

**BOSTON UNIVERSITY**  
**Department of Mechanical Engineering**  
**ME 305: Mechanics of Materials Sections A1**  
**Fall 2024**

**Instructor and Class Information**

**Instructor:**

- Dr. Xin Zhang: Professor of Mechanical Engineering
- Office: The Photonics Center, Rm. 921
- Email: [xinz@bu.edu](mailto:xinz@bu.edu)
- Phone: (617) 358-2702

**Hours:**

- Class Hours (A1): 12:20-2:05PM Monday/Wednesday (PHO 210)
- Discussions (B1&B2): 11:15AM-12:05PM, Monday (SOC B63) / Wednesday (CAS 116)
- Weekly Hours: Friday 2:00-3:00PM (in the lobby of 7<sup>th</sup> floor of PHO)

**Course Websites:**

- Blackboard: <http://learn.bu.edu>
- Gradescope: <https://www.gradescope.com/courses/845854>
- Piazza: <https://piazza.com/bu/fall2024/me305a1>

**Exams:**

- Midterm #1: October 16 (Wednesday), 12:20-2:05PM, PHO 210
- Midterm #2: November 20 (Wednesday), 12:20-2:05PM, PHO 210
- Final Exam: Date to be set by registrar—please do not make travel plans before the end of the exam period.

**Textbook:**

- Barry J. Goodno and James M. Gere, *Mechanics of Materials*, 9<sup>th</sup> ed., Cengage, 2018, ISBN 978-1-337-09334-7.

**Course Summary:**

- This course will introduce students to the theory and application of the fundamentals of mechanics of materials. The course will help enhance students problem-solving skills. After completing the course, students will be prepared for advanced courses in structural engineering. Specific learning objectives of this course are: (1) Gain a general understanding of normal and shear stresses and the relationship between stress and strain. (2) Be able to analyze axially loaded members (statically determinant and indeterminant) and determine the resulting stresses and displacements. (3) Be able to analyze members with circular cross-sections loaded in torsion. (4) Determine bending and shear stress distribution of members loaded in pure bending and transverse loads. (5) Be able to determine slopes and deflections of beams. (6) Understand the concept of stress transformation and be able to determine principle stresses and maximum in-plane shear stresses from a given state of stress. (7) Gain a general understanding of buckling and stability of columns with varying support conditions.

Week Beginning	Topics	Reading
09/04	Statics of deformable bodies	1.1-1.3
09/09	Tension, compression, and shear	1.4-1.10
09/16	Axially loaded structural elements	2.1-2.6
09/23	Torsion	3.1-3.5
09/30	Torsion	3.6-3.8, 3.11
10/07	Stresses in beams	4.1-4.5, 5.1-5.6
	10/16, Midterm Exam 1 (on Chapter1,2,3,4)	
10/14	Stresses in beams	5.7-5.10
10/21	Deflections of beams	9.1-9.4
10/28	Deflections of beams	9.5-9.7
11/04	Statically indeterminate beams	10.1-10.4
11/11	Buckling	11.1-11.5
	11/20, Midterm Exam 2 (on Chapter5,9,10,11)	
11/18	Buckling, Two-dimensional stress and strain	11.1-11.5, 7.1-7.4
11/25	Two-dimensional stress and strain	7.5-7.7
12/02	Combined loading	8.1-8.3
12/09	Combined loading	8.4-8.5

### **Grading:**

- Class attendance and participation: 10% of the final grade
- Weekly homework assignments: 10% of the final grade
- Three laboratory exercises (during the weeks of 09/16, 10/07, and 11/11): 15% of the final grade
- Midterm Exam 1 (on Chapter1,2,3,4): 17% of the final grade
- Midterm Exam 2 (on Chapter 5,9,10,11): 18% of the final grade
- Final Exam (on Chapter 1,2,3,4,5,9,10,11,7,8): 30% of the final grade

### **Teaching Assistants (TAs):**

Name	Email	Lecture	Discussion	Labs	Labs Grading	Tests Grading
Xiaohang Xie	<a href="mailto:xhxie@bu.edu">xhxie@bu.edu</a>	A1/Zhang	B1/B2/Zhang	√	√	A1/Zhang
Hongrui Zhang	<a href="mailto:h2622@bu.edu">h2622@bu.edu</a>	A2/Plummer	B3/B4/Plummer	√	√	A2/Plummer
Adedire Adesiji	<a href="mailto:aadesiji@bu.edu">aadesiji@bu.edu</a>			Lead	Lead	

### **Graders:**

Name	Email	Weekly HWs	Tests Grading
Dai Yu Lian	<a href="mailto:daiyul@bu.edu">daiyul@bu.edu</a>	A1/Zhang	A1/Zhang
April Qiu	<a href="mailto:aqiu26@bu.edu">aqiu26@bu.edu</a>	A1/Zhang	A1/Zhang

## Class Policies and Course Components

### Websites:

- Most materials (handouts, assignments, etc) will be distributed via Blackboard. Work will be submitted via Gradescope. Questions posted to the Piazza website tend to get answered very quickly.
- **Blackboard** (for handouts, assignments, etc):
  - <http://learn.bu.edu>
- **Gradescope** (to submit assignments, see grades, and grading):
  - <https://www.gradescope.com/courses/845854>
- **Piazza** (for questions & discussions, etc):
  - <https://piazza.com/bu/fall2024/me305a1>

