

Physics 125

Fall 2017

<https://canvas.rice.edu/courses/1763>

<https://www.pearsonmylabandmastering.com/northamerica/>

Welcome to your first semester of physics!

We are about to spend two terms studying what one could say is *the fundamental science*. It has served as a model and inspiration for the development of many other branches of human endeavor. The journey of scientific discovery began at the dawn of civilization and has taken us to amazing places.

At the end of this semester you will have a basic but firm knowledge of the laws of Mechanics, which will allow you to understand the behavior of a great number of physical systems. Even more important than this, if you are successful you will have developed *an attitude of thought and a way of thinking* that will serve you in many fields of inquiry.

In this class we will be sharing with you some of the insights (accumulated mostly over the last four centuries) about the way nature works and *how we describe it*. Just as important, we would also like to share with you the sense of wonder that nature inspires in us. We hope you will enjoy it!

Faculty

Jared Stenson

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Stan Dodds (Labs)

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Course Objectives and Learning Outcomes

Students that successfully complete this course will:

- Have a basic but firm knowledge of the mechanical laws of motion, forces, and energy which will allow them to understand the behavior of a great number of physical systems and phenomena such as fluids, rotations, and waves.
- Appreciate a scientific approach to learning and problem solving.
- Develop an aptitude for quantitative, qualitative, critical, and symbolic reasoning.
- Be able to effectively communicate technical ideas to others.
- Have hands-on experience in collecting and evaluating data using simple equipment in a laboratory setting.

1 Venues and Activities

1.1 Class

LOCATION: Herzstein Physics and Astronomy Amphitheater
Tu, Th 9:25 AM – 10:40 AM

The class is large. Despite this, you must get involved and make it as interactive as possible. The goal of class time is to present the most important material in a clear and consistent way, and to identify the most common conceptual difficulties and stumbling blocks in the material. Your participation in class is encouraged and appreciated *and your engagement outside of class is necessary*. It is your responsibility to prepare yourself for class so that you can obtain maximum benefit from lecture. The format of the class will be a combination of lecturing, conceptual questions, demonstrations, and problem solving. Please notice that we will use class time only to go over the most difficult concepts in each chapter. *We will not cover all the basic material that you need to know to succeed in the class.* You will have to do this by studying the textbook outside of class and doing the homework. These are essential parts of the course.

1.2 Homework Help Session

LOCATION: Herman Brown Hall 223
T 2:00 PM – 6:00 PM

Help sessions are designed to help you understand the material necessary to solve the problems in the homework. Attendance to help sessions is not mandatory. However, they are an excellent environment to meet with other students working on similar problems. Dr. Roberts will run the help sessions but he is NOT there to do the problems for you but only to instruct, give guidance, clarify related concepts, and answer questions.

1.3 Laboratory

LOCATION: Herzstein 218 and 220

The laboratory portion meets 8 times over the course of the semester. You should submit your preference form no later than 5:00 PM on Thursday Aug. 24th, to Stan Dodds in HRZ 215. The form will be given to you on the first day of class and may also be found in the labs portion of the class website (Canvas). Your lab meeting time will be posted outside HRZ 215 by 5:00 PM on Friday Aug. 25th, after compiling student preferences.

Though your lab instructor will make clear the expectations for the laboratory portion of the course, note that *you are expected to prepare for the labs in advance* (including the first lab) by reading over the material.

1.4 Office Hours

Office hours are an excellent resource for you, the student. They will be held in the respective faculty offices. Other times may be schedule by appointment via email. Please realize that office hours are important for us as instructors as well. While you get help on the class, we get feedback on how students are coping with the material. Therefore, we hope to see you there!

2 Nuts and Bolts

2.1 Materials

TEXTBOOK: Knight, Randall D., "University Physics for the Life Sciences" Update Edition, Pearson Publishing. You can use other editions of the Knight text but you will be responsible for navigating any differences. Homework questions will come from this text but regardless of which book you have you will have access to the online homework as long as you have a valid access code.

CALCULATOR: Any scientific calculator with logarithms and trigonometric functions will do.

