Sabanci University
Faculty of Engineering and Natural Sciences

ME 301- Mechanical Systems I

Instructor: Güllü Kızıltaş Şendur gkiziltas@sabanciuniv.edu

Textbook: F. Beer, E. R. Johnston, J. T. DeWolf, D.F. Mazurek, Mechanics of Materials - SI Version, 7th Revised edition, McGraw-Hill Education, USA, July 2015.

Teaching Assistants: Ata Alipoor, Kazi Sher Ahmed, +2 TBA

Lecture Hours and Place: T:11:40-13:30 , Th:9:40-10:30

Recitations: T: 17:40-18:30 CLASS ROOM TBA

Office Hours: TBA

References:

1) Egor P. Popov, Mechanics of Materials, 2nd edition, Prentice Hall, 1976
2) R.C. Hibbeler, Mechanics of Materials, Ninth Edition, Prentice Hall, New Jersey, USA
3) Warren C. Young, Roark's Formulas for Stress and Strain, McGraw-Hill, 6th Edition, New York, 1996.

Course Objectives:

This course introduces fundamental principles and methods of structural mechanics. Topics covered include: stresses and strains in structural elements, states of stress (shear, bending, torsion), statically indeterminate systems, displacements and deformations, deflections with simple loadings, superposition techniques, thermal stresses, combined stresses, Mohr's circle, combined loadings, buckling, energy methods, elastic stability, and approximate methods.
The course objective can be listed as to:

1. Introduce students to mechanics of materials and fundamentals of strength of materials,
2. Understand the sources and relationship between strain and stress and learn how to calculate them given various loading conditions
3. Apply computational techniques, such as Mohr's circle, to solve mechanics problems
4. Learn how to conduct mechanical component design based on stress and deflection analysis
5. Calculate deflections of structural elements under basic loading.
6. Introduce students to the principles of design for static failure
7. Learn how to analyze a given solid mechanics problem in a simple and logical manner and using fundamental concepts to find its solution

Prerequisites:

A passing grade in ENS 204 is required

Course Work:

Each student's grade in the course will be based on the following distribution:

• Homework (4x) 10% Attendance and participation 5%
• Mid-Term 1 25% Tentative Date: Nov.7, during lecture
• Mid-Term 2 25% Tentative Date: Dec. 5, during lecture
• Final Exam 35%

There will be two closed book MT exams, and a comprehensive final exam given during the official scheduled time as well as homework assignments.

Homework Policy:

Homework will be given almost every other week during the classes. No late homework will be accepted. The solution to each problem should start at top of a new page with all solution steps shown in an easy to follow format. All units of measurement must be shown throughout the solution. The solution to each problem should be free of scratch marks with the final answer(s) boxed or clearly marked. Sloppy assignment reports **will suffer a significant grade deduction** even if the solution is correct.

Syllabus Overview:

Tentative allocation of topics throughout the semester is as follows.

Week 1: Review and Introduction
Week 2: Introduction, Stress-strain, Mechanical properties of materials
Week 3: Stress-strain, Mechanical properties of materials
Week 4: Axial Loading
Week 5: Axial Loading
Week 6: Torsion, Pure Bending
Week 7: Torsion, Pure Bending
Week 8: Transverse Shear
Week 9: Transverse Shear
Week 10: Combined Loading
Week 11: Transformation of Stress, Strain
Week 12: Transformation of Stress, Strain, Failure Theories
Week 13-14: Deflection of beams

Student Conduct- Academic Honesty:

It is the responsibility of each student to adhere to the principles of academic integrity. Academic integrity means that a student is honest with him/herself, fellow students, instructors, and the University in matters concerning his or her educational endeavors. Thus, a student should not falsely claim the work of another as his/her own, or misrepresent him/herself so that the measures of his/her academic performance do not reflect his/her own work or personal knowledge. All homework and projects must be an individual effort unless specifically noted.