### Class Attendance & Participation:

- We expect that if you are registered for ME305A1, you should attend class – in person if possible but online if not. Most of the course material can be found in a textbook, but not everything, and you will be tested on what is covered in class, not what is simply covered in the textbook. Generally speaking, you don't need to inform the instructor if you must miss class; however, there are ~25 lectures in the semester, and ***you will get a full 10% for attending 23 lectures (>80mins per lecture).***

### Homework:

- One of the best methods to learn the material is to read the text, pay attention in class, and work through the assigned problem sets. By working through the problem sets, you will prepare yourself for the midterm and final exams. Weekly homework will be assigned. It will be collected and graded via Gradescope. Generally speaking, any HWs submitted late will receive partial or no credits (within 24 hours, 75%; beyond 24 hours, 0%).

### Quizzes:

- Weekly quizzes will be assigned. It will *not* be collected or graded. Solutions will be discussed in class and/or posted online.

### Laboratory Materials and Excises:

- The course includes three lab exercises during the weeks of 09/16, 10/07, and 11/11. Generally speaking, any lab reports submitted late will receive partial or no credits (within 24 hours, 75%; within 48 hours, 50%; beyond 48 hours, 0%). ***Failure to turn in any one of the laboratory exercises will result in automatic failure of the course.***

### Midterm and Final Exams:

- There will be two in-class midterm exams given during the semester. The final exam will be given during the final exam period. ***All exams are closed note and closed book.*** Since the Registrar will set the date later during the semester, ***do not make travel plans before the end of the exam period.*** Make-up exams will be given only in extreme circumstances. It is your responsibility to let your instructor know as far in advance as possible of an unavoidable conflict or medical emergency.

### Discussion:

- You will need to register to one of discussion sections. Led by TAs, the discussion sections will focus on solving problems assigned for homework and other, similar problems.

### **Grading:**

- All complaints related to grading HWs must be reported to two Graders ([daiyul@bu.edu](mailto:daiyul@bu.edu) and [aqiu26@bu.edu](mailto:aqiu26@bu.edu)) **within one week** after the grades are announced.
- All complaints related to grading labs and exams must be reported to our lecture TA Xiaohang Xie ([xhxie@bu.edu](mailto:xhxie@bu.edu)) **within one week** after the grades are announced.
- Note that while graded assignments will be posted for your review, we do NOT use the Blackboard Grade Center to calculate semester grades. Ignore any interpretation of your grade based on whatever Blackboard-reported “points” that are displayed.

### **Deadlines and Late Work:**

- Deadlines help keep the class working together. Mutual respect for your group mates requires that you keep up with the course. Circumstantial uncertainty, however, suggests that we won't all keep up all the time with everything. Therefore, limited flexibility will be available for assignment deadlines on a case-by-case basis, but there will be no flexibility on requirements of those assignments.
- Generally speaking, any HWs submitted late will receive partial or no credits (within 24 hours, 75%; beyond 24 hours, 0%).
- Generally speaking, any lab reports submitted late will receive partial or no credits (within 24 hours, 75%; within 48 hours, 50%; beyond 48 hours, 0%).

### **Drop and Withdrawal Dates:**

- The last day to DROP (without a “W” grade): October 8, 2024
- The last day to WITHDRAW (with a “W” grade): November 12, 2024

### **Incompletes:**

- Incompletes will be permitted only for extenuating circumstances and must be arranged with me as soon as such a circumstance arises. This situation only pertains to assignments whose due dates have not yet passed.

### **Accommodations:**

- ***Accommodations for students with documented disabilities:*** If you are a student with a disability or believe you might have a disability that requires accommodations, please contact the Office for Disability Services (ODS) at (617) 353-3658 to coordinate any reasonable accommodation requests. ODS is located at 19 Deerfield St, on the second floor. We will make every effort to accommodate such requests but (a) please notify your instructor at the beginning of the semester if you’ve received approved accommodations in previous semesters (even if you haven’t received your paperwork for this semester yet!) and (b) provide at least one week’s notification prior to each exam so we can make the necessary arrangements.
- ***Religious accommodations:*** We are aware of and in agreement with Boston University’s Policy on Religious Observance, whereby absences for any religious beliefs are understood and missed assignments on such occasions will be given a chance to be made up. We require notification at least a week in advance, particularly if an accommodation must be made, for such occasions.

### **Ethical Responsibilities:**

- Cheating on homework, exams, lab reports, or any form of assignment, may be a form of plagiarism and is an infringement of every code of engineering ethics. Plagiarism is a serious academic offense and should not be taken lightly. Understanding your ethical responsibilities is an integral part of becoming a professional. A copy of the Code of Ethics of engineers, promulgated by the Accreditation Board for Engineering and Technology (ABET) and the National Society of Professional Engineers can be found on the main course web site. Please recall that when you enrolled at Boston University, you agreed to an Academic Honesty Pledge. The Academic Conduct Code details your responsibilities as well as the results of code violations, and is posted at: <https://www.bu.edu/academics/policies/academic-conduct-code/>