Principles of Physics II Syllabus

1 Professor contact information

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2 Course Description

Welcome to Principles of Physics I! This course is the first semester of a two-semester sequence that presents an intermediate, calculus-based introduction to physics. The first semester covers ideas like kinematics, Newton's laws, conservation of energy, rotational motion fluids, gravity, and thermodynamics. The second semester will cover electricity and magnetism, waves/optics, and modern physics. We will develop a conceptual understanding of the laws of physics, and use these laws to describe a wide range of physical phenomena.

In addition to these physics-specific goals, this course will develop skills that will serve you well in your career. A particularly vital one is the ability to reason through complex problems using basic principles or physical models. Solving problems and mastering concepts are closely linked; only after you have mastered the underlying physical concepts and principles will you be able to apply them effectively to solve problems.

3 Course Prerequisites

You should have taken Calculus 1. Other prerequisites for PHYS 2051 are high school algebra, geometry, and trigonometry. Of all the skills that will be present throughout all of 2051 and 2052 that will be most important to have mastered is trigonometry and really everything triangle related. We will be finding components of vectors from magnitude and direction as well as going the other way. This requires the Pythagorean theorem and lots of trigonometry.

4 Course Web Page

Canvas will host the course web pages for this class. Almost all the information that you will need for this course (syllabus, homework schedule, web links to homework solutions and computer programs for certain homework assignments, how to find/contact your professor, announcements, etc.) will be placed on this website. Familiarize yourself with the course website; it will come in handy.

5 Course Philosophy

This course may be different than other physics courses you have taken in the past. In the same way that you cannot learn basketball by watching a video on basketball, you cannot learn physics by simply listening to someone lecture on physics. This is a well-documented fact based upon years of research by the physics education community. You must play an active role in your learning. The various components of the course are discussed here. Here we want to give you an overview and a successful strategy for doing well in the course.

- **Before each class, actively watch each lecture video associated with the class.**
  - **What does "active" watching entail?**
    When the video is a problem, you should read the problem and pause the video. Try to solve it before continuing on. If you get stuck, watch until I catch up with you. Get yourself unstuck, and then pause the video again, and try to finish the problem.
- **Go to all of the lecture and recitation sessions and ask questions!**
  - You will get much more out of each aspect of this class if you ask questions rather than being passive. This is the time to get questions answered that you were unable to answer yourself.

6 Course Components (with percentage of course grade in italics)

6.1 Attendance/Participation (90 points, taken out of 80 points)

Attending all lectures and recitations is integral for a summer course. Because the pace is fast, and there is no slowing down, attending all lectures and recitations is required. There will be no make-up recitations except in extenuating circumstances. Excused absences will be considered only under exceptional circumstances such as serious illnesses, off-campus, university-sanctioned activities, or certain legal obligations, such as jury duty.

There are 25 lectures during this session. If you miss a lecture without an excuse, your attendance grade will be decreased 2 points. If you are significantly late to lecture, your grade will be reduced 1 point. Note: This includes the tests too. There are 20 recitations during this session. If you miss a recitation without an excuse, your attendance grade will be decreased 2 points. If you are significantly late to recitation, your grade will be reduced 1 point.

6.2 Homework Assignments (125 points, taken out of 100 points)

You will have a weekly homework assignment of two to four problems to work at home to be submitted by the following Monday at 11AM unless otherwise noted (for instance, during

the last week). Each assignment is taken out of 24 points for a total of 120 points, but your overall grade will be taken out of 100 points, thus being (roughly) equivalent to dropping your 1.25 lowest HW scores. The first assignment is filling out the introduction form, which is worth 5 points and is a completion grade.

If you feel like something has been graded in error on your recitation homework, you may submit a regrade request through Gradescope. You will have 24 hours from receiving your grade back to submit a regrade request. No regrade requests will be accepted after this time for any reason.