WEB ACCESS: On-campus access to the internet shouldn't be a problem for Rice students. We will use two main websites and email:

Canvas:

<https://canvas.rice.edu/courses/1763>

We'll use this site to post course information, updates, announcements, and resources. *Students are required to check it regularly.*

Mastering Physics:

<https://www.pearsonmylabandmastering.com/northamerica/>

Please note: this is different from the MasteringPhysics site that has been used in the past. You will need to purchase an access code to the "Mastering Physics" website in order to gain access to online homework sets and to submit homework (You will also need the COURSE ID: hafner51453). If the codes do not come with your textbook you can purchase them at the link above.

Rice Email:

Class announcements will be posted on Canvas and/or sent to your Rice email account. Please make sure to check both periodically.

2.2 Your Grade

Your success in this course will depend on many factors. Some of them are beyond your control, like your previous experience with math and physics and your natural skills. However, many other factors – *even more important factors* – are entirely up to you. These include your focus, attitude, determination, and most importantly, the *quality* of the effort you spend working on the course. *A good attitude with hard and smart work can make a significant difference in your grade.*

Grade Breakdown	
Laboratory	15%
Online Homework	10%
Pledge Problems	5x2%=10%
Exam I	15%
Exam II	20%
Final Exam	30%

Grade Cut Offs (tentative)	
87%	A-
77%	B-
67%	C-
57%	D-
There are the minimum grades that you are guaranteed when your grade is greater than or equal to the cut off listed.	

2.2.1 Laboratory (15%)

The laboratory portion of the course is both significant and important. The objective is to gain appreciation for the empirical nature of physical science and to gain experience in testing its relationships. Your grade will be determined by Prof. Stan Dodds and your individual lab instructor. Please refer any questions you might have about the labs to them.

2.2.2 Regular Homework (10%)

Part of your homework grade will be based on weekly homework assignments posted on the MyMasteringPhysics website <https://www.pearsonmylabandmastering.com/northamerica/> (COURSE ID: hafner51453). Each week there will be a set of approximately 20 problems to complete. These assignments will be due (mostly) on Wednesday evenings.

To provide students with additional resources to help them prepare for the exams we plan on placing some practice problems and/or practice exams in the “Resources” folder in Canvas. Please note that *even though the solution to these problems may be available, students are strongly encouraged to look at the solutions only as a last resort*. Every minute you spend genuinely exploring a problem adds to your understanding of the material.

2.2.3 “Pledge” Problems (10%)

Roughly 5 times during the semester students will be assigned a more extensive, take-home problem which they “pledge” to work on *individually*. If approached correctly this will not only give students experience working a problem in more depth but will prepare them for the exams. These will be graded for correctness and on the quality of the work.

2.2.4 Exams I, II (15%, 20%)

We will have a total of two midterm exams at the day and time specified on the schedule on the last page of this syllabus. *Please make sure that you make arrangements, travel and otherwise, so that you can take the exams at the scheduled times. Only documented medical emergencies and official conflicting university-endorsed activities will be considered as exceptions.* Each midterm exam will test you only on the chapters covered since the previous exam though you will be benefited if you recognize that physics is necessarily a subject that builds later results off of earlier insights. In general, all exams (including the final exam) will have a combination of conceptual short-answer questions (such as multiple choice, etc.) and free-response multiple-part problems (like homework problems). Note also that exams are increasingly weighted more heavily as we go throughout the course. This means *it is more important to finish strong than it is to start fast*. Early on, *building a lasting conceptual foundation is more*

important than merely “finishing assignments.” This also mirrors the cumulative nature of scientific learning in which first principles are constantly revisited.

2.2.5 Final Exam (30%)

The final exam will be given during the regularly scheduled week for final exams at Rice. ***You are required to take the final at the time and place specified by Rice University. Do not make travel arrangements before the last day of final exams (Dec. 6-13).*** The final is *comprehensive* but will emphasize material from the last third of the semester.

2.3 Policies

2.3.1 The Honor Code

We expect you to uphold the ideals set out by the honor council for Rice University students. More information can be found at <http://honor.rice.edu/>.

2.3.2 Lectures

If laptops are open they should be used for class-related activities to promote learning (i.e. facebook, recreational videos, work from other classes, etc. are not class-related activities). Be polite and considerate with your instructors and your fellow classmates. If you are late or need to leave early, please enter and leave the room as quietly as possible.

