ENGR 309 - 01: MECHANICS OF SOLIDS

Bulletin Description:
ENGR 309-01: 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 2017:
Instructor: Zhaoshuo Jiang, Ph.D., P.E., LEED AP
Office: SCI-130
Email: zsjiang@sfsu.edu
Phone: (415) 338-7741
Office Hours: M/W: 10:00 AM – 11:30 AM or by appointment
(Recommended to make an appointment at zsjiang.youcanbook.me first; the QR code on the right will take you to the booking site as well)

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:
qdex play – Interactive Mobile Apps

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, e]
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]
3. Compute deformation of columns under axial load. [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]

2 Numbers in brackets refer to evaluation methods used to assess student performance.
Important Dates:
Last day to add/drop: Feb. 10, 2017
Last day to withdraw: April 24, 2017
No Class Mar. 20, 2017 & Mar. 22, 2017
First midterm: Mar. 08, 2017
Second midterm: April 05, 2017
Final exam: May 22, 2017, 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

CSU Course Redesign:
This course is part of a course redesign effort funded by California State University Office of the Chancellor which intends to provide innovative tools to help improve students’ learning experience. Through this effort, several new components are developed for use in this course:
1. Recorded Review Videos: available through iLearn
2. Interactive Mobile Apps: see handout provided in class on how to access
3. Mobile Remote Laboratory: see handout provided in class on how to access
4. Virtual Office Hours: reserve a time at zsjiang.youcanbook.me

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:
You are expected to be honest and ethical in your academic work. Cheating and plagiarism are serious violations of the academic code of conduct. Students who have been found to be cheating will be notified by the professor. Furthermore, their act will be reported to the Office of Student Conduct (OSC). There is a “zero tolerance” policy in effect for cheating in this class. Any assignment or exam that is the product of cheating will be assigning a zero or “F” for that assignment.

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.

Policy on Disability:
Students with disabilities who need accommodations for exams are encouraged to contact the instructor. The Disability Programs and Resource Center (DPRC) will facilitate the accommodation process for individuals with verified disabilities. If a student is a DPRC client, he/she must present an RAV (Reasonable Accommodation Verification) AND an EAR (Exam Accommodation Request) to the instructor at the beginning of the semester. Students are responsible for submitting the completed EAR form to the DPRC. Any changes to the accommodation require prior approval by a DPRC specialist. Changes cannot be requested during an exam. 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).

Student disclosures of sexual violence:
SF State fosters a campus free of sexual violence including sexual harassment, domestic violence, dating violence, stalking, and/or any form of sex or gender discrimination. If you disclose a personal experience as an SF State student, the course instructor is required to notify the Dean of Students. To disclose any such violence confidentially, contact:
The SAFE Place: (415) 338-2208; http://www.sfsu.edu/~safe_plc/.
Counseling and Psychological Services Center: (415) 338-2208; http://psyservs.sfsu.edu/.
For more information on your rights and available resources: http://titleix.sfsu.edu.
**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.

__________________ (Print Name) have read the syllabus and agreed with the content and terms stated.

Signature: __________________________       Date: __________________________