



## Syllabus for ENGR151-01: Strength of Materials

Spring 2019

Instructor: Mehmet Baykara

**Designation:** ENGR 151

**Catalog Description:** Fundamental concepts of how objects deform or fail under loading, and related concepts by analyzing stretching, bending and torsion of beams/rods along with their stress and strain analysis; stress and strain analysis in pressure vessels; strength and elastic instability (buckling).

**Text Books and Other Required Materials:** Hibbeler, R.C. (2016). Mechanics of Materials, 10th Edition, Pearson. ISBN: 0134319656 (available as e-text over the Pearson Mastering system).

**Course Objectives/  
Student Learning Outcomes:**

1. Understand the basic concepts of stress, strain, deformation, and material behavior under different types of loading: axial, torsion, bending.
2. Perform stress analysis and design of beams subjected to bending and shearing loads using several methods.
3. Perform stress analysis of thin-walled members.
4. Understand and analyze elastic stability of columns.

**Program Learning Outcomes:**

**Prerequisites by Topic:** ENGR 45: Introduction to Materials  
ENGR 57: Statics and Dynamics

**Course Policies:**

1. Late arrivals to the classroom (beyond an initial grace period of 10 min.) are not allowed.
2. Cell phone use during the lectures is not allowed.
3. Late submissions of any kind will not be accepted, unless there is a documented medical emergency.
4. No make-up exams/quizzes/labs, unless there is an official doctor's note regarding a medical emergency.
5. University policy on academic honesty concerning exams and individual work will be strictly enforced.
6. Students are responsible for completing the reading assigned from the textbook related to the covered topics and for checking email regularly for important information and announcements related to the course.
7. The quizzes, midterms and final exam will be closed book/notes. General formula sheets may or may not be distributed.

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8. HW sets consisting of selected questions from the textbook will be assigned throughout the term. These sets are for practice purposes only and will not be collected/graded.

9. Should you miss a lab session due to a medical reason, please notify the appropriate TA (Ogulcan Acikgoz, Yulin Qin or Anni Zhao) by email as soon as possible, CC the instructor (Mehmet Baykara) and also the lab coordinator (Neeraj Sharma). An official doctor's note will be required for a make-up lab.

**Academic Dishonesty Statement:**

- a. Each student in this course is expected to abide by the University of California, Merced's Academic Honesty Policy. Any work submitted by a student in this course for academic credit will be the student's own work.
- b. You are encouraged to study together and to discuss information and concepts covered in lecture and the sections with other students. You can give "consulting" help to or receive "consulting" help from such students. However, this permissible cooperation should never involve one student having possession of a copy of all or part of work done by someone else, in the form of an e mail, an e mail attachment file, a diskette, or a hard copy. Should copying occur, both the student who copied work from another student and the student who gave material to be copied will both automatically receive a zero for the assignment. Penalty for violation of this Policy can also be extended to include failure of the course and University disciplinary action.
- c. During examinations, you must do your own work. Talking or discussion is not permitted during the examinations, nor may you compare papers, copy from others, or collaborate in any way. Any collaborative behavior during the examinations will result in failure of the exam, and may lead to failure of the course and University disciplinary action.

**Disability Statement:**

Accommodations for Students with Disabilities: The University of California Merced is committed to ensuring equal academic opportunities and inclusion for students with disabilities based on the principles of independent living, accessible universal design and diversity. I am available to discuss appropriate academic accommodations that may be required for student with disabilities. Requests for academic accommodations are to be made during the first three weeks of the semester, except for unusual circumstances. Students are encouraged to register with Disability Services Center to verify their eligibility for appropriate accommodations.

