Course Description:


Lectures:

MW 5:00-6:15 pm, EC 1112.

Office Hours:

MW 1:00-2:00 pm. For other times, appointment by e-mail is encouraged.

Text Book:


Course Outline:

Part I Basics: Brief Review of Mechanics of Materials

1. Introduction
2. Ethics
3. Materials
4. Load and Stress Analysis
5. Deflection and Stiffness

Part II Failure Prevention: Design Theories

6. Failures Resulting from Static Loading
7. Fatigue Failure Resulting from Variable Loading

Part III Design of Mechanical Elements

8. Screws, Fasteners, and the Design of Nonpermanent Joints
9. Welding, Brazing, Bonding and the Design of Permanent Joints

Course Objectives:

- This course presents a review of the concepts on stress, strain, elastic and plastic ranges of material behavior, stress-strain relationship, and engineering materials.

- Stress calculations under axial loading, torsion, bending, and transverse loading. Brief review of deflection analysis.

- Static failure theories for ductile and brittle materials: Maximum shear stress theory, Maximum normal strain theory, Distortion energy (von Mises) theory; Maximum normal stress theory, Coulomb-Mohr theory, modified Coulomb-Mohr theory.

- Fatigue failure theories such as Gerber, Soderberg, Goodman, and modified Goodman for cyclic loading.

- Application of static and dynamics failure theories to mechanical design problems.

- Permanent and temporary joints. Welding, bolts and screws, welding groups and bolt groups. Mechanical springs.

ABET MME Program Outcomes Supported by the Course:

MME departmental program outcomes that are supported by this course are as follows:

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

(d) Ability to function on multi-disciplinary teams.

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

(f) Understanding of professional and ethical responsibility.
(g) Ability to communicate effectively.

(k) Ability to use the techniques, skills and modern engineering tools necessary for engineering practice.

**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>
</tr>
</thead>
<tbody>
<tr>
<td>Attendance</td>
<td>5%</td>
</tr>
<tr>
<td>Quizzes</td>
<td>15%</td>
</tr>
<tr>
<td>Exam 1</td>
<td>15%</td>
</tr>
<tr>
<td>Exam 2</td>
<td>15%</td>
</tr>
<tr>
<td>Project 1</td>
<td>10%</td>
</tr>
<tr>
<td>Project 2</td>
<td>20%</td>
</tr>
<tr>
<td>Final Exam</td>
<td>20%</td>
</tr>
</tbody>
</table>

- Unannounced quizzes; **no make-ups offered.**
- Open book only. 1 page of formula sheet allowed.
- Open book only. 1 page of formula sheet allowed.
- Open book only. 3 pages of formula sheets allowed. Comprehensive exam.

**Dates:**

Each project’s due date will be at least two weeks after the initial assignment.

Exam dates will be announced at least one week earlier than 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 e-mail address for correspondence.

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 exams, three sheets in the final exam. Class notes and problem solutions will not be allowed. Calculators, textbooks or formula sheets may not be shared during exams or quizzes.

**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.

**Problem Assignments and Quizzes:**

Problem assignments will be posted at the course web site. Solutions will not be collected in the form of homework assignments, but unannounced quizzes based on assignment problems will be given in class. Expect at least one quiz per week. 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.

**Late Projects:**

Project due dates will be strictly enforced. Late project submissions will not receive full credit, and the following policy will apply: Submissions after the class hour on due date or the following day will lose 10 points out of 100. Submissions on the second or third day after the due date will lose 10 additional points each day.

**Incomplete:**

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 reason for failure to fulfill the requirement in time must be officially proved by the student (e.g., a medical doctor’s official letter), and verified by the Department in order to receive an “Incomplete” grade.

**Ethics:**

All work prepared and submitted in this course in the form of projects, presentations, problem solutions in quizzes and exams are expected to be original and produced by the submitting student. Any portion that may have been borrowed from a previous work must be clearly identified and referenced to indicate the original author along with the title of
the work, and where and when it appeared. It is extremely important to realize that not doing so may result in an accusation of plagiarism.

Projects must contain the following statement and include student’s signature:

Author’s Statement:

The work submitted in this project is solely prepared by NAME LASTNAME, and it is original. Excerpts from others’ work have been clearly identified and listed in the list of references. All of the engineering drawings, computer programs, formulations and related files submitted on the accompanying CD are also original and prepared by NAME LASTNAME.

NAME LASTNAME

(Include Signature)