion of this course, students will be expected to (at a minimum):

1. apply the principles of equilibrium to the problems of deformable body mechanics, distinguish between statically determinate and indeterminate systems.
2. explain the concepts of stress, strain, material behavior and distinguish between linear and nonlinear material behavior.
3. describe fundamental principles used in developing equations for stresses in axial loading, pure bending, transverse shear, torsion and thin-walled pressure problems.
4. formulate and solve mechanical and structural problems involving tension, torsion and bending.
5. formulate and solve for the deflection of a beam subjected to a variety of loading and boundary conditions.
6. determine various modes of buckling and determine the critical loads of buckling for various boundary conditions.
7. develop a thorough understanding of the stress-state at a point and determine principal stresses and maximum shear-stress at any point in a simple structural problem.
8. select, design and analyze a mechanical part based on stress-based and maximum deflection-based design criteria.

Student Outcomes Addressed:

In this course, students will develop the following Student Outcomes:

- A. an ability to apply knowledge of mathematics, science, and engineering
- E. an ability to identify, formulate, and solve engineering problems

Course Topics:

Review of prerequisite material; Introduction to stress and strain; Axial loading; Torsion; Bending, shear and moment diagrams; Flexural and shear stresses; Beam design; Beam deflection; Stress transformation and Mohr's circle; and Columns.