

ENGS 211: Statics & Materials Testing Fall 2024

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Office Hours: M/F 1:00-2:00, W 10:00-11:00, or by appointment

Prerequisites: PHYS 201

Course Materials:

Required Books:

- Moore, J et al. Mechanics Map Digital Textbook.
[https://eng.libretexts.org/Bookshelves/Mechanical_Engineering/Mechanics_Map_\(Moore_et_al.\)](https://eng.libretexts.org/Bookshelves/Mechanical_Engineering/Mechanics_Map_(Moore_et_al.))
- Roylance, D. Mechanics of Materials.
[https://eng.libretexts.org/Bookshelves/Mechanical_Engineering/Mechanics_of_Materials_\(Roylance\)](https://eng.libretexts.org/Bookshelves/Mechanical_Engineering/Mechanics_of_Materials_(Roylance))

Course Overview: A detailed study of vector forces and space, scalar mass and time, including the following concepts from an engineering structures perspective: equilibrium, free-body diagrams, moments, couples, distributed forces, centroids, moments of inertia, analysis of two-force and multi-force members, and quantitative analysis of stress, strain, and modulus values.

Course Format: This course will use a flipped classroom. You will be expected to review recorded lectures and other content on an assigned topic prior to each class meeting. In-class, we will do things like address misunderstandings and questions you have, review homework, and practice applying the content introduced prior to class. Your preparation ahead of class time and engagement in class are essential for your success in the course.

Learning Outcomes: Upon completion of this course, successful students will be able to:

1. Draw free-body diagrams
2. Formulate and solve the equations of equilibrium
3. Analyze simple structures utilizing vector component notation, including articulating an
4. equilibrium solution.
5. Identify and measure basic mechanical properties of materials, including Bulk and Young's
6. modulus, hardness, and ductility.
7. Understand stress and strain in a solid
8. Analyze bodies experiencing tensile and shear stress
9. Analyze beams experiencing bending

Expectation: Students are expected to put in a minimum of 12 hours/ week of work in order to successfully complete this course.

Academic Integrity: Maintaining academic integrity is a mutual responsibility for all of us. I will be respectful of your time and make sure I am available during my office hours and will communicate with you in a timely manner. I expect the same in terms of your timeliness, honesty and sustained effort. Plagiarism and cheating are unacceptable and also violate RC policies. Refer to the “Academic Integrity” page on the RC website–
https://www.roanoke.edu/inside/a-z_index/academic_integrity
Included here is an explanation of how violations of the College’s academic integrity policy are handled.

Grading: Grades for this course will be based on homework assignments, in-class assignments and participation, quizzes, and exams.

Homework	10%
In-class work, participation	10%
Quizzes	10%
Lab	25%
Unit Exams (3x)	30%
Final Exam	15%

Points	Grade	Points	Grade
<60	F	77-79	C+
60-62	D-	80-82	B-
63-66	D	83-86	B
67-69	D+	87-89	B+
70-72	C-	90-92	A-
73-76	C	≥93	A

Homework: There will be at least one homework set each week (often every day), consisting of problems from the lectures given during the week. The homework sets will be given in class. Homework is due at the beginning of class on the assigned due date. See the late work policy below for more details.

Homework Assistance: Homework is assigned to provide you with additional structured practice solving the types of problems that you will encounter on exams. If you get stuck on a problem, you should get help learning to solve the problem prior to the due date so that you will be better prepared for the next exam. Copying an answer from another student, an artificial intelligence platform (e.g., ChatGPT), or another source may help you get the right answer on the homework but it will not prepare you for exams.

In-Class Problems and Participation: You will also be required to complete problems assigned in class. Participation in class discussions is also an important aspect of learning the material.

Quizzes: Quizzes will be assigned periodically throughout the term. They will be conducted in class, typically at the beginning, and cover material from the most recent week or chapter.

Late Work: Please note that for all assignments a total of 50% will be deducted after one week past the due date. After two weeks past the originally-assigned due date, no credit will be awarded for the assignment.

Exams: There will be three exams during the semester. Each exam will cover the material listed on the syllabus or as informed by me in class. See the class schedule at the end of this handout.

Final Exam: Yes, there will be a final exam at the end, and it is cumulative. It is an in-class exam scheduled for 2:00 to 5:00 pm on Tuesday December 6th.

Make-up Exams: Make-up exams will only be allowed as a result of a discussion with me beforehand or a note related to the emergency (death, hospitalization, misdemeanor, etc.) signed by a governing official (medical doctor, parent, law enforcer, etc.).

MCSP Colloquium Series: You are required to attend at least 2 of the several talks as a part of the MCSP colloquia this semester. You have to write up a paper on your reflections of the talk to get full credit (2 points) The reflection papers are due within one week of the talk. MCSP credits will be factored in while determining the final grade. This particularly helps students who are on the cusp of a letter grade.

Participation: What it means to “participate” in ENGS 211 includes the following: demonstrating familiarity with video lectures reviewed prior to class, active engagement in class (e.g., asking/answering questions, working on practice problems), reflective write-up for one extracurricular lecture or presentations, and responsibility for your own learning (office hours, etc.).

Attendance: Students are required to attend every class. Your attendance will be recorded each lecture period. If you show up more than 10 minutes late, you will be marked absent. Any unexpected absence due to health reasons/emergency situation/participation in a conference or sporting events representing the College should be supported by proper documentation such as doctor’s note, court order, and schedule of conference/sports events. You will need to inform me prior to the absence or within 48 hours of such an absence to be considered as excused. It is best to inform me about your absence in person. Emails and phone voice messages are not very reliable. It is your responsibility to make up for the work that you missed. I will not extend the deadline for turning in homework or other work assigned in the class unless you have my prior approval.

Class Disruption: All students are entitled to a professional learning environment. Students should not act in a manner which will distract and disrupt the class learning experience. Such practices will not be tolerated. Cell-phones or any other electronic communication/entertainment devices, except for tablets/laptops used for taking notes, must be either turned off or silenced at all times during the lecture period.

Class Schedule: Refer to the table below