2.3.3 Homework

You are advised to work on your homework *individually* for *as long as you are making progress*. Discussing, articulating, and learning from your peers is very useful and important but *it must remain constructive* (reasoning-centered and independent rather than answer-centered and conforming). If you need help from others you may collaborate but *do not confuse this with the important task of making progress on your own*. Working wisely on these problems is an essential part of your training and it will improve your performance on exams. You are wasting your time when you have somebody else solve a problem for you, for the same reason an athlete is wasting his or her time letting his/her teammate workout for them.

In Canvas, under “Resources,” you may find practice problems/exams and study helps to help you prepare for the exams. Please note that as said before, *the only problems that benefit you are the ones you make your own by investing individual effort*. Please be aware that *memorizing solutions to various example problems is a notorious waste of time!*

2.3.4 Exams

Exams must be completed within the allotted time and with no outside assistance. Instructors will periodically enter the classroom, and you are permitted to ask questions of them to clarify what is written on the exam. *The instructors will not provide any information that would give you an unfair advantage over your classmates.* This includes pertinent definitions, units, or interpretations that you are expected to know. There should be no communication with any other persons (verbal, electronic, etc.) other than the instructor. The use of calculators on the exam is permitted, but not other electronic devices. You will also include a signed copy of the honor pledge on your exams: "On my honor, I have neither given nor received any unauthorized aid on this exam nor have I observed any improper behavior in other students."

Please note that you will have one week after an exam's grade is posted in Canvas to report any problems with the grading or the recording of the grade of your exam. To ask for a re-grade, please attach to your exam a note with a specific explanation of the problem and return it to the instructors. We will review the *whole* exam, not just the problem in question, and will make any necessary corrections. Clearly, since we re-grade the entire exam, *the assigned grade can increase, decrease, or stay the same.*

2.3.5 Late Policy

As a general policy, *no late exams will be permitted.* Exceptions to this rule and opportunities for make-up are *rare* and are limited to *documented medical emergencies and official conflicting university-sponsored activities.* Exceptions will be considered on a case-by-case basis. Generally homework will receive a 25% point deduction per day late up to a maximum 75% late deduction. Other late assignments will be automatically reduced by 50%. Laboratory policies will be set up by Prof. Dodds and your lab instructor. It is advantageous to the student to discuss these situations with the instructor in person or by email *in advance.* If the nature of the circumstance prevents advance notice, it is in the student's best interest to discuss it with the instructor *as soon as possible.*

2.3.6 Students with Disabilities

Any student with a documented disability seeking academic adjustments or accommodations is requested to speak with Dr. Stenson during the first two weeks of class. All such discussion will remain completely confidential. Any documentation must come directly from the Disability Support Services in Allen Center.

2.3.7 Standard Disclaimers

The instructors have authority to rule on any point not covered in this syllabus.

The syllabus is subject to change at the discretion of the instructors. Students will be notified ahead of time before any changes take effect.

Schedule for Physics 125 Fall 2016 (Tentative)

Week	Topics (T,Th)	Textbook Chapters	Laboratory
8/21	Introduction, 1D Kinematics	1, 2	
8/28	Vectors & 2D Kinematics	3	Kinematics
9/4	Newton's Laws & Forces [^]	4	Projectile Motion
9/11	Force Problems	5	Forces
9/18	Circular Motion, Gravitation [^]	6	
9/25	Rotations	7.1-5	Circular Motion
9/29	EXAM I, 7-9 PM	1-6	
10/2	Rotations, Springs & Elasticity	7.6, 8.1-4	
10/9	MIDTERM RECESS , Momentum	9.1-3	
10/16	Momentum [^]	9.4-7	Collisions
10/23	Work-Energy	10.1-4	
10/27	Exam II, 7-9 PM		
10/30	Energy Conservation	10.5-8	Rotations
11/6	Fluids	13	Elastic Materials
11/13	Oscillations	14	Fluids
11/20	Waves, THANKSGIVING[^]	15.1-5	
11/27	Waves	15.6-7, 16.1-8	Simple Pendulum
12/6-13	Final Exam TBA [^]		

[^]Pledge problem due (Tentative).