

ME 305: Mechanics of Materials

Spring 2020

Instructor and Class Information

Instructor: Dr. Harold Park, Professor of Mechanical Engineering

Office: 730 Commonwealth, ENA 212 (this building is directly above CVS).

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Phone: (617) 353-4208

Office Hours: Th 11-12, other times available via appointment (email preferred)

Class Hours: TTh 9:00-10:45 AM

Classroom: EPC 209

Prerequisites: EK301

Course Website: Blackboard (<http://learn.bu.edu>)

Midterms: Tentatively on Thursday, February 20 and Thursday, April 2

Labs: Tentatively the weeks of February 3 (Tension), March 2 (Torsion) and April 6 (Bending)

Final Exam: Tentatively Wednesday, May 6 from 9-11 AM in EPC 209 - this may change to Monday, May

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TA Information

Lingxiao Yuan (lxyuan@bu.edu)

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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 indeterminate) 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.

Textbook

Mechanics of Materials by R.C. Hibbeler, 10th edition, Pearson 2016

Class Policies

- I expect that if you are registered for ME 305, you should attend class. 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. Tuition at B.U. is expensive, so make the most of your time and money by taking advantage of all the resources you are paying for! We also expect that you will do your best to pay attention during class. You will have a busy schedule with many academic (and social) demands, so it's understandable that paying attention 100% of the time can be a difficult task. However, I do ask that you not distract your peers if your attention starts to wander. Please ignore all forms of non-approved (!) electronic communication temptation (texting, email, web surfing, etc) and turn off your cell phone during class. If you find that we are going over material too quickly or you do not understand something crucial, don't hesitate to ask questions during lecture. For shorter questions, see your instructor or GTF outside of class.
- Homeworks will be assigned each week. Homework problems should be well-organized with labeled free body diagrams, while demonstrating a clear flow of thought and worked-out steps. Homework problems will be graded on a 10/7/0 scale. A score of 10 indicates that you worked through the entire problem and came to a correct or mostly correct solution. A score of 7 indicates that you made a solid attempt and a 0 will be given for a minimal attempt or lack thereof.
- All discussion sections are open to any student enrolled in the course. The discussion sections will focus on solving problems assigned for homework and other, similar problems.
- If you must miss class, see a classmate to obtain the class notes. If, after reviewing the material you have missed, you have questions, see the instructor during office hours and/or teaching fellow during discussion sections to get your questions answered.
- All complaints related to grading labs, projects and exams must be reported to the instructor within one week after the grade for the assignment is posted on Blackboard.
- There will be three laboratories in the course.
- **Late assignments of any type (homeworks, labs) will not be accepted and will receive a zero.**

Active Learning in ME 305

ME 305 will be run using a format that is similar to that used in EK 301. My hope is that this new format will better help you learn the material. Periodically throughout each lecture, you will work in 2-4 person groups on example problems.

You will typically be given about 15 minutes to solve each example problem. The faculty and GTFs will circulate around the room to provide assistance if necessary, so don't hesitate to ask for help! At the end of the exercise the lecturer will review the work and highlight correct steps and common mistakes. The goal is to provide you with immediate feedback on your comprehension of the material, rather than have you wait several weeks for your graded assignments to be returned.

You will NOT be graded on the quality or correctness of your work, but don't be surprised if your group's work gets presented to the class during the feedback portion. However, since the feedback portion is as important as your work effort, you should show all the steps you followed to the solution, even if you're not sure if they're correct. Just try to be as systematic and orderly as possible so we can make sense of your work.

Academic Conduct

- Students must follow the COE Academic Conduct Code, which is found in the COE Undergraduate Student Handbook (<http://www.bu.edu/academics/eng/policies/academic-conduct/>). Any violation of this conduct code will be reported to the COE Academic Conduct Committee.
- Plagiarism is discussed briefly in the conduct code. However, for several reasons, this subject warrants additional emphasis. In engineering, just as in humanities, science, and social science disciplines, plagiarism is unacceptable. Plagiarism is theft of another person's ideas and is a punishable offense in the same way that any form of theft is an offense. Plagiarism harms the individual whose ideas have been stolen. Original thought is highly valued in engineering and is expected from students in this course in preparing and completing all course assignments.
- Quizzes, Midterm and Final Exams: These assignments are to be completed by each student individually with no consultation with any other person other than the proctor.
- Homework and Lab Reports: Students are permitted to consult with each other regarding approaches to solving problems in these assignments. However, everything that is written down and turned in must be authored by the student getting credit for the assignment, and any sources that were consulted while completing the assignment must be referenced. For example, if you consult with another person in preparing one section of a laboratory report, you should write "Consulted with <person's name> in preparing this section" in that section of the report. Similarly, if you consult with a textbook other than the course text or a webpage, acknowledge this in writing in the relevant section of the report or project.

Approximate List of Topics to be Covered

Stress, strain, mechanical properties of materials, axial loading, torsion, bending, transverse shear, stress transformation, deflection of beams and shafts, buckling

Grading

- Homeworks: 2.5%
- Labs: 20%
- Midterm 1: 25%
- Midterm 2: 25%
- Final exam 27.5%: