

ENGS 301L: Statics & Materials Lab

Fall 2022

Instructor: Dr. Truong Le (he,him,his)

Office: Trexler 266B

Email: tle@roanoke.edu

Credits for the course: 1

Lectures Time: T 8:30-11:30 am

Lectures Room: Trexler 273

Class Environment: I consider this classroom to be a place where we will treat one another with respect, creating an environment that welcomes individuals of all ages, backgrounds, beliefs, ethnicities, genders, gender identities, gender expressions, national origins, religious affiliations, sexual orientations, ability and other visible and nonvisible differences. All members of this class are expected to contribute to a respectful, welcoming and inclusive environment for every other member of the class. I will gladly honor your request to address you by an alternate name or gender pronoun. Please advise me of this preference early in the semester so that I may make appropriate changes to my records. To minimize distraction, please put your cell phone to silent mode before the lectures. The instructor has the right and the authority to expel anyone who disrupts the lecture or behaves inappropriately at any time.

Office Hours: MWF (10-12 pm), and by appointment. Office hours can be live face to face or zoom (<https://roanoke-edu.zoom.us/j/84574957578>)

COURSE DESCRIPTION In this lab you will assemble apparatus, gather data, and analyze the data. The apparatus will be chosen to test different engineering concepts and structures including: friction, equilibrium of forces, distributed forces, analysis of two-force and multi-force members, tension, compression, and different truss configuration. Hence, the lab part of the class will be somewhat independent of the lecture part of class.

GENERAL EDUCATION OBJECTIVES: This course is designed to help students understand the processes engineers employ when presented with a problem or a proposed solution to a problem. Because engineering requires critical skills of observation, measurement, and communication of experimental results, this course includes a significant hands-on laboratory component. Student understanding of engineering processes will be measured through a specific laboratory exercise, and student work on this exercise will be assessed with a rubric that focuses on the process of scientific investigation.

SUPPLIES You will need the following:

- A non-red writing instrument
- A decent scientific calculator.

DAILY PROCEDURES At the beginning of most labs, I'll hand out a set of instructions for the day's lab. You and your group will take measurements, fiddle with equipment, and perform calculations. At the end of the lab session, you will show me what you've learned in one of four ways:

1. The majority of labs will end with
 - (a) a short quiz for you to demonstrate your learning. You will *not* work together on the quizzes. You will be able to use your handouts (unless otherwise specified).
 - (b) a demonstration that you have successfully build a testing device to test a particular concepts or structures.
2. Occasionally you'll turn in fill-in-the-blank reports, where you write responses to questions on the actual lab handouts. You may need to add your own graphs or data tables. Your group should turn in a single report best representing the views of the group as a whole.
3. Potentially some labs may require a semi-formal lab report. I'll give you a handouts about these as needed. Your group should turn in a single report best representing the views of the group as a whole.

I'll tell you each week which of these you'll do. You should plan to turn in your work by the end of the lab period. (Occasionally, you will need to finish it up and turn it in a couple of days later.)

EXAMS AND GRADES There are no lab exams for this class. Each lab will be graded on a scale of 0 to 10. Getting a score of 10 is difficult: Your lab report must be flawless. Getting a score of 9 is much less difficult: You must finish all activities, but your report may have one or two minor flaws. Scores below 9 result from anything beyond minor flaws, or many minor flaws.

POLICIES

1. **Attendance: I do not offer make up labs.** Attendance is mandatory. NO make-up labs will be offered at the end of the semester; one lab will be dropped. This is intended to cover all possible reasons you might need to make up a lab, including absences or poor grades. If you miss more than one lab your grade will almost inevitably suffer.
2. **Cheating:** Honesty is of primary importance in scientific work. You should **ALWAYS** report what you actually observe, whether it agrees with what you expect to observe or not. **Lab reports with dishonest representation of observations will be given a negative score, no matter the quality of the rest of the report.** It is much better to honestly report data that is not what you want than to change the numbers to fit your expectations or some formulas.
Any indication of cheating will result in a grade of "0" for the lab or quiz. A second violation the student will be forwarded to the Dean of Students and may receive an F in the course, indicating failure of the course due to academic dishonesty (see the Colleges AI policies).
3. **Accessible Education Services (AES):** located in the Goode-Pasfield Center for Learning and Teaching in Fintel Library. AES provides reasonable accommodations to students with documented disabilities. To register for services, students must self-identify to AES, complete the registration process, and provide current documentation of a disability along with recommendations from the qualified specialist. Please contact Becky Harman, Assistant Director of Academic Services for Accessible Education, at 540-375-2247 or by e-mail at aes@roanoke.edu to schedule an appointment. If you have registered with AES in the past and would like to receive academic accommodations for this semester, please contact Becky Harman at your earliest convenience to schedule an appointment and/or obtain your accommodation letter for the current semester.
4. **Food and Drink:** You may have a drink in this class only if it is in a completely sealed container. The container may be unsealed only while you are actively drinking the fluid. Solid food must stay well away from any equipment, such as on another table or a window ledge.

Lab Calendar - Fall 2022

- Week 1 - No Class
- Week 2 - Measurements and errors
- Week 3 - Determine the statics coefficient of friction
- Week 4 - Determine the kinetic coefficient of friction
- Week 5 - Determine the force strength of a beam (tension/compression) (ice-cream stick)
- Week 6 - Build a truss configuration and determine its breaking load
- Week 7 - Determine a force of a tension (horizontal beam) on a flat surface
- Week 8 - Determine a force of a tension (forward angle beam) on a incline plane surface
- Week 9 - Determine a force of a tension from a multiple pulleys
- Week 10/11 - Project 1: Pick a truss configuration and build a bridge and test it breaking load
- Week 12/13/14 - Project 2: May use up to two truss configurations to create an applicable structure with material efficiency and determine its broken load (hanging truss over a cliff).

I have read and understood this syllabus. Sign, date, and submit this syllabus for 10 points toward your first lab grade.

Student's signature:

Date: