



AME204: Strength of Materials

Units: 3

Spring 2024

#28724: Mon./Wed. at 2:00- 3:20 PM

Location: THH 208

Instructor: Ramtin Sheikhhassani

Office: OHE 500J

Office hours: TBD

E-mail: sheikhha@usc.edu - Include AME204 in subject
I will respond to emails within 48 hours.

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Disclaimer: This syllabus is subject to change based on the needs of the class. Verbal or written changes announced in class, are considered as an addendum to this syllabus. Students will be held responsible for all changes.

Course Description

Strength of Materials is the first course in the field of solid mechanics. Studying the properties and behaviors of materials is crucial in predicting structural failure in any industry application. This course provides principles of mechanics and their application to analyze fundamental engineering problems.

Learning Objectives and Outcomes

- Apply the concept of stress and strain deflection to various mechanical structures
- Analyze and interpret tension, shear, bending, torsion, buckling, and combined loads
- Employ a strength-based design approach
- Analyze statically indeterminate structures
- Utilize energy methods to analyze structural members
- Develop a comprehensive and methodical strategy to solve real-world engineering problems

Pre-requisite

Statics: AME 201 or CE 205.

Textbook

Beer, F., Johnston, E.R., DeWolf, J., and Mazurek, D.F. *Mechanics of Materials.*, 8th Edition

Resources

Campuswire We use Campuswire platform to post announcements, Q&A and discussions. Copies of lecture notes, and other class information will be posted on Campuswire.

Gradescope Homework assignments are submitted and graded via Gradescope. Quizzes and exams will be graded via Gradescope after a hard-copy is collected.

Blackboard Blackboard will be only used to post the overall score at the end of semester.

Technological Proficiency and Hardware/Software Required

A scientific calculator will be required.

Communication

I want you to feel comfortable asking questions and giving me feedback on the course. If you have questions or comments, please speak to me directly after class or during my posted office hours. You can also email me (sheikhha@usc.edu). I will respond to all emails within 48 hours.

Description and Assessment of Assignments

Homework

Weekly problem assignments will be delivered through Gradescope. Handwritten solutions should be scanned and submitted via Gradescope.

Late Work Policy

No late homework will be accepted. Two of the lowest grades in homework assignments will be discarded.

Quizzes

Weekly quizzes will be administered. The content will be similar to problems solved in the previous lectures, study guides, homework or reading assignments. There will be no make-up quiz for any reason. Instead, two of the lowest grades will be disregarded.

Examinations

Two midterm examinations are scheduled for the regular lecture periods. The format will be similar to the assigned homework assignments; successful completion of the assignments will be a good indicator of your success on the exams.

a. Midterm examinations:

i. Midterm 1: Ch. 1-2

ii. Midterm 2: Ch. 3,4,5,6

b. Final Examination :

The final examination will be comprehensive, covering all topics presented in the course. Extra emphasis will be placed on the material covered after the second midterm.

A respectable performance on quizzes and exams can be realized by all students if attention and energy are given to the timely completion of assigned homework problems.

Dates

Midterm dates are tentative and may change depending on how the class progresses. Any change will be announced two weeks before. The final examination date and time are set by the office of registration and cannot be changed.

	MT#1	MT#2	Final
Date	2/14	3/27	5/6
Time	2pm	2pm	2pm

Grading Breakdown

Assignments	Points	%
Homework	100	15
Quiz	100	15
Max(MT#1,#2)	100	22
Min(MT#1,#2)	100	18
Final	100	30
Total	500	100

If there is any extra-credit assignment or project it will be applied to the final exam.

Grading Scale

Course final grades will be determined using the following scale.

Grade	Total
A	93-100
A-	90-92.99
B+	88-89.99
B	83-87.99
B-	80-82.99
C+	78-79.99
C	73-77.99
C-	70-71.99
D+	68-69.99
D	63-67.99
D-	60-62.99
F	59.99 and below

The overall letter grade will be assigned within three days of grading the final. The grade letters are based on a class average performance of B. If the mean falls below the grade cutoffs of B, the grades will be curved.

Grading Dispute

Grading disputes are to be resolved within two days after returning the exam. To receive a fair grade, all the problems in the disputed exam will be regraded. The score might go up or down. In addition, no extra-credit

or curve will be applied to the disputed exam.

Additional Course Policies

Class attendance is strongly encouraged. The approach to specific subjects in the lecture might be different from the text. Students will be responsible for the methods outlined in the class.

Cellphones, laptops, tablets (except for note-taking purposes) and anything else electronic are to be turned off during class.

Final grade will depend entirely on the performance on the above components and be independent of the financial support requirements (e.g., minimum grade requirement for tuition reimbursement).

Work-related travel must be scheduled outside of the mid-term and final examinations periods. Accommodation to take exams on different dates will be made only for family emergencies, religious observance and documented illness or health-related emergencies.

DSP approved students should inform the instructor at the beginning of the semester for any requested accommodation.

Course evaluation

Two surveys will gather student opinions about the course: the mid-semester evaluation and the standard USC course evaluation survey at the end of the semester. Your opinion is valued and can make a difference in how this course is conducted; please give your honest and constructive recommendations.

Table 1: Tentative Schedule : a weekly breakdown

Date	Lecture	Principle Topics	Readings	Problem Set	Quiz
	1	Introduction Statics Review	1.1A, App A		
	2	Normal Stress	1.4,1.2A		
	3	Shear and contact stress Oblique planes	1.2BC,1.4 1.3		
	4	Strain	2.1A,2.7,2.3	HW#1	Q#1
	5	Stress-Strain Curve	2.1 BCDE		
	6	Poisson's Ratio, Shear modulus Factor of Safety	2.4,7 1.5C		
	7	Axial Members	2.1G,2.10	HW#2	Q#2
	8	Axial Members	2.1G		
	9	Indeterminate structures Thermal effect	2.2 2.3	HW#3	Q#3
	10	Stress Concentration Generalized Hooke's law	2.11 2.5, 2.8		
	11	Torsion	3.1 ABC	HW#4	
2/14		Midterm 1 Exam	1-2		
	12	Torsional members	3.1-3		
	13	Power Transmission, Thin-walled Tubes	3.4-5 3.10	HW#5	Q#4
	14	Shear and Moment diagrams	5.1-2		
	15	Bending	4.1-5	HW#6	Q#5
	16	Composite Beams & Design	4.4,5.3		
	17	Transverse Shear	6.1,6.3-4	HW#7	Q#6
	18	Thin walled members	7.6		
	19	Stress and Strain Transformation	7.1,7.7		
3/27		Midterm 2 Exam	3,4,5,6		
	20	Mohr's Circle Combined Loading	7.2-4, 8.3	HW#8	Q#7
	21	Theories of Failure	7.5		
	22	Deflection of Beams	9.1-2	HW#9	Q#8
	23	Deflection of Beams	9.3-5		
	24	Buckling of Columns	10.1-2	HW#10	Q#9
	25	Buckling of Columns	10.3-4		
	26	Energy Methods	11.1-8	HW#11	Q#10
	27	Energy Methods Plates	11.1-8		
5/6		Final Exam	Comprehensive		

*A review session will be offered for each exam. Date and time will be announced accordingly.

