

AME 204 Strength of Materials

Units: 3

Spring 2019—Tuesday/Thursday—9:30-10:50 am

Location: VKC 100

Instructor: Assad Oberai

Office: RRB 212

Office Hours: Wednesday 9-11 AM or by appointment

Contact Info: aoberai@usc.edu. Phone: 213-740-1882

Course Description

This course provides an understanding of the mechanics of deformable materials and structures. It introduces the concepts of stress and strain, and basic structural elements like rods, beams, and shearing and bending elements.

Learning Objectives

The learning objectives associated with this course are:

1. Understanding of stress and strain in a solid.
2. Analyzing the deflection of a rod under axial stress.
3. Analyzing the torsion of beams.
4. Analyzing the bending of beams.
5. Ability to transform stresses and strains.
6. Understanding of energy methods to analyze structures.

Prerequisite(s): AME 201 or CE 205

Co-Requisite(s): none.

Concurrent Enrollment: none.

Recommended Preparation: none.

Course Notes

The course will include lectures presented in the classroom. These lectures and other information pertaining to the course will be posted on Blackboard.

Required Readings and Supplementary Materials

Required text:

F. P. Beer, E. R. Johnston, Jr., J. T. DeWolf and D. F. Mazurek; "Mechanics of Materials"; Seventh Edition McGraw-Hill Publication

Supplementary reading material:

Engineering Mechanics of Deformable Solids: A Presentation with Exercises, by Sanjay Govindjee, Oxford University Press, 2012

Description and Assessment of Assignments

Learning outcomes will be assessed by testing students on their performance in:

1. Homework that will be assigned every week or every other week.
2. Mid-term exam.
3. Final exam.

Grading Breakdown

Assignment	Points	% of Grade
10 Homeworks	250	20
Mid-term exams (2)	100	50
Final exam	100	30
TOTAL	450	100

Grading Scale

Course final grades will be approximately determined using the following scale

A	90-100
A-	80-89
B+	70-79
B	60-69
B-	55-59
C+	50-54
C	45-49

Assignment Submission Policy

Homework assignments are to be submitted in class on the due date.

Grading Timeline

All graded assignments will be returned to the students within one week.

Additional Policies

Homework assignments that are less than a week late will receive half credit. Any assignments that are late by more than a week will receive no credit.

Course Schedule: A Weekly Breakdown

(Please refer to the *Contact Hours Reference* at arr.usc.edu/services/curriculum/resources.html.)

	Topics/Daily Activities	Readings and Homework	Deliverable/ Due Dates
Week 1	Introduction	Chapter 1	HW due in one week
Week 2	Stress and Strain	Chapter 2	HW due in one week
Week 3	Axial loading (rod)	Chapter 2	HW due in one week
Week 4	Torsion	Chapter 3	HW due in one week
Week 5	Torsion (cont.). Midterm.	Chapter 3	HW due in one week
Week 6	Bending	Chapter 4	
Week 7	Bending (cont.)	Chapter 4	
Week 8	Analysis and design of beams for bending	Chapter 5	HW due in one week
Week 9	Shear stresses in beams	Chapter 6	
Week 10	Transformation of Stress and Strain. Midterm.	Chapter 7	HW due in one week
Week 11	Transformation of Stress and Strain	Chapter 7	HW due in one week
Week 12	Deflection of Beams	Chapter 9	HW due in one week
Week 13	Columns	Chapter 10	HW due in one week
Week 14	Energy Methods	Chapter 11	
Week 15	Review		
FINAL			Date: For the date and time of the final for this class, consult the USC <i>Schedule of Classes</i> at www.usc.edu/soc .

Statement on Academic Conduct and Support Systems

Academic Conduct:

Plagiarism – presenting someone else’s ideas as your own, either verbatim or recast in your own words – is a serious academic offense with serious consequences. Please familiarize yourself with the discussion of plagiarism in *SCampus* in Part B, Section 11, “Behavior Violating University Standards” <https://policy.usc.edu/scampus-part-b/>. Other forms of academic dishonesty are equally unacceptable. See additional information in *SCampus* and university policies on scientific misconduct, <http://policy.usc.edu/scientific-misconduct>.

Support Systems:

Student Counseling Services (SCS) - (213) 740-7711 – 24/7 on call

Free and confidential mental health treatment for students, including short-term psychotherapy, group counseling, stress fitness workshops, and crisis intervention. <https://engemannshc.usc.edu/counseling/>

National Suicide Prevention Lifeline - 1-800-273-8255

Provides free and confidential emotional support to people in suicidal crisis or emotional distress 24 hours a day, 7 days a week. <http://www.suicidepreventionlifeline.org>

Relationship and Sexual Violence Prevention Services (RSVP) - (213) 740-4900 - 24/7 on call

Free and confidential therapy services, workshops, and training for situations related to gender-based harm. <https://engemannshc.usc.edu/rsvp/>

Sexual Assault Resource Center

For more information about how to get help or help a survivor, rights, reporting options, and additional resources, visit the website: <http://sarc.usc.edu/>

Office of Equity and Diversity (OED)/Title IX Compliance – (213) 740-5086

Works with faculty, staff, visitors, applicants, and students around issues of protected class. <https://equity.usc.edu/>

Bias Assessment Response and Support

Incidents of bias, hate crimes and microaggressions need to be reported allowing for appropriate investigation and response. <https://studentaffairs.usc.edu/bias-assessment-response-support/>

The Office of Disability Services and Programs

Provides certification for students with disabilities and helps arrange relevant accommodations. <http://dsp.usc.edu>

Student Support and Advocacy – (213) 821-4710

Assists students and families in resolving complex issues adversely affecting their success as a student EX: personal, financial, and academic. <https://studentaffairs.usc.edu/ssa/>

Diversity at USC

Information on events, programs and training, the Diversity Task Force (including representatives for each school), chronology, participation, and various resources for students. <https://diversity.usc.edu/>

USC Emergency Information

Provides safety and other updates, including ways in which instruction will be continued if an officially declared emergency makes travel to campus infeasible, <http://emergency.usc.edu>

USC Department of Public Safety – 213-740-4321 (UPC) and 323-442-1000 (HSC) for 24-hour emergency assistance or to report a crime.

Provides overall safety to USC community. <http://dps.usc.edu>