6.3 Pre-lecture Videos (60 points, taken out of 50 points)

This class is run in a flipped classroom form. This means your daily homework is watching pre-lecture videos where the concepts and math of the material are presented to you in one to five videos per lecture. The average amount of time you will need to watch per lecture is just over 60 minutes. Because not all topics are created equal, you will have some days with as many as 80 minutes and some days with as few as 18 minutes. I try to have the heavier watching days occur on the Monday of the week and the lightest day of lecture watching be the Thursday of the given week.

There are 20 days with pre-lecture videos. If you watch all of the pre-lecture videos prior to the day it is associated with, then you will receive 3 points for that day. If you watch some of the video(s) for that day, but not all or do not finish a video, you will receive a 2/3. If you do not watch any of the videos prior to the lecture day, but do successfully watch the all of the videos prior to the start of class on Friday (8:30AM), then you will receive 1/3. If you do not watch the video(s) prior to the start of class on Friday (8:30AM), you will receive 0/3.

6.4 Exams (250 points, taken out of 250 points)

Exams (250 Points/250 Points)

There will be 5 exams on the dates shown in the course schedule. Exams will be cumulative in that physics builds upon itself, but not cumulative in that questions from the earlier exams will explicitly be on future tests. Each test will consist of 3 free response problems and 4 multiple choice questions. The multiple choice questions will be taken out of 5 points broken up into two parts (2 points for answering, 3 points for justification). The free response problems will be taken out of 10 points which will be subdivided between 2-5 parts depending on the problem. If you want to understand the grading scale for each of these problems, please see the grading rubric page.

No exam grades will be dropped, weighted differently, or replaced with another exam grade. In the event the exam average or median score is below 70% (35/50) or one standard deviation below either of those numbers is below 60%, there will be the opportunity to earn some credit back by completing corrections for problems you missed.

If you feel like something has been graded in error on your exam, you may submit an exam regrade request through Gradescope. You will have 24 hours from receiving your exam back to submit a regrade request. No regrade requests will be accepted after this time for any reason.

6.4.1 Materials to Bring to the Exams

You will need writing implements (pens or pencils), an eraser, and a calculator for each exam. Check your calculator batteries before you come to exams. I do not have spare calculators. If your calculator cannot function during the test, you must complete the test without a calculator.

7 Attendance and Other Course Policies

7.1 Attendance

Attendance to lecture and recitation sessions is mandatory. Attendance will be taken in all of these components. Because of the fast pace of summer courses, even missing a single lecture can set you back significantly.

7.2 Recitation Sessions

Attendance at the weekly recitation sessions is mandatory. Problems will be assigned, completed, and submitted as part of your course grade. Unexcused absences from recitation will result in a 0 for that grade.

7.3 Makeup Exams

Makeup exams are a great inconvenience for everyone, and they will be considered only under exceptional circumstances such as serious illnesses, off-campus, university-sanctioned activities, or certain legal obligations, such as jury duty. Except in emergency situations, arrangements for makeup exams need to be made prior to the regularly scheduled exam. If an unexpected emergency prevents you from taking the exam, notify your instructor as soon as possible.

8 Course Grades

Your final grade in PHYS 2051 is determined by adding up your total points and comparing it to the chart below: Grading Scale:

A	446-480
A-	432-445
B+	417-431
B	398-416
B-	384-397
C+	336-383
C	312-335
C-	288-311
D+	264-287
D	240-263
F	0-239

The instructor reserves the right to lower the borderline percentages, but will never raise them.

9 Academic Integrity

Physics as practiced in real life is often a collaborative exercise. Students are therefore permitted and encouraged to work with classmates on homework to stimulate their own thought processes and to receive feedback from their peers on possible misconceptions. However, the written work that you submit should be yours alone – actual or effective Xerox copies of written work are not permitted.

Cheating on exams and copying homework are serious offenses. Any suspected cases of cheating/plagiarism will be reported and dealt with according to the rules specified by the Honor System.

