PHYS 101: Principles of Physics I
Summer 2022

Course Meeting Days and Times
Lectures: Mon-Fri, 8:30-10:00, TBD

Recitation:
- Section 10: Tues & Thurs, 10:15-11:15, TBD
- Section 11: Mon & Wed, 10:15-11:15, TBD

Office Hours
TBD

Welcome to PHYS 101!
This is the first semester of a calculus-based introduction to physics, particularly suited to the needs of premed students and science majors. The overall goal of the course is to introduce the fundamental ideas that form the foundation of physics, and to show that this framework of ideas can be used to explain the behavior of a wide variety of complex physical systems. The course will cover the traditional introductory topics, including kinematics, Newton's Laws, momentum, energy, rotational dynamics, gravitation, oscillations, fluids, and thermodynamics.

When you join this class you become part of a community that has a single mission: to help you learn in a supportive environment so that you can achieve your personal goals for success. In our community, there is great diversity and we all have different life experiences. Those experiences bring equally valuable insights, perspectives, and backgrounds. Respecting and honoring those is an important part of working together to achieve our common goals.

Required Course Materials and Tools
- Textbook: *OpenStax University Physics Volume 1*
- Access to Canvas: All course content will be shared via Canvas as well as discussions and assignments..
- Means to upload scanned written work as a pdf document. More details on options for doing this will be available on Canvas.

Learning Goals
The primary learning goals of this course are:

1. To develop a conceptual understanding of physics and the interconnectedness of physical phenomena, and how the laws of physics affect living organisms. For example, we will explore why bugs don't need lungs, but humans do and how Newton's Laws apply even at the cellular level.

2. To develop autonomous learning skills, particularly in relation to creating a toolkit of representations for expressing and manipulating the laws of physics, which will help you to make quantitative predictions about various phenomena.
3. To learn to think clearly and simply about the physical world. We will work on increasing problem-solving and modeling skills. Specifically, we will focus on identifying the important elements of a problem (in a physics context or otherwise), making appropriate simplifications, constructing a solution, and identifying the limitations of the solution. A few years after this course is over, it is likely that you will have forgotten the formula for the kinetic energy of an object that rolls without slipping - but you hopefully will have retained these modeling skills.

How we will achieve the goals

Lecture - Class Time

Much of the course concepts will be introduced through lecture.This will be a space for us to build up an understanding through conceptual questions and also to practice solving problems together. Even though we have quite a large class size I do want our class time to be as interactive as possible.

Discussion Posts

Participation in discussion on Canvas will give you the opportunity to ask questions about what you are confused about or aspects that you are interested in and want to know more about. I will make sure to follow up on questions raised in the discussion during synchronous class time. We will be using Piazza (a tool integrated in Canvas) for discussion. The system is highly catered to getting you help fast and efficiently from classmates and myself. Rather than emailing questions to the course team, I encourage you to post your questions on Piazza. That way everyone can benefit from the question and response.

Recitation

People generally learn best by discussion, lots of practice, and by teaching one another. Recitation will be a space for us to engage in activities that explore concepts and their applications more deeply. During this time you will work in assigned groups of 3-4 with a TA available for questions and to help guide your reasoning. If you think you can not attend the scheduled recitation time please let me know as soon as possible. Every recitation will have a follow-up homework that will allow you to continue exploring the concepts in another context. Both recitation homeworks from the previous week will be due at the start of your first recitation the next week (Monday or Tuesday depending on your section).

Lecture Homework

One of the most important things that you can do to train your brain to simplify the physical world is *to think through physics problems.* We will assign homework in two forms:

- *Problem Sets***:** The homework here will generally focus on numerical response questions.

- *Conceptual homework:* These assignments will usually be more involved problems, requiring the drawing of diagrams and writing of explanations.

I very strongly encourage you to work on the problems in (small) groups. After discussions with classmates, I expect you to write up your solutions independently; solutions should not appear to have been copied from a shared template. Your homework solutions should be presented cleanly (they should not look like scratch paper) and equations should be framed and connected by complete, grammatical sentences. Your solutions should read like stories or like textbook excerpts. You should not simply copy solutions to similar problems that you have found on the internet. This is academic dishonesty unless you acknowledge the source of your "solution," and you will likely learn little this way.

