Engineering Mechanics II

Department of Mechanical Engineering
Boston University

Welcome to ENG ME 302: Engineering Mechanics II! This document will be your roadmap throughout the semester. It contains valuable information regarding the course's goals, resources, and expectations. Please read this document carefully and refer back to it often throughout this semester.

As we all know, this semester will look different than prior semesters. It is my hope that the Learn from Anywhere model will actually help enhance your learning experience. However, I understand that we will have to be more flexible this semester as things may not go as intended. Updated versions of this document will be posted throughout the semester.

Description

Engineering Mechanics II investigates dynamics, which is the subfield of mechanics that deals with the motion of bodies, the forces causing their motion, and the forces caused by their motion. The main goal of this course is to provide an introduction to the science, skill, and art involved in modeling mechanical systems to predict their motion. The concepts studied in this course are necessary to understand, analyze, and design mechanisms and machines, and they are also fundamental to the study of biomechanics, robotics, and vehicles, along with many other interesting subjects.

This is the course that made Prof. Khurshid decide to major in mechanical engineering when she was an undergraduate student. She hopes you enjoy it as much as she did!

Teaching Team

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Course Websites

Blackboard Learn: ME302 will use Blackboard to host video lectures, quizzes, and to post announcements, handouts, and some lecture materials. We'll also use Blackboard for extensive online Q & A.

Have any questions about the class? Post to Blackboard! You may even post questions anonymously to your peers. If you send us a question relating to the course material via email, we'll ask you to repost it on Blackboard. We also encourage you to answer posted questions and improve existing answers. Actively participating in Blackboard will have a positive influence on your end-of-semester grade if your numerical score falls at the border between two grades.

Gradescope: Homework assignment (except for Matlab assignments), in-class assignments, and exams will be graded using Gradescope. Students will be responsible for uploading their assignments on Gradescope by all stated deadline

Office Hours (Update)

Javier and I will hold office hours every week. Please fill out this when2meet form https://www.when2meet.com/?9613664-EGptT to help us schedule office hours that work well for your schedules. Please fill the poll out with your general availability, not just your availability for the week shown in the doodle poll. For example, if you have a meeting at 2pm next Wednesday, but will typically be free on Wednesdays at 2, please mark that time as available. We want you to come to office hours to ask questions and discuss course topics with us!

Credit

This class is four credit hours. It is required for all Mechanical Engineering students and is typically taken in the sophomore or junior year. ME minors and students in other majors are welcome to take this class, provided they have satisfied the pre-requisites.

Pre-Requisites

To enroll in ME 302, you should have already taken ENG EK 301: Engineering Mechanics I or its equivalent. This means that you have also completed CAS PY 211, CAS MA 225, and ENG EK 127. ME 302 will build on each of these courses. If you have doubts about your preparedness for the course, please co.

Lectures

Each ME 302 will have lectures two times per week. Professor Khurshid will teach Section A1 on Tuesdays and Thursdays from 3:30 pm-5:15 pm in the School of Theology (STH), Room B19.

The classroom can only fit 15 students. Video lectures will be recorded and posted online. You must watch the videos and take the corresponding quiz prior to starting each class.

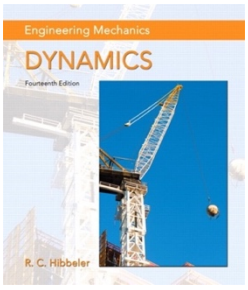
The plan is to work many examples during lectures. The goal would be to have a student in the classroom work with remote partners. Many students will be in a timezone where they cannot attend the lectures live. These students will be asked to complete the in-class exercises in groups on their own time.

Discussions

Discussions are an important time for you to actively engage with the course material. Given the Learn from Anywhere Model, we will work together to figure out the most productive way to use the discussions.

Javier will lead the discussion on Fridays from 3:35 pm - 4:25 pm in the Epic, Room 207.

Textbook and Mastering Engineering



ME 302 will use the textbook **Engineering Mechanics: Dynamics, Fourteenth Edition** by R.C. Hibbeler, published by Pearson.

We have placed four copies of the textbook on course reserves at the Engineering Library. You may borrow one book for up the 2 hours at a time (we can change this window to 24 hours, based on your feedback).

Course Requirements and Evaluation (update)

Your grade in this class will be determined as a weighted combination of your performance in the following areas. The weights may be altered as the semester progresses.

15% Quizzes

There will be a quiz due before the start of every class, unless stated otherwise. These quizzes are meant to ensure that you are watching the posted videos and absorbing the material.

All stated deadlines are firm.

10% Laboratory Exercise

There will be two lab exercises. Details will be given later in the semester.

15% In-Class Assignments and Book Problems

In-class assignments and book problems will be turned in using Gradescope. These will mostly be graded using a rubric which will be posted on Gradescope. While getting the correct answer is important, the goal of the rubric will be to reinforce good problem-solving habits. However, I retain the right to change the grading standard if I do not believe sufficient effort is being put into the assignments.