Most academic integrity violations are simply incorrect choices made when students are stressed out, sleep deprived, and facing numerous deadlines. Keep this mind: it takes only a brief moment to make a bad decision, but it takes far longer to earn back the trust of instructors, advisors, and friends. Further, an academic integrity violation will follow you for years, even after you leave the university to seek your first job or professional degree. Rather than making a poor choice, take control of the situation by talking to your instructor or a counselor beforehand, especially if external pressures (roommate troubles, relationship issues, depression, etc,) are involved. Remember, Georgetown faculty take very seriously the Jesuit educational principle of Cura Personalis (care for the whole person).

10 Cell phones and laptops

We don't want to hear cell phones or other electronic devices. Turn them off before class or at least set them on silent mode. It is very unfair to other students to have your personal

affairs interfering with their education.

Laptops are distracting to you and to students around you. You are best served by leaving them at home or in your backpack, but we understand some of you may occasionally need to use your laptop during lecture. Out of consideration for your fellow students, please only use laptops in the back third of the classroom, preferably only in the last few rows.

11 Sexual Misconduct

Georgetown University and its faculty and staff are committed to supporting survivors and those impacted by sexual misconduct, which includes sexual assault, sexual harassment, relationship violence, and stalking. Georgetown requires faculty members, unless otherwise designated as confidential, to report all disclosures of sexual misconduct to the University Title IX Coordinator or a Deputy Title IX Coordinator. If you disclose an incident of sexual misconduct to a professor or staff member in or outside of the classroom (with the exception of disclosures in papers), that faculty or staff member must report the incident to the Title IX Coordinator, or Deputy Title IX Coordinator. The coordinator will, in turn, reach out to the student to provide support, resources, and the option to meet. Please note that the student is not required to meet with the Title IX coordinator and no action will be taken without the student's awareness. More information about reporting options and resources can be found on the Sexual Misconduct Website

If you would prefer to speak to someone confidentially, Georgetown has a number of fully confidential professional resources that can provide support and assistance. These resources include:

Health Education Services: Sexual Assault Response and Prevention

Counseling and Psychiatric Services (CAPS): 202.687.6985

Additional resources are included below:

Georgetown Self-Care Resource Guide

Georgetown Wellness Wheel

Georgetown Guide to Recognizing Students in Distress

Pregnancy Modifications and Adjustments

Georgetown University is committed to creating an accessible and inclusive environment for pregnant students. At any point throughout their pregnancy students may request adjustments/modifications based on general pregnancy needs or accommodations based on a pregnancy-related complication or medical need. Students may also request accommodations following labor and delivery based on a complication or medical need.

To request pregnancy modifications, please complete the SCS Pregnancy Modification Request Form

More information about pregnancy modifications can be found on the Title IX Georgetown University Website

12 Calendar of the session

Day	**Topic**
Week 1 Day 1	Waves
Week 1 Day 2	Superposition
Week 1 Day 3	Wave Optics
Week 1 Day 4	Ray Optics
Week 1 Day 5	**Exam 1**
Week 2 Day 1	Electric Charges
Week 2 Day 2	Electric Field
Week 2 Day 3	Dipole/Flux
Week 2 Day 4	Gauss' Law
Week 2 Day 5	**Exam 2**
Week 3 Day 1	Potential
Week 3 Day 2	Potential and Field
Week 3 Day 3	Current
Week 3 Day 4	Circuits
Week 3 Day 5	**Exam 3**
Week 4 Day 1	Biot-Savart
Week 4 Day 2	Ampere's Law
Week 4 Day 3	Induction
Week 4 Day 4	E&M Waves
Week 4 Day 5	**Exam 4**
Week 5 Day 1	Quantization
Week 5 Day 2	Atomic Physics
Week 5 Day 3	Radioactivity
Week 5 Day 4	Radioactivity Pt. 2
Week 5 Day 5	**Exam 5**