SUNY Geneseo
Department of Physics and Astronomy
Class: MWF 12:30 -1:20 pm; ISC 229
Web: www.geneseo.edu/~pogo

Dr. Pogo
Online Office Hours: MTW 8:30; MW 9:30; T 12:30; M 1:30
Online Office Hours Link: https://discord.gg/GjkWREU
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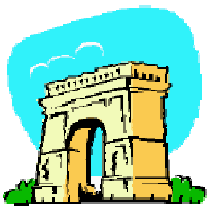
Applied Mechanics

(Phys 313)

Fall 2025



What am I doing here? At the end of this course, you will be able to: analyze structural engineering problems (beams, cables, and trusses) in a simple and logical manner; use the concepts of stress and strain in structural members experiencing tension, compression, shear, bending, and twisting to evaluate the possibility of their failure; and use Mohr's circle and the Von Mises stress to ensure that your analysis is performed from the appropriate perspective. The first part of the course focuses on the analysis of "rigid bodies" in equilibrium. The second part of the course focuses on structures made of "real" materials having elasticity and finite strength.

There are two textbooks for this class: *Vector Mechanics for Engineers – Statics*, by Beer, Johnston & Mazurek (McGraw Hill, any edition), and *Mechanics of Materials*, by Beer, Johnston et al. (McGraw Hill, any edition). These books will be used in the first and second parts of the course, respectively.

Hey! Why are there *two* books? This material is typically presented in two different courses at engineering schools, and these are the texts for those courses. We will cover chapters 1 through 7 of *Statics*, and 1 through 9 of *Materials*. Both books have great example problems and illuminating text. If you are planning on a career in mechanical, civil, or environmental engineering, I strongly recommend that you purchase and keep both books, even after the semester ends.

How will I be graded? Your grade will be determined by:

Assignments:	30%
Bridge Competition:	10%
Exams (4 exams):	60%
	100%

Each of the four exams (including the "final") will cover the specific material from the weeks preceding it. However, all of the exams are effectively cumulative for the course, since you cannot master the material for the second exam unless you understand the material from the first (and so on). Really.

For this course, using online homework solutions is considered academic dishonesty. Students must not turn in homework problems that someone else has solved or solutions they find online. At best you will not receive credit for the homework; at worst you will be charged with academic dishonesty.

The bridge competition will be held in Newton 204 beginning at 3:45 pm on Thursday, December 4, 2025.

Can I do written homework on Post-it notes? Are you kidding? In the real world, neatness counts, and it counts in this class, too. The main purpose of the (rare) written assignments is *professionalism*. More information concerning written homework can be found on the reverse side of this syllabus. Take it seriously!

When are the tests? Here is a **tentative** schedule of exams. Exams #1 through #3 are currently scheduled as 50 minute "in class" exams. If the entire class (including Dr. Pogo) agrees, then any exam time, date, or length can be changed (to a two hour evening exam, for example). Such changes will not affect the exam questions itself. In any case, the time limit for exams #1 through #3 will not exceed two hours.

Exam #1: Friday, September 19, 2025 (chapters 1 through 5 of *Statics*)
Exam #2: Friday, October 17, 2025 (chapters 6 through 7 of *Statics*)
Exam #3: Wednesday, November 12, 2025 (chapters 1 through 3 of *Materials*)
Exam #4: Friday, December 12, 2025; Noon - 2:30 pm (chapters 4 through 9 of *Materials*)

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Written Homework Rules

The entire point of having written assignments is to help you improve your professionalism. Therefore, unlike the CAPA portion of each weekly assignment, your grade will be primarily based on factors other than whether you get the right answer.

1) Use exactly 8½ × 11 inch paper. I will measure it with a ruler. Do not use spiral ring paper.
2) Use only one side of each sheet.
3) Put your name on the top of every sheet. Put the assignment number on the top of the first page (e.g., "Applied, Assignment #3).
4) **Staple** all your sheets together. Paper-clips and torn corners are not permitted.
5) Clearly and systematically indicate what is given, and what is sought.
6) Work must progress linearly down the page. If your solution initially meanders around the page, I expect you to **recopy your solutions**.
7) Type your work. Use correct notation: italics only and always when needed, subscripts as appropriate, equations in standard textbook form (not in "Mathematica" code), etc. The symbol ":=" is (now and for the rest of your professional life), unacceptable for written work, along with other "computational" notation ("^", "E", "*", etc.).
8) Draw and use Free Body diagrams as appropriate for all problems. Define and use coordinate systems. Specify your choice of "free body". Label your forces.
9) **Define your symbols**, and **use subscripts**. Not all forces can be called "*F*", not all tensions can be called "*T*", and not all normal forces can be "*N*". Every symbol must be unique and clearly defined. Make a list or table of relevant symbols and their values when this will help me to understand your solution.
10) Do not even bother to submit nonsensical results (e.g., a negative tension in a chain or rope).
11) **Use words** and/or pictures to clarify your method of solution and your symbol definitions.
12) Solutions should be symbolic… don't use your CAPA generated values until the very last step (and often, not even then). Include the initial fundamental formulas, but don't show every step of intermediate algebra. If, for some unusual reason, your solution uses actual numeric values, show no more than 4 significant figures, and include units.
13) Box your answers.
14) Plots should be professional and no smaller than 3 × 4 inches. Do not use default font sizes, default trendline formatting (where every variable is apparently an *x* or a *y*), default line widths, default colors, etc. No decision should be made by Excel or Mathematica. Axis names should include units.

What if I have trouble with the homework? Come see me during office hours on Discord, and I'll try to point you in the right direction. You must bring a paper copy of your homework assignment (not just your "answers"). Also, I know that most of you will work in groups, and I won't attempt to stop it. However, the learning is in the doing. Nobody on this planet learns from copying somebody else's work, no matter how clear or correct it is. Every part of every problem that you let somebody else do for you is something that you are deciding that you just don't want to learn. You will not have their help on exams!

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Learning Outcomes:

At the end of this course, students will:

- Be able to analyze rigid structural engineering problems consisting of beams, cables, and trusses in a simple and logical manner
- Be able to evaluate the possibility of failure due to tension and compression in structures made of elastic materials of finite strength
- Be able to evaluate the possibility of failure due to torsion in structures made of elastic materials of finite strength
- Be able to evaluate the possibility of failure due to bending in structures made of elastic materials of finite strength
- Be able to evaluate the possibility of failure due to shear in structures made of elastic materials of finite strength
- Be able to use Mohr's circle and the "von Mises stress" to combine the above effects in 2D and 3D, respectively, to ensure that your failure analysis is performed in the correct coordinate system.

Also, the college provides information at the following URL relating to a variety of topics:

https://sunygeneseo.sharepoint.com/sites/provost/sitepages/syllabus%20resources%20related%20to%20student%20success/syllabus-resources-related-to-student-success.aspx?web=1