Table 2: Academic sanctions

Violation	USC – Recommended sanction	AME – Recommended sanction
Copying answers from other students ** on any course work	F for course	First offense: F on assignment Second offense: F for course
One person allowing another to cheat from his/her exam or assignment	F for course for both persons	If assignment: First offense: F on assignment Second offense: F for course If exam: F for course
Possessing or using material during exam (crib sheets, notes, books, etc.) which is not expressly permitted by the instructor.	F for course.	First offense: F on exam. Second offense: F for course.
Continuing to write after exam has ended.	F for course.	F on exam
Taking exam from room and later claiming that the instructor lost it.	F for course and recommendation for further disciplinary action (possible suspension)	F for course
Changing answers after exam has been returned.	F for course and recommendation for further disciplinary action (possible suspension)	F for course
Fraudulent possession of exam prior to administration.	F for course and recommendation for suspension.	F for course
Obtaining a copy of an exam or answer key prior to administration	Suspension or expulsion from the university for both students F for course.	F for course
Having someone else complete course work for oneself.	Suspension or expulsion from the university for both students; F for course.	F for course
Plagiarism — Submitting other’s work as one’s own or giving an improper citation.	F for course.	First offense: F on assignment. Second offense: F for course.
Submission of purchased term papers or papers done by others	F for course and recommendation for further disciplinary action (possible suspension).	F for course
Submission of the same assignment, to more than one instructor where no previous approval has been given	F for both courses.	F for both courses
Unauthorized collaboration on an assignment.	F for the course for both students.	First offense: F on assignment. Second offense: F for course
Falsification of information in admission applications (including supporting documentation).	Revocation of university admission without opportunity to reapply	Revocation of university admission without opportunity to reapply
Documentary falsification (e.g., petitions and supporting materials; medical documentation.)	Suspension or expulsion from the university; F for course when related to a specific course.	Suspension or expulsion from the university; F for course when related to a specific course.
Plagiarism in a graduate thesis or dissertation	Expulsion from the university when discovered prior to graduation; revocation of degree when discovered subsequent to graduation.***	Expulsion from the university when discovered prior to graduation; revocation of degree when discovered subsequent to graduation.***

*Assuming first offense

**Exam, quiz, tests, assignments or other course work.

***Applies to graduate students

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” policy. <http://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 Health Counseling Services - (213) 740-7711 – 24/7 on call

<http://engemannshc.usc.edu/counseling>

Free and confidential mental health treatment for students, including short-term psychotherapy, group counseling, stress fitness workshops, and crisis intervention.

National Suicide Prevention Lifeline - 1 (800) 273-8255 – 24/7 on call

<http://suicidepreventionlifeline.org>

Free and confidential emotional support to people in suicidal crisis or emotional distress 24 hours a day, 7 days a week.

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

<http://engemannshc.usc.edu/rsvp>

Free and confidential therapy services, workshops, and training for situations related to gender-based harm.

Office of Equity and Diversity (OED) — Title IX - (213) 740-5086

<http://equity.usc.edu>,

<http://titleix.usc.edu>

Information about how to get help or help a survivor of harassment or discrimination, rights of protected classes, reporting options, and additional resources for students, faculty, staff, visitors, and applicants. The university prohibits discrimination or harassment based on the following protected characteristics: race, color, national origin, ancestry, religion, sex, gender, gender identity, gender expression, sexual orientation, age, physical disability, medical condition, mental disability, marital status, pregnancy, veteran status, genetic information, and any other characteristic which may be specified in applicable laws and governmental regulations.

Bias Assessment Response and Support - (213) 740-2421

<http://studentaffairs.usc.edu/bias-assessment-response-support> Avenue to report incidents of bias, hate crimes, and microaggressions for appropriate investigation and response.

The Office of Disability Services and Programs - (213) 740-0776

<http://dsp.usc.edu>

Support and accommodations for students with disabilities. Services include assistance in providing readers/notetakers/interpreters, special accommodations for test taking needs, assistance with architectural barriers, assistive technology, and support for individual needs.

USC Support and Advocacy - (213) 821-4710

<http://studentaffairs.usc.edu/ssa>

Assists students and families in resolving complex personal, financial, and academic issues adversely affecting their success as a student.

Diversity at USC - (213) 740-2101

<http://diversity.usc.edu>

Information on events, programs and training, the Provost's Diversity and Inclusion Council, Diversity Liaisons for each academic school, chronology, participation, and various resources for students.

USC Emergency - UPC: (213) 740-4321, HSC: (323) 442-1000 - 24/7 on call

<http://dps.usc.edu>

<http://emergency.usc.edu>

Emergency assistance and avenue to report a crime. Latest updates regarding safety, including ways in which instruction will be continued if an officially declared emergency makes travel to campus infeasible.

USC Department of Public Safety - UPC: (213) 740-6000, HSC: (323) 442-120 - 24/7 on call

<http://dps.usc.edu>