PHYS 1211

Principles of Physics for Scientists and Engineers: Mechanics, Waves, and Thermodynamics

Fall 2021

Instructor: Phillip Stancil

TR 9:35am-10:50am, Physics 221

Prerequisite: MATH 2250, 2250E, 2300H, or 2400/H

Pandemic Information: While room 221 can hold up to 60 students and 40 students have registered for this course, I strongly urge you to wear a face mask while in the classroom and the Physics Building.

Instructor Information

- Office: Room 206, Physics Bldg.
- Phone: 706-542-2485
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- Email: pstancil@uga.edu
- Website: www.physast.uga.edu/people/phillip_stancil

Times and Locations

- Lectures: T(Tu)R(Th), Period 2, Room 221, Physics Bldg.
- Office hours: TBD
- Laboratory: Various times, Physics Bldg., third floor

Introduction

This course is the first semester of introductory university physics which covers mechanics, wave properties, and some thermodynamics. The focus is on classical physics. Multivariable calculus will be used throughout and some familiarity with general chemistry will be helpful.

Course Goals and Learning Outcomes

- To develop physics expertise in mechanics, waves, and thermodynamics,
- To apply advanced mathematics to describe the physical world,
- To expand our physics language ability, both written and verbal,
- To enhance our problem solving abilities,
- To enhance our ability to work in groups,
- To keep up with current developments in physics and astronomy, and
- To grow as scientists and/or engineers.

Required Course Materials

- *Physics for Scientists and Engineers*, 4th ed., Randall D. Knight, Pearson, 2017.
- *Experiments for an Introductory Physics Course*, 2016 or 2017 edition. (Hayden-McNeil Publishing). Needed for the laboratory section of the course.
- A simple scientific calculator, which must be non-programmable, non-graphing, and non-symbolic for tests/exams. The use of a calculator with graphing, algebra-solving, or programming functions will not be permitted for any test or exam, nor are PDAs, tablets, cell phones, Apple watches, or other electronic devices to be used.

Required Resources

- Course Website: http://www.physast.uga.edu/classes/phys1211/stancil/ .
- *Learning Online Network with CAPA (LON-CAPA)*: http://spock.physast.uga.edu/. Online homework system. See Homework section for more information.

Optional Resources

- *The Student Workbook*, R. D Knight, Pearson
- Other University Physics textbooks

Grading Policy

Your final score will be determined from your overall performance in the class including tests, final exam, online homework, and laboratory grade with the following weights:

- 40% Two (out of three) in-class tests (20% each), lowest test score dropped
- 30% Final exam score
- 10% *LON-CAPA* online homework
- 5% In-class group assignments
- 15% Overall laboratory score

Final letter grades will be based on the class statistical distribution of total composite scores with the mean score corresponding to a middle-C. However, the lower range of the grade distributions will be no higher than 95.00 A, 90.00 A-, 86.67 B+, 83.33 B, 80.00 B-, 76.67 C+, 73.33 C, 70.00 C-, and 60.00 D.

Test and Exam Policy

There will be three in-class tests and one final exam. All tests and exams are closed book and closed notes. You can only bring pencil and calculator to the tests and exam. Calculators must be non-programmable, i.e. no formulae can be stored. Equation sheets will be provided. The tests and exam will consist of primarily problems with some true/false and/or multiple-choice questions. Further details about each test and the exam will be given in class.

The test make-up policy is as follows: 1) There will be **NO** make-up tests given. 2) If you miss one test, your test average will be based on the other two tests only (i.e., the missed test will count as your dropped test score). 3) If you miss a second test or the final exam, **regardless of the excuse**, the maximum grade

you can receive in the course is an Incomplete. 4) A missed final exam can only be made-up under extreme circumstances. In order to be eligible for a make-up final exam you must have a documented excuse for missing the exam (e.g., doctor's note for a serious illness) and you must contact me (e.g., via email) before the final exam. 5) If you have a scheduling conflict with the final exam, you must inform me at least two weeks before the exam, so arrangements can be made. The anticipated test/exam schedule is attached, though it may be possible that the dates of the in-class tests can change. Announcements of the fact will be made in class. "I did not know we had a test today" is an unacceptable excuse.

