

**AME 204 Strength of Materials**

**Units: 3**

**Spring 2025**

**Class Tuesday/Thursday—3:30-4:50 PM, MHP 101**

**Discussion: Friday —1:00-1:50 pm, MHP 101**

**Instructor: Assad Oberai**

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## 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 Brightspace.

## Required Readings and Supplementary Materials

### Required text:

F. P. Beer, E. R. Johnston, Jr., J. T. DeWolf and D. F. Mazurek; "Mechanics of Materials"; 8<sup>th</sup> 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. In-class pop quizzes.
3. Mid-term exams.
4. Final exam.

## Grading Breakdown

Assignment	% of Grade	
5-10 Pop Quiz	20	
10 Homeworks	15	
Mid-term exam 1	20	
Mid-term exam 2	20	
Final exam	25	
<b>TOTAL</b>	<b>100</b>	

## 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

	Topics/Daily Activities	Readings and Homework	Deliverable/ Due Dates
<b>Week 1</b>	Introduction	Chapter 1	HW due in one week
<b>Week 2</b>	Stress and Strain	Chapter 2	HW due in one week
<b>Week 3</b>	Axial loading (rod)	Chapter 2	HW due in one week
<b>Week 4</b>	Torsion	Chapter 3	HW due in one week
<b>Week 5</b>	Torsion (cont.).	Chapter 3	HW due in one week
<b>Week 6</b>	Bending ( <b>Midterm 02/18</b> )	Chapter 4	
<b>Week 7</b>	Bending (cont.)	Chapter 4	
<b>Week 8</b>	Analysis and design of beams for bending	Chapter 5	HW due in one week
<b>Week 9</b>	Shear stresses in beams	Chapter 6	
<b>Week 10</b>	Transformation of Stress and Strain.	Chapter 7	HW due in one week
<b>Week 11</b>	Transformation of Stress and Strain ( <b>Midterm 04/01</b> )	Chapter 7	HW due in one week
<b>Week 12</b>	Deflection of Beams	Chapter 9	HW due in one week
<b>Week 13</b>	Columns	Chapter 10	HW due in one week
<b>Week 14</b>	Energy Methods	Chapter 11	
<b>Week 15</b>	Review		
<b>FINAL</b>			Date: For the date and time of the final for this class, consult the USC <i>Schedule of Classes</i> at <a href="https://classes.usc.edu/term-20251/classes/ame/">https://classes.usc.edu/term-20251/classes/ame/</a>

## 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.usc.edu/scampus-part-b](http://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, [policy.usc.edu/scientific-misconduct](http://policy.usc.edu/scientific-misconduct).

### Support Systems:

*Counseling and Mental Health - (213) 740-9355 – 24/7 on call*  
[studenthealth.usc.edu/counseling](http://studenthealth.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*  
[suicidepreventionlifeline.org](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) 740-9355(WELL), press “0” after hours – 24/7 on call*  
[studenthealth.usc.edu/sexual-assault](http://studenthealth.usc.edu/sexual-assault)

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

*Office of Equity and Diversity (OED) - (213) 740-5086 | Title IX – (213) 821-8298*  
[equity.usc.edu](http://equity.usc.edu), [titleix.usc.edu](http://titleix.usc.edu)

Information about how to get help or help someone affected by harassment or discrimination, rights of protected classes, reporting options, and additional resources for students, faculty, staff, visitors, and applicants.

*Reporting Incidents of Bias or Harassment - (213) 740-5086 or (213) 821-8298*  
[usc-advocate.symlicity.com/care\\_report](http://usc-advocate.symlicity.com/care_report)

Avenue to report incidents of bias, hate crimes, and microaggressions to the Office of Equity and Diversity | Title IX for appropriate investigation, supportive measures, and response.

*The Office of Disability Services and Programs - (213) 740-0776*  
[dsp.usc.edu](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 Campus Support and Intervention - (213) 821-4710*

[campussupport.usc.edu](http://campussupport.usc.edu)

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*

[diversity.usc.edu](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*

[dps.usc.edu](http://dps.usc.edu), [emergency.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*

[dps.usc.edu](http://dps.usc.edu)

Non-emergency assistance or information.