

General Physics I, PHY 130-01 and 130-02, Spring 2021



COURSE MEETING TIME AND PLACE:

Course Section	Meeting Time	Format	Location (zoom link)
130-01 (lecture)	MWF 9:00-9:50 am	Remote Synchronous	
130-91 (fourth hour)	W 2:00-2:55 pm	Remote Synchronous	
130-02 (lecture)	MWF 10:00-10:50 am	Remote Synchronous	
130-92 (fourth hour)	W 3:00-3:55 pm	Remote Synchronous	

Students should plan on attending the lecture and discussion for which they are registered. Permission to attend the other section may be granted under special circumstances, but only if requested in advance. **Students must attend their own section for exams.**

COURSE DESCRIPTION:

Physics 130 (General Physics 1) is the first semester of an introductory, algebra based, physics sequence. Topics covered include kinematics, dynamics, the mechanics of solids and fluids, wave motion, heat and temperature, and kinetic theory. In less technical language, we will cover the mathematical description and modeling of motion (kinematics), how forces give rise to changes in motion (dynamics), and a number of applications on the macroscopic and microscopic world. *Physics 130 is primarily a service course for students in biological and health science fields, so we will emphasize applications to these fields.*

A laboratory portion of this course will provide experience with these phenomena discussed in lecture and give a glimpse into how scientists discovered physical laws.

Please note Physics 130 is also an approved science distributive course in WCU's general education program (see the General Education statement later in this document.)

Prerequisites: A good working knowledge of algebra and trigonometry are pre-requisites for this course. Mathematical language provides the precision required to state physical laws and the tools to manipulate them. We will be using algebra and trigonometry on a daily basis. ***If you feel you have any deficiencies in your mathematical preparation please see me.***

INSTRUCTOR INFORMATION:

Dr. Shawn H. Pfeil

e-mail: spfeil@wcupa.edu (please include course and section number on subject line)

phone: (610) 430-4084

office: Schmucker Science South 229 (Current location: Somewhere in Chester County)

WCU OFFICIAL COVID-19 STATEMENT

Part of West Chester University's response to the COVID-19 pandemic was to switch the vast majority of instruction to remote. This decision was made out of an abundance of caution to protect the health of all members of the WCU community. Faculty have been asked to make every effort to adapt their courses to this novel situation while still meeting the critical learning outcomes of the course. Students are asked to discuss any problems with the new course format and schedule directly with their instructors. Patience and flexibility on everyone's behalf are critical to our community's navigation of this public health crisis.

For this particular course, the following alternative modalities are being utilized: Instruction over Zoom video conferencing, which is offered synchronously, but some of it may be accessed asynchronously (see below), a prerecorded lab experiments with synchronous work on Zoom in "lab groups" (see lab supplement), and exams proctored remotely on Zoom.

WEST CHESTER UNIVERSITY GENERAL EDUCATION LEARNING OUTCOMES:

PHY 130 is approved as a WCU General Education Science Distributive course, and as such meets the following General Education Goals:

Gen Ed Goal #1: Communicate effectively

Gen Ed Goal #2: Think critically and analytically

Gen Ed Goal #3: Employ quantitative concepts and mathematical methods

More specifically, after successfully completing this course a student will be able to:

1. Mathematically describe mechanical systems using the language of kinematics.
2. Recognize and distinguish between the concepts of physics in action within mechanical systems, including force, energy, momentum, harmonic motion, and wave phenomena.
3. Analyze mechanical systems through visualization, modeling, algebra, as well as diagrammatic and graphical techniques.
4. Assemble the above elements in order to solve multi-part problems and formulate quantitative predictions for physical experiments.

Student learning outcomes will be met and assessed through the following activities:

- **Communicate effectively:** This course develops a student's ability to express oneself effectively in common college-level written forms (Gen Ed SLO #1a). In class, peer instruction specifically in recitation, give students practice communicating physical concepts in plain language. Homework assignments develop a student's ability to describe physical systems in the mathematical language of kinematics. Laboratory activities, performed in groups of 2-3 students, provide further practice explaining physical systems with brevity and mathematical precision. Effective written communication is assessed through short-answer conceptual questions on exams, as well as Post-Lab Assignments.
- **Think critically and analytically:** This course develops a student's ability to construct and/or analyze arguments in terms of their premises, assumptions, contexts, conclusions, and anticipated counter-arguments (Gen Ed SLO #2b), as well as reach sound conclusions based on a logical analysis of evidence (Gen Ed SLO #2c). In mechanics, critical thinking most often takes the form of identify/analyze/predict: (i) identify the aspects of physical system which determine its motion, (ii) analyze the system using physical concepts and mathematical relations, and (iii) develop a quantitative prediction for the system's behavior. Lecture, in-class activities, and homework problems all work to develop a student's skill in this process. For example, a common in-class activity is to propose a brief experiment and ask students to formulate a prediction for the outcome of that experiment. The experiment is then performed, and students are asked to analyze the assumptions and logic that led to their prediction. Student achievement in this critical thinking process is assessed through multiple choice questions and analytic free-response problems on exams. Critical and analytical thinking is also developed in the lab. Laboratory exercises ask students to synthesize experimental results and physical reasoning in order to construct explanations of observed behavior, formulate predictions for future experiments, and critically assess the quality of their data. Student achievement in these skills is assessed through written Lab Exercises and Post-Lab Assignments.
- **Employ quantitative concepts and mathematical methods:** This course develops a student's ability to employ quantitative methods to examine a problem in the natural or physical world (Gen Ed SLO #3a), as well as apply the basic methods and thought processes of the scientific method for natural/physical science in a particular discipline (Gen Ed SLO #3b). As a course in mechanics, essentially every element of this course involves quantitative methods and problem-solving. Quantitative tools such as algebra, trigonometry, and vectors are employed in every aspect of the course. Lecture presentation and textbook material train students in the following problem-solving skills: organizing information, visualizing and diagramming, recognizing concepts, strategizing solutions, combining mathematical relations, and assessing results. Weekly laboratory sessions allow students to actively apply the scientific method in order to explore physical phenomena and verify their predictions. For instance, in a lab on projectile motion students are tasked with predicting the distance a ball will travel when shot out of a launcher.

Students determine the initial launch speed of the ball empirically, then utilize their measurement to model the ball's flight and ultimately predict the ball's landing position. Students then critique and refine their analysis based upon the accuracy of their result. While quantitative problem-solving is an ingredient in every aspect of the course, it is primarily assessed through exam questions and through written Lab Exercises.

WHERE AND WHEN YOU ARE REQUIRED TO ATTEND ONLINE:

- **When are you required to attend synchronously?**

- You are required to attend the **fourth hour**, i.e. the second meeting on Wednesdays labeled W2 on the calendar. We will be working on carefully chosen tutorial problems in groups during these times.
- Exams are proctored in real time synchronously on Zoom (see further along in the syllabus). You must attend synchronously at those times.

- **When do I suggest you attend synchronously?**

The regular class periods will be hosted on Zoom. *I strongly suggest attending these meetings live, so that you can ask questions in real time.* Being able to stop me and ask a question as it occurs is one of the key advantages of a live class. *I will also be posting the lecture videos on D2L, which will allow you to rewind, revisit, or view them asynchronously.*

- **Can you attend asynchronously?**

I understand that you may have issues that arise, for example an internet outage, which may keep you from attending the regular lecture period. Don't worry about it too much, the lecture will be posted on D2L.

- **Zoom Etiquette**

I **require** the following during Zoom attendance:

- **You must use your real name.** I will not admit anyone who I don't recognize. (Honestly, this only really comes