Homework Policy

Homework assignments will consist of two parts. The first part will be done online for a grade with the Learning Online Network with a Computer Assisted Personalized Approach (LON-CAPA) system. More details about using LON-CAPA will be given in class and on the course website. The second part of the homework will be the End of Chapter (EOC) problems from Knight, 4th ed., but which will NOT be collected for grading. Assignments will generally be made each week with the LON-CAPA portion due the following week, while the EOC problem assignments will be posted on the course website. While you receive no grade for the EOC portion of the homework, it is one of the most important things you can do in this course to learn physics. Concepts you learn from the online problems are applied to more complex, and often, practical problems in the EOC portion. I suggest you do all of the assigned problems as carefully as you can. It is highly likely that one or more online or EOC problems will appear, in some form, on a test and/or the final exam. You are encouraged to work with your fellow classmates on the EOC portion of the homework assignments, but the LON-CAPA part must be your own work. You are also encouraged to work additional problems - as many as possible!

Group Assignments

This semester the course is evolving to incorporate *active learning* methodologies (also called SCALE-UP). While most of the lecture structure will remain, we will spend some of each week working in (usually) 3-member groups on problems. Group assignments will be turned in by no later than the end of the day (via email). This is for a grade, so that attendance is required. It is therefore important that the groups learn to function efficiently and cooperatively. Group membership may be reorganized if deemed necessary by the instructor.

Bonus Points

Throughout the semester, pop quizzes will be given in class (roughly every other week). Each quiz will consist of one multiple-choice or true-false question. The average of all quizzes is worth a maximum of 2 points. Further, during most class periods, I'll randomly call on some students to work an example problem or other task. If the student is in attendance and assists, they will receive 1 bonus point. The maximum number of bonus points for the course is 3. You can receive 1 bonus point just for taking all quizzes, even if all your answers were incorrect. The purpose of the bonuses is to reward those who regularly attend class and keep up with the lecture material and homework assignments. For example, if the lowest total course score for a B− turned-out to be 80.00 while your average was 78.50, you will receive a B− if your bonus average is 1.50 or higher. Otherwise, if you failed to take the quizzes or your bonus average was 1.49 or lower, you will receive a C+. Therefore, unless there is a numerical error in your scores, there will be no basis to discuss a letter grade adjustment. I do not "round up".

Student Responsibilities

1. You are responsible for all material (a) given in the homework problems, (b) discussed in class, (c) in the assigned reading, and (d) in the lab exercises.
2. You are responsible for all announcements made in class, whether you are present or not, and on the class website.
3. Read the assigned portions of the textbook before class.
4. Do all homework assignments.
5. Attend ALL laboratory sessions in your assigned laboratory section.
6. Know the University's policies concerning withdrawals and incompletes.
7. Ask me if you do not understand **anything**. There is no dumb question.
8. Enjoy. *Physics is fun!* and *everywhere.*

Academic Honesty

Be aware of the University's policy on academic honesty. See http://honesty.uga.edu. Anyone caught cheating on a test or exam will receive a failing grade for the course. Anyone found to be cheating on labs, *LON-CAPA* assignments, or quizzes will receive a zero for that assignment. A second incident will result in failure of the course. All suspected incidents of cheating will be reported to the Office of the Vice President for Instruction. A session before the Academic Honesty panel is not pleasant. *So, let's not meet there.*

CORONAVIRUS INFORMATION FOR STUDENTS FOR FALL 2021 CLASSES

Face coverings: Following guidance from the University System of Georgia, face coverings are recommended for all individuals while inside campus facilities. How can I obtain the COVID-19 vaccine? University Health Center is scheduling appointments for students through the UHC Patient Portal (https://patientportal.uhs.uga.edu/logindualauthentication.aspx). Learn more here: https://www.uhs.uga.edu/healthtopics/covid-vaccine. The Georgia Department of Health, pharmacy chains and local providers also offer the COVID- 19 vaccine at no cost to you. To find a COVID-19 vaccination location near you, please go to: https://georgia.gov/covid-vaccine. In addition, the University System of Georgia has made COVID-19 vaccines available at 15 campuses statewide and you can locate one here: https://www.usg.edu/vaccination

What do I do if I have COVID-19 symptoms? Students showing COVID-19 symptoms should self-isolate and schedule an appointment with the University Health Center by calling 706-542-1162 (Monday-Friday, 8 a.m.-5p.m.). Please DO NOT walk-in. For emergencies and after-hours care, see: https://www.uhs.uga.edu/info/emergencies.

What do I do if I test positive for COVID-19? If you test positive for COVID-19 at any time, you are required to report it through the DawgCheck Test Reporting Survey. We encourage you to stay at home if you become ill or until you have excluded COVID-19 as the cause of your symptoms. UGA adheres to current Georgia Department of Public Health (DPH) quarantine and isolation guidance and requires that it be followed. Follow the instructions provided to you when you report your positive test result in DawgCheck.