**Topics:**

1. Stress
2. Strain
3. Mechanical Behavior and Linear Elasticity
4. Axial Loading
5. Torsion
6. Bending
7. Deflection of Beams
8. Transverse Shear
9. Combined Loading

**Class/laboratory Schedule:**

Lectures: TR 12:00-1:15pm (SSB 160), Labs: 02L M 8:00-10:50am or 03L W 8:00-10:50am or 04L F 8:00-10:50am or 05L T 2:30-5:20pm (SE2 160)

**Midterm/Final Exam Schedule:**

Midterm Exam 1: Mar. 7, 2019; 12:00-1:15pm, SSB 160  
Midterm Exam 2: Apr. 4, 2019; 12:00-1:15pm, SSB 160  
Final Exam: May 16, 2019; 8:00-11:00am; SSB 160

**Course Calendar:**

- 1) Jan. 22: Syllabus and Course Introduction
- 2) Jan. 24: Statics Review

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- 3) Jan. 29: Statics Review
- 4) Jan. 31: Stress & Strain
- 5) Feb. 5: Stress & Strain
- 6) Feb. 7: Stress & Strain
- 7) Feb. 12: Mechanical Behavior and Linear Elasticity
- 8) Feb. 14: Axial Loading
- 9) Feb. 19: Axial Loading
- 10) Feb. 21: Axial Loading
- 11) Feb. 26: Torsion
- 12) Feb. 28: Torsion
- 13) Mar. 5: Review for Midterm 1
- 14) Mar. 7: Midterm 1
- 15) Mar. 12: Bending
- 16) Mar. 14: Bending
- 17) Mar. 19: Bending
- 18) Mar. 21: Bending
- 19) Apr. 2: Review for Midterm 2
- 20) Apr. 4: Midterm 2
- 21) Apr. 9: Deflection of Beams
- 22) Apr. 11: Deflection of Beams
- 23) Apr. 16: Deflection of Beams
- 24) Apr. 18: Deflection of Beams
- 25) Apr. 23: Transverse Shear
- 26) Apr. 25: Combined Loading
- 27) Apr. 30: Combined Loading
- 28) May 2: Combined Loading
- 29) May 7: Combined Loading
- 30) May 9: Review for Final

This schedule is tentative and subject to change during the course of the semester.  
The lab schedule is TBA at a later date.

**Professional  
Component:**

Engineering fundamentals: 75%  
Engineering applications: 25%

**Assessment/Grading  
Policy:**

- Midterm Exam 1 (20%): Closed book/notes.
- Midterm Exam 2 (20%): Closed book/notes.
- Final Exam (30%): Closed book/notes.
- Quizzes (10%): A total of five in-class quizzes will be held throughout the term, based on pre-assigned HW sets. The dates for the quizzes will be announced one week in advance. Closed book/notes.
- Lab Reports (20%): Labs will be completed according to the lab schedule. Students are responsible for printing and bringing appropriate lab instructions and text to laboratory sections as part of participation. A full lab write up will be completed for each lab and due the following week at the beginning of lab. No late labs will be accepted. Labs will be performed in groups, however, each individual is responsible for turning in and completing his/her own calculations and write up. Labs must be submitted in the required format indicated by the TAs. All lab sections are mandatory and will be used for experiment completion and, if necessary, lectures.

**Coordinator:**

Professor: Mehmet Baykara; TAs: Ogulcan Acikgoz, Yulin Qin, Anni Zhao; Lab Coordinator: Neeraj Sharma

**Contact Information:**

Mehmet Baykara (Professor): mehmet.baykara@ucmerced.edu  
Ogulcan Acikgoz (TA): oacikgoz@ucmerced.edu

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Yulin Qin (TA): yq8kr@virginia.edu

Anni Zhao (TA): azhao9@ucmerced.edu

Neeraj Sharma (Lab Coordinator): nsharma8@ucmerced.edu

**Office Hours:**

Mehmet Baykara: W (3:00-4:00pm; SE2 280)

Ogulcan Acikgoz: F (3:00-4:00pm; SE2 120 & Atrium)

Yulin Qin: T (10:00am-11:00pm; SE2 Atrium)

Anni Zhao: T (11:00am-12:00pm; SE2 Atrium)