20% Exam 1

October 8

20% Exam 2

November 12

20% Exam 3

During Finals

Academic Ethics

> "Engineering is an important and learned profession. As members of this profession, engineers are expected to exhibit the highest standards of honesty and integrity. Engineering has a direct and vital impact on the quality of life for all people. Accordingly, the services provided by engineers require honesty, impartiality, fairness, and equity, and must be dedicated to the protection of the public health, safety, and welfare. Engineers must perform under a standard of professional behavior that requires adherence to the highest principles of ethical conduct."
>
> - *National Society of Professional Engineers*

All students are expected to act with civility, personal integrity, respect other students' dignity, rights and property; and help create and maintain an environment in which all can succeed through the fruits of their own efforts. An environment of academic integrity is requisite to respect for self and others and a civil community.

All students in this course must follow Boston University's Academic Conduct Code (https://www.bu.edu/academics/policies/academic-conduct-code/). Sanctions for breaches in academic integrity may range, depending on the severity of the offense, from an "F" grade on an assignment or test to an "F" in the course. Severe cases and/or repeat offenses of academic dishonesty may

also result in more severe disciplinary sanctions up to and including suspension or expulsion.

To help you understand the meaning of academic integrity in this class, the teaching team will attempt to provide very clear explanations of what types of activities are allowed and disallowed on each assignment. You also need to ask questions whenever you encounter or observe potentially ambiguous situations. As far as practicable, we will also try to avoid academic procedures that create temptations to violate the Code of Academic Conduct.

The teaching team understands that solution manuals and individual problem solutions are freely available online and from peers. Students sometimes use these resources to expedite or circumvent the completion of take-home assignments, which is not fair to the rest of the class. Simultaneously, we believe that homework problems offer a fundamentally important learning opportunity for students: you can learn to solve challenging dynamics problems only by grappling with new problems that you haven't already seen worked out. The teaching team is committed to helping your through the sometimes-frustrating process of learning new and difficult material. It is always better to come to office hours, as opposed to checking the solutions manual for the next step, when you get stuck. You will demonstrate your ability to independently solve problems on the course's three exams.

Disability Accommodation

If you have a physical or learning disability that we should be aware of, please arrange for individual consultation with the professor of your section to discuss accommodation. Students entitled to additional time and/or an alternative location during in-class exams need to coordinate with the BU Disability Services to make these arrangements.

Statement of Student Wellbeing

Diminished mental health, including significant stress, mood changes, excessive worry, or problems with eating and/or sleeping can interfere with optimal academic performance. The source of symptoms might be strictly related to your course work; if so, please speak with us. However, health issues, problems with relationships, family worries, loss, or a personal crisis can also contribute to decreased academic performance.

Boston University provides mental health services to support the academic success of students. BU offers a variety of resources that you should be aware of in the event that you or a friend need additional support. Those seeking free, confidential mental health counseling can contact Student Health Services Behavioral Medicine (p: 617-353-3569, w: http://www.bu.edu/shs/behavioral-medicine). Behavioral Medicine can help to support both better general mental wellness, as well as during psychiatric emergencies 617-353-3549. Students should as note that Center for Psychiatric Rehabilitation offers a variety of free and paid programs, including LEAD BU, a free course focused on

developing well-being, academic, and interpersonal skills. (p: 617-353-3549, w: http://www.cpr.bu.edu). Other BU resources include the Danielsen Institute (617-353-3047), and the Center for Anxiety & Related Disorders (617-353-9610).

In the event we suspect you need additional support, we will express our concerns and the reasons for them, and remind you of resources that might be helpful to you. It is not our intention to know the details of what might be bothering you, but simply to let you know we are concerned and that help, if needed, is available.

Getting help is a smart and courageous thing to do -- for yourself *and* for those who care about you.

Schedule

The tentative course schedule is listed below.

Week	Course Meetings	Topics	Reading
1	September 3	Particle Kinematics	12.1—12.3
2	September 8, 10	Particle Kinematics	12.4, 12.5,12.7, 12.8
3	September 15, 17	Particle kinetics: Newton's second law for a particle and system of particles	13.1—13.6, 12.6
4	September 22, 24	Particle kinetics: work and energy for a particle and system of particles	14.1—14.6
5	September 29, October 1	Particle kinetics: impulse and momentum for a particle and system of particles	15.1—15.7
6	October 6, 8	October 6: Flex/Review Exam 1: October 8 *Last day to drop a class without a 'W" is October 7	
7	October 15	Planar kinematics of rigid bodies	16.1—16.8
8	October 20, 22	Planar kinematics of rigid bodies	16.1—16.8
9	October 27, 29	Rigid body kinetics: Newton's second law	18.1—18.5

Week	Course Meetings	Topics	Reading
10	November 3, 5	Rigid body kinetics: work and energy	18.1—18.5
11	November 10, 12	November 10: Review November 12: Exam 2	
12	November 17, 19	Rigid body kinetics: impulse and momentum	19.1—19.4
13	November 24	Rigid body kinetics: impulse and momentum	19.1—19.4
14	December 1, 3	Mechanical vibrations	22.1-22.6
15	December 8, 10	Mechanical vibrations	22.1-22.6