Guidelines for COVID-19 Quarantine Period (As of 8/1/21; follow DawgCheck or see DPH website for most up-to-date recommendations) Students who are fully vaccinated do not need to quarantine upon exposure unless they have symptoms of COVID-19 themselves. All others should follow the Georgia Department of Public Health (DPH) recommendations:

Students who are not fully vaccinated and have been directly exposed to COVID-19 but are not showing symptoms should self-quarantine for 10 days. Those quarantining for 10 days must have been symptom-free throughout the monitoring period and continue self-monitoring for COVID-19 symptoms for a total of 14 days. You should report the need to quarantine on DawgCheck (https://dawgcheck.uga.edu/), and communicate directly with your faculty to coordinate your coursework while in quarantine. If you need additional help, reach out to Student Care and Outreach (sco@uga.edu) for assistance.

Students, faculty and staff who have been in close contact with someone who has COVID-19 are no longer required to quarantine if they have been fully vaccinated against the disease and show no symptoms.

Well-being, Mental Health, and Student Support If you or someone you know needs assistance, you are encouraged to contact Student Care & Outreach in the Division of Student Affairs at 706-542-7774 or visit https://sco.uga.edu/. They will help you navigate any difficult circumstances you may be facing by connecting you with the appropriate resources or services.

UGA has several resources to support your well-being and mental health: https://well- being.uga.edu/ Counseling and Psychiatric Services (CAPS) is your go-to, on-campus resource for emotional, social and behavioral-health support: https://caps.uga.edu/, TAO Online Support (https://caps.uga.edu/tao/), 24/7 support at 706-542-2273. For crisis support: https://healthcenter.uga.edu/emergencies/.

The University Health Center offers FREE workshops, classes, mentoring and health coaching led by licensed clinicians or health educators: https://healthcenter.uga.edu/bewelluga/

Monitoring conditions: Note that the guidance referenced in this syllabus is subject to change based on recommendations from the Georgia Department of Public Health, the University System of Georgia, or the Governor Office or. For the latest on UGA policy, you can visit coronavirus.uga.edu.

PHYS 1211 Class Schedule, Fall 2021, Tu(T)Th(H), Period 2, Prof. Stancil

Class	Date	Chapter	Reading	Topic
1	H 8/19	1	1.1-1.8	Introduction - Science and Motion
2	T 8/24	2	2.1, 2.2, 2.4	Kinematics in 1D (*Drop/Add ends*)
3	H 8/26	2	2.5-2.7	Kinematics in 1D
4	T 8/31	3	3.1-3.4	Vectors
5	H 9/2	4	4.1-4.3	Kinematics in 2D
6	T 9/7	4	4.4-4.5	Kinematics in 2D
7	H 9/9	5	5.1-5.6	Forces, Newton's 1st and 2nd Laws
8	T 9/14	5, 6	5.7, 6.1-6.3	Dynamics in 1D
9	H 9/16	*Review*		
10	T 9/21	**Test 1**		**Chapters 1-5**
11	H 9/23	6	6.4-6.6	Dynamics in 1D
12	T 9/28	7, 13	7.1-7.5, 13.3, 13.4	Newton's 3rd Law, Gravity
13	H 9/30	8	8.1-8.5, 4.6	Dynamics in 2D, Circular Motion
14	T 10/5	9	2.3, 9.1-9.4	Integrals, Work, Energy
15	H 10/7	9, 10	9.6, 10.1-10.4	Potential Energy
16	T 10/12	*Review*		
17	H 10/14	**Test 2**		**Chapters 6-9**
18	T 10/19	10, 11	10.8, 11.1-11.2	Conservation of Energy, Momentum
19	H 10/21	11	11.3-11.5	Collisions
20	T 10/26	12	12.1-12.5	Rotational dynamics *(With. date10/25)*
21	H 10/28	12	12.6-12.9	Rotational dynamics
22	T 11/2	12,13	12.10-11, 13.5-6	Angular Momentum, Orbits
23	H 11/4	15	15.1-15.6, 10.5-10.6	Oscillations, Energy Diagrams
24	T 11/9	16	16.1-16.5	Waves
25	H 11/11	*Review*		
26	T 11/16	**Test 3**		**Chapters 10-15**
27	H 11/18	16, 17	16.9, 17.1-17.3	Doppler Effect, Superposition
28	T 11/23	17	17.4-17.8	Superposition of waves
	H 11/25		No class	*Thanksgiving*
29	T 11/30	18	18.1-18.2	Thermodynamics
30	H 12/2	*Final review*		
31	H 12/9	**Mass Final Exam**	**Comprehensive**	7-10pm