

How to be Successful in Foundations of Physics I (PHYS 2305)

Foundations of Physics I (PHYS 2305) is an introductory, “**weed-out**” class designed to challenge students in difficult science-based majors to determine if students can really handle the course work of their engineering or hard-science major. Students majoring in engineering or a hard-science, such as Chemistry, Physics, or a type of Geoscience, are required to take PHYS 2305. Students majoring in engineering typically take PHYS 2305 during their spring semester of their freshmen year. Students majoring in a hard-science typically take PHYS 2305 during their fall semester of their sophomore year. The material covered in PHYS 2305 includes **classical mechanics** and **thermodynamics** and some of the concepts are taught using calculus. Therefore, **MATH 1205** is a prerequisite for PHYS 2305. There are three parts of the PHYS 2305 class. These parts include **physics lecture**, **lab**, and **recitation** sessions.

The Physics Lecture Session

The lecture session of the class meets three times a week, Monday, Wednesday, and Friday, for fifty minutes. The lecture session of the class can also meet twice a week, Tuesday and Thursday, for one hour and fifteen minutes. All lecture sessions meet in **Hahn North 130**. The lecture session is taught by an instructor or a professor in a large lecture hall and consists of around one-hundred students. During the lecture, the instructor or professor goes over the material that: (1) the students took a weekly prelecture quiz on and (2) students read in the textbook prior to class. The instructor or professor will write notes on the board or use PowerPoint slides, depending on his/her teaching style. The instructor or professor will also work out example problems and instruct students to answer iClicker questions.

Work for the lecture part of the class includes weekly online homework on **Mastering Physics**, weekly **pre-lecture quizzes**, in-class **iClicker** questions, tests and a final. Typically, weekly Mastering Physics homework is due on Fridays at midnight and weekly pre-lecture quizzes are due on Mondays at 8am. The tests and final are common-time. This means every PHYS 2305 student will take the tests and the final at the same time but in different class rooms. Tests take place on Fridays at 7pm-9pm and the final will take place during the last week of the semester.

The Physics Lab Session

The lab session of the class meets any day, once a week for one hour and fifty minutes. All lab sessions meet in **Hahn North 103**. The lab session class is taught by a TA and consists of about twenty students. In the lab sessions, you work with a lab partner. Lab partners rotate every lab session. At the beginning of the lab, students turn in their pre-lab assignments and the TA briefly goes over how the lab exercises should be performed. During the lab, the TA answers any questions about how exercises should be performed and how to complete problems on the post-lab assignment. At the end of the lab, students print out any graphs that go along with the day’s lab exercise and turn in their completed lab exercise and post-lab assignment. The PHYS 2305 class combines the grades a student earns in the lecture and lab sessions for one, overall final grade for PHYS 2305 at the end of the semester.

Work for the lab part of the class includes a weekly **pre-lab assignment** and a weekly in-class **lab exercise** and **post-lab assignment**. The pre-lab assignment is completed as homework and is turned in at the start of the lab. All of the lab assignments and exercises are completed in students’ **lab manual**.

The Physics Recitation Session

The recitation session of the class meets once a week, usually on Friday, for fifty minutes. The recitation session is instructed by a **teacher's assistant (TA)** and consists of twenty students. The recitation session is designed to offer help and clarification of concepts taught in lecture sessions to students. Work and attendance for recitation sessions is optional and is not included in the students' grades. Optional recitation work sheets are posted on Scholar for students who want extra practice. The TA goes over the recitation work sheet during the session. During recitation sessions students can also ask the TA for help with homework and practice test questions.

If you need help completing any of the work for the lecture, lab, or recitation sessions of the class, free help is available from teacher's assistants and physics graduate students in **Robeson 308**, or what I like to call, "The Physics Help Center."

As mentioned, PHYS 2305 is a challenging course, but it can be mastered. Success in PHYS 2305 derives from students' weekly, consistent dedication to learning the material and students' strong drive and desire to master the material. Weekly dedication to the material consists of reading the textbook and taking notes on the chapters before the textbook chapters are discussed in class. Weekly dedication to the material also consists of pacing yourself during the week to complete the Mastering Physics homework on time. Students who procrastinate on the homework are more inclined to cheat. If you cheat, you are only cheating yourself out of learning the material.

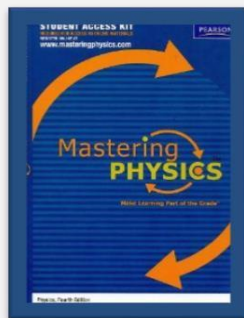
Success in PHYS 2305 is not just about earning a good grade in the class. Success in PHYS 2305 is important because it prepares students for the hard work needed for future advanced engineering and hard-science classes. It is important to be successful in the class because the class helps students get used to the kind of thinking needed for problem-solving and engineering.

Required Materials for Success in PHYS 2305

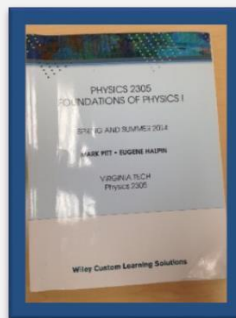
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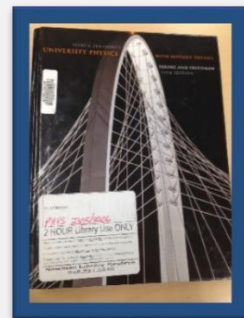
Mastering Physics
Subscription



Physics Lab Manual



Physics Textbook



Day-by-day Instructions for a Difficult Week in PHYS 2305

The day-by-day instructions address how to pace oneself through the assignments and material that is required outside of physics lecture and lab during a sample difficult week in PHYS 2305. Assignments during difficult week in PHYS 2305 include a pre-lecture quiz due on Monday morning, a pre-lab assignment due Tuesday, Mastering Physics homework due on Friday at midnight, and a test on Friday at 7pm. (*Pretend your physics lab is on Tuesday, which is why the pre-lab assignment is due on Tuesday.) Reading and taking notes on the chapter that the professor will go over in the week's upcoming lecture sessions is work that is not assigned, but doing so helps students learn the concepts and material.

Sunday

1. Read and take notes on the chapters of the book that the pre-lecture quiz is on and that the professor will discuss in the week's upcoming lectures.
 - Take notes on the conceptual information. Learning and memorizing the concepts is essential to solving problems on homework and tests
2. Take the pre-lecture quiz because it is due Monday morning.

Monday

1. Do at least one third of the Mastering Physics homework that is due Friday. If you are getting through the homework easily, then do a half of the problems. More is better!
 - The concepts in the homework will be tested on the exam on Friday.
2. Complete the pre-lab assignment to turn in at the start of your lab on Tuesday.
 - If you can't complete the pre-lab assignment by yourself, get help at "The Physics Help Center," your professor's **office hours**, or recitation.

Tuesday

1. Finish another third or the other half of the Mastering Physics homework.
 - If you couldn't finish homework questions from yesterday by yourself, get c
2. Finish and correct the practice test that is posted on **Scholar**.
 - Use the practice test to see what you need to work on before Friday's test.

Wednesday

1. Finish the final third of the Mastering Physics homework, that is if you didn't finish all of the homework on Tuesday.
 - If you need help on the home work go to "The Physics Help Center," your professor's office hours, or recitation.
2. Go to your "The Physics Help Center," your professor's office hours, or recitation to learn how to work the problems you got wrong on the practice test.
3. Do practice problems in the back of the textbook that test similar concepts as the questions you got wrong in the practice test to prepare for the test on Friday.
 - When you are doing practice problems before your test, make sure you do more practice problems from the chapter(s) you struggle with and fewer practice problems from the chapter(s) you are confident with.

Thursday

1. Do more practice problems in the back of the textbook that test similar concepts as the questions you got wrong on the practice test.
2. Create your formula sheet using, at most, the front and back of an 8.5 x 11 piece of paper.
 - Just put formulas and concepts on your formula sheet. Don't put worked out sample problems because I can almost guarantee you that they won't help you on the test.

Friday

1. Do more practice problems from the book before your test.
2. Eat dinner before you take your test at 7pm.
 - No one can concentrate on an empty stomach!

