ENGR 309 - 02: MECHANICS OF SOLIDS

 Bulletin Description:
ENGR 309-02: Mechanics of Solids (3 units)
Prerequisites: ENGR 102, ENGR 200 concurrently.
Stress and deformation analysis for members under axial load, torsion, flexure, and combined
forces: columns, strain energy. Elastic and ultimate resistance of materials.

Spring Semester 2015:
Instructor: Zhaoshuo Jiang, Ph.D., P.E.
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Phone: (415) 338-7741
Office Hours:
M/W/F: 10:00 AM – 11:00 AM or by appointment

Coordinator:
Dr. Timothy B. D’Orazio, Professor of Civil Engineering

Class Schedule:
Lectures: Monday and Wednesday: 3:35 PM – 4:50 PM
Location: Thornton Hall 325

Textbook:

Reference:

Prerequisites by Topic:
2. Application of the equations of static equilibrium.
3. Mechanical properties of engineering materials, particularly steel and other metals.
4. Solution of 2nd order differential equations and integration.
5. Centroids and moments of inertia.

Course Objectives1:
1. Enhance student understanding of mechanical properties of solid materials. [a, c]
2. Enable students to determine internal forces in common civil and mechanical engineering
   components. [a, c, e, i]
3. Develop student understanding of stresses and strains created in components due to various
   loads. [a, c, e, i]
4. Develop student understanding of deformation of common components. [a, c, e, i]
5. Acquaint student with the concept of stability. [a, c, e]

1 Letters in brackets refer to ABET outcomes.
Topics:
1. Basic concepts of stress and strain
2. Stresses in bodies subject to axial, torsional, and pressure loads.
3. Forces and stresses in beams.
4. Beam deflection.
5. Transformation of stress and strain.
7. Introduction to column stability.

Professional Component:
Engineering Science 100%

Evaluation:
1. Homework 15%
2. Quizzes 15%
3. Midterm Exam 30%
4. Final exam 30%
5. Participation 10%

Performance Criteria:

Course objective 1
Students will demonstrate an ability to:
1. Understand basic mechanical properties of solid materials. [1, 2, 3, 4, 5]
2. Stress-strain of brittle and ductile materials. [1, 2, 3, 4, 5]

Course objective 2
Students will demonstrate an ability to:
1. Determine internal forces in common civil and mechanical engineering components. [1, 2, 3, 4, 5]
2. Obtain stresses in prismatic bars under axial load. [1, 2, 3, 4, 5]
3. Obtain stresses in circular shafts due to torsion. [1, 2, 3, 4, 5]
4. Obtain stresses in prismatic beams due to bending loads. [1, 2, 3, 4, 5]

Course objective 3
Students will demonstrate an ability to:
1. Transform stresses from one set of axes to another. [1, 2, 3, 4, 5]
2. Use Mohr’s circle to transform stresses. [1, 2, 3, 4, 5]

Course objective 4
Students will demonstrate an ability to:
1. Compute deformation of beams under bending. [1, 2, 3, 4, 5]
2. Compute deformation of torsional members. [1, 2, 3, 4, 5]

Course objective 5
Students will demonstrate an ability to:
1. Compute the buckling resistance of axially loaded columns. [1, 2, 3, 4, 5]

Numbers in brackets refer to evaluation methods used to assess student performance.
Important Dates:
Last day to add/drop: Feb. 06, 2015
Last day to withdraw: April 24, 2015
No Class Mar. 23, 2015 & Mar. 25, 2015
First midterm: Mar. 09, 2015
Second midterm: April 13, 2015
Final exam: May 22, 2015, 1:30 PM to 4:00 PM

Grading Policy:
A from 100 to 94 A- from 93 to 90
B+ from 89 to 87 B from 86 to 84 B- from 83 to 80
C+ from 79 to 77 C from 76 to 74 C- from 73 to 70
D+ from 69 to 67 D from 66 to 64 D- from 63 to 60
F below 60

Homework and Exams:
1. Homework will typically be due at the beginning of the lecture on the specified day. Zero points will be given to late homework without justified excuses.
2. Name, date, course number, and homework problem number should be placed at the top of each page.
3. Homework and exams should be done on one side of the 8.5x11-in paper only; Neatness is of essence; each problem should be clearly labeled; multiple pages should be stapled in order at the top left corner; A straight edge should be used for all sketches, diagrams, and graphs; Units must be included in solution.
4. Exams will be closed book and closed notes; Name, date and course number should be placed at the top of each page.
5. No make-up midterm or final exams will be given except for emergency situations.

Policies on Attendance and Classroom:
1. Attendance is mandatory. Students missing six lectures or more need to withdraw from the class. You must come to class if you plan to pass the course. The information covered in class is essential for you to prepare for exams and quizzes.
2. No cell phone calls. No food. Allowances for special circumstances or emergencies will be made on a case-by-case basis.

Policy on Add, Drop and Withdrawal:
Students are responsible for their class enrollments. Students should check their enrollment records periodically throughout the semester to ensure that the enrollment record is correct. Particularly, all students should check their enrollment record a day or two after any enrollment changes are made and take immediate action if the university record does not reflect the changes. Also make sure to maintain a record of any adds, drops, or withdrawals. First week through fourth week of instruction is the open add/drop period. No late add will be allowed after the deadline.
Policies on Academic Dishonesty:
The instructor of this class takes the issue of academic dishonesty very seriously. You are expected to be honest and ethical in your academic work. Any instance of a violation of the Academic Integrity Policy will be handled in strict accordance with the policies outlined at the following website: http://conduct.sfsu.edu/academic-dishonesty-faculty.

No excuses will be accepted if plagiarism is discovered. Plagiarism is defined as using someone else’s ideas or work as one’s own without giving proper credit to the source. The sources include public (books, journals, magazines, newspapers, internet, etc.) as well as private (unpublished reports, internal documents, personal work, etc.) materials. The instructor will not accept excuses such as “I forgot to give credit to …,” “It’s an oversight,” or “It’s a clerical error.” Students are solely responsible for materials submitted for the course so “My roommate must have done that without my knowledge” is not an acceptable excuse either. If a submitted work is found to contain plagiarized material, the work will receive zero credit and the student may be reported to the Student Judiciary Affairs for disciplinary actions. Disciplinary actions may include disqualification from the university.

There is a “zero tolerance” policy in effect for cheating in this class. If there is the slightest evidence of cheating, no credit will be given for the entire quizzes or exams. Cheating will also be reported to the Student Judiciary Affairs. Disciplinary actions may include disqualification from the university.

Disability Policy Statement:
Students with disabilities who need reasonable accommodations are encouraged to contact the instructor. The Disability Programs and Resource Center (DPRC) is available to facilitate the reasonable accommodations process. The DPRC is located in the Student Service Building and can be reached by telephone (voice/TTY 415-338-2472) or by email (dprc@sfsu.edu). Please contract the instructor as early as possible in the semester if academic accommodations will/may be requested. Signed documents from DRPC must be presented before accommodations can be granted.

If you have a disability for which you are or may be requesting academic accommodations, please contact the instructor as early as possible in the semester. You must have the approved documents before accommodations can be granted.

Policy on observance of religious holidays:
If a student wishes to observe religious holidays and such observances require the student to be absent from class activities, it is the responsibility of the student to inform the instructor, in writing, about such holidays during the first two weeks of the class each semester. If such holidays occur during the first two weeks of the semester, the student must notify the instructor, in writing, at least three days before the date that he/she will be absent.

Disclaimer:
All information on this syllabus is tentative, and the instructor reserves the right to make revisions as necessary.