How we will assess the goals

Final grades will be based on the following components:

- *Participation (20%)*
    - Engaging with material and in discussion during class time
    - Recitation worksheet
- Homework (35%)
    - Problem Sets (10%)
    - Lecture HW (12.5%)
    - Recitation HW (12.5%)
- Exams (45%; 15% each)
    - Exam 1: TBD
    - Exam 2: TBD
    - Exam 3: TBD

Your numerical grade is translated into a letter grade according to:

A range ≥ 90%
B range ≥ 80%
C range ≥ 70%
D range ≥ 60%
F < 60%

Course Schedule

Course Schedule					
Week	*Mon*	*Tues*	*Wed*	*Thurs*	*Fri*
1	Introduction	Motion, Kinematics	Vectors, Forces	Newton's Laws, Projectiles	1D Dynamics
	Rec #1:How big is an earthworm?	Rec #1:How big is an earthworm?	Rec #2: Kinematics	Rec #2: Kinematics	
2	Newton's 3rd Law	2D Dynamics	Work and kinetic energy	Potential energy	EXAM 1
	Rec #3: Statics	Rec #3: Statics	Rec #4: Dynamics	Rec #4: Dynamics	
3	**Juneteenth**	Energy conservation	Impulse and momentum	Rotational motion	Rotational dynamics
		Rec #5: Energy	Rec #5: Energy	Rec #6: Momentum	
4	Rotational Energy	Gravity	Fluids	Oscillations	EXAM 2
	Rec #6: Momentum	Rec #7: Rotational	Rec #7: Rotational	Rec #8: Pressure in a liquid	
5	Phases of matter	**Independence Day**	First law of thermodynamics	Micro/macro connection	EXAM 3
	Rec #8: Pressure in a liquid		Rec #9: Buoyancy	Rec #9: Buoyancy	

Policies

Accommodations

- Accommodations Requests: If you have a disability that may affect your academic work or well-being and for which accommodations may be necessary, I encourage you to approach me within the first two weeks of the course (or, in other circumstances, as soon as possible after accommodation becomes necessary) so that I can arrange for your needs to be met in this regard. You will also need to contact the Academic Resource Center (http://academicsupport.georgetown.edu), located in Leavey Center

Honor System

The Georgetown Honor System can be found online at http://honorcouncil.georgetown.edu. All students are expected to maintain the highest standards of academic and personal integrity in pursuit of their education at Georgetown. Academic dishonesty, including plagiarism, in any form is a serious offense, and students found in violation are subject to academic penalties. All students are held to the Georgetown University Honor System.

Support

When it comes to issues around health and wellness, you may face challenges in your time at Georgetown—and even in the course of one semester. It's important to be aware of the resources available to support you, myself included.

Here is a link to the mental health, wellness and health care resources Georgetown provides: https://www.georgetown.edu/mental-health-and-telehealth-resources/

Here is a link to the Coronavirus resources Georgetown provides: https://www.georgetown.edu/coronavirus/

Here is a guide to returning to campus that was put together by the Center for New Designs in Learning and Scholarship (CNDLS): https://instructionalcontinuity.georgetown.edu/guide-for-students/

Project Lighthouse is a peer-to-peer support service developed in consultation with the Georgetown Counseling And Psychiatric Services (CAPS), the office of the Assistant Vice President for Student Health, and Health Education Services (HES). They provide an easy-to-access resource for Hoyas to anonymously voice their concerns to a sympathetic ear, and we discuss and explain resources that could help. During the Georgetown academic semester, their anonymous chat line is available from 7 PM to 1 AM EST, 7 days per week. You can access the chat service by visiting the Home page of this website during our hours of operation and clicking "chat with us." This will redirect you to the chat platform, where you will be anonymously connected to a Georgetown peer who is trained and ready to listen.