Saturday

1. Relax, your test is over!

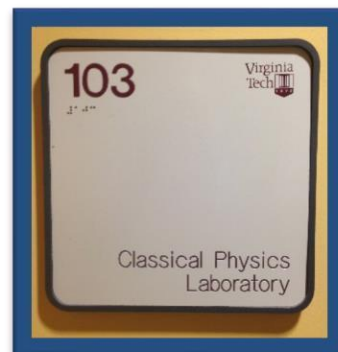
Glossary

Classical mechanics:

The study of the motion of bodies under a system of forces as modeled by Isaac Newton.

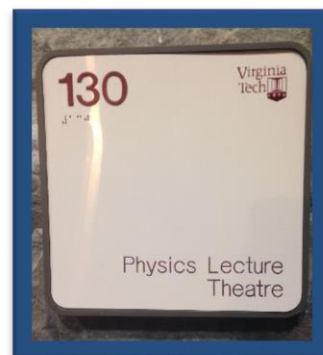
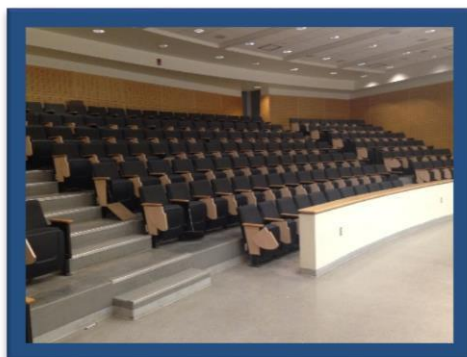
Hahn North 103:

The room that holds PHYS 2305 lab sessions.



Hahn North 130:

The auditorium that holds PHYS 2305 lecture sessions.



iClicker:

The remote that is used to instantly answer multiple choice questions asked by the instructor or professor during lecture sessions.

Lab exercise:

Physics experiments completed during weekly lab sessions that reinforce and provide real-life examples of the concepts that are taught in lecture sessions.

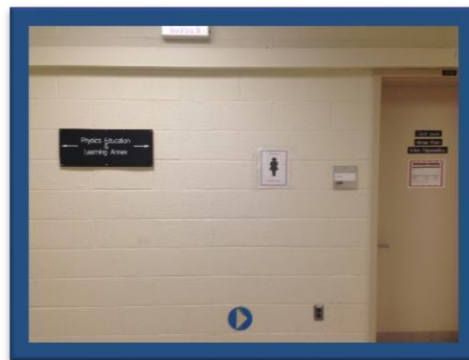
Lab manual:

The required handbook for lab sessions that hold instructions for lab exercises and pre-lab and post-lab assignments.

Mastering Physics:

The online program that gives students access to the weekly online homework.

- MATH 1205:** A prerequisite course to PHYS 2305 in which differential calculus is learned.
- Office hours:** A scheduled time during the week that instructors and professors allow students to ask them questions and to ask them for help.
- Physics lab:** The once-a-week session during which concepts taught in lecture sessions are reinforced.
- Physics lecture:** The twice or three-times-a-week session during which students are taught physics concepts and how to do physics problems by a professor or instructor in a large hall.
- Physics recitation:** The optional, once-a-week session during which students are offered help by a TA with the concepts and material taught in lecture sessions.
- Post-lab assignment:** The worksheet that is completed after the lab exercise is completed and that is turned in at the end of the lab session.
- Pre-lab assignment:** The worksheet that is completed before the start of the lab session and that is turned in at the beginning of the lab session.
- Pre-lecture quiz:** The weekly assessment taken before the start of the week that introduces students to the material that will be taught in the lecture sessions that week.
- Robeson 308:** The room that offers free physics help by teacher's assistants and physics graduate students. Some instructors and professor hold their office hours in this room.



- Scholar:** A Virginia Tech website used by instructors and professors to post lecture materials and resources.

Teacher's assistant (TA):

A Virginia Tech student that helps instructors and professors with grading and teaching students the material.

Thermodynamics:

The science of the relationship between heat and temperature and work and energy.

Weed-out:

A slang term used to describe major-specific, prerequisite courses that cause some students to change their major.