Course Description:

Introduction to mechanical stress and strain. Stress and strain calculations in mechanical members under axial loading, torsion, bending and transverse loading. Engineering material properties. Transformation of stresses. Principal stresses, maximum shear stress; Mohr’s circle. Deflection analysis of beams.

Lectures:

MW 5:00-7:45 pm, EC 1114.

Office Hours:

T 2:00-3:00 pm. For other times, appointment by e-mail is encouraged.

Text Book:


Course Outline:

- Introduction: Concept of Stress
- Stress and Strain: Axial Loading
- Torsion
• Pure Bending
• Design of Beams for Bending
• Shearing Stress in Beams
• Transformations of Stress and Strain
• Principal Stresses
• Deflection of Beams

Course Objectives:
• Introduction to stress and strain concepts under different types of loading.
• Calculation of stress and strain configuration at a point for a specific loading arrangement.
• Transformation of plane stress and strain configurations and identification of principal stresses and principal axes.
• Design of prismatic beams under various loading conditions.
• Deflection analysis of beams.

ABET MME Program Outcomes Supported by the Course:
MME departmental program outcomes that are supported by this course are as follows:

(a) Ability to apply knowledge of mathematics including statistics, multivariable calculus and differential equations, science including physics, and engineering.

(c) Ability to design a system, component, or process to meet desired needs.

(e) Ability to identify, formulate and solve engineering problems.

(f) Understanding of professional and ethical responsibility.

Note Regarding ABET MME Outcomes:
ABET program outcomes are defined for the MME program that must be achieved by graduating students. Each course supports several of the outcomes incrementally but must not necessarily achieve them fully.
### Grading:

<table>
<thead>
<tr>
<th>Activity</th>
<th>Percent</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Attendance</td>
<td>5%</td>
<td>Attendance will be monitored.</td>
</tr>
<tr>
<td>Quizzes</td>
<td>30%</td>
<td>Expect at least one quiz a day; <strong>no make-ups offered</strong>.</td>
</tr>
<tr>
<td>Midterm Exam</td>
<td>30%</td>
<td>Open book only. 1 page of formula sheet allowed.</td>
</tr>
<tr>
<td>Final Exam</td>
<td>35%</td>
<td>Open book only. 2 pages of formula sheets allowed.</td>
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<td>Final is a comprehensive exam.</td>
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During the quizzes and exams, in addition to the items listed above, only one personal calculator may be used. No laptops, phones or any electronic device will be allowed. No material may be shared by students.

### Exam Dates:

Midterm exam will be given in the third week and final exam in the last week of classes. Exam dates will be announced one week before the exam date. It is the student’s responsibility to follow announcements closely.

### Correspondence via E-mail:

Each student is required to provide a reliable “permanent” e-mail address for correspondence. Various announcements and reminders will be sent via e-mail throughout the semester.

Students are expected to check their e-mail regularly and make sure their inboxes are not full as the bounced mail messages will not be sent again.

### Attendance:

Attendance will be monitored throughout the semester.

### Exams:

Exams and quizzes will be open book only. One letter-size sheet of formulas is allowed in mid-term exam, two sheets in the final exam. Class notes and problem solutions will not be allowed.

### Problem Assignments and Quizzes:

Problem assignments will be posted at the course website. Solutions will not be collected in the form of homework assignments, but quizzes based on assignment problems will be given in the class regularly. Expect at least one quiz per lecture day. Solutions of assigned problems will be posted at the course site.
IMPORTANT: No make-ups will be offered for quizzes as it is extremely impractical to do so. The lowest quiz grade will be dropped. If you miss classes more than once, please be prepared to miss a quiz and receive a “0” grade as a result.

Make-up Exams:

Make-up exams will be allowed only after the student provides a medical doctor’s original report describing the problem and a statement that it was an emergency. The report must include the doctor’s address and phone number. The Department will contact and verify the situation before a test day is scheduled.

Policy on Incomplete Grades:

A grade of “incomplete” will not be assigned to replace an unwanted grade. In order to be eligible to receive “incomplete,” only a single component of the entire coursework needs to be missing.

The University requires that a student must fill out an “Incomplete Grade Form” before the incomplete grade is assigned. The form must be signed by both the student and the professor, and copies provided to the Chair as well as the Dean’s office. Otherwise, an incomplete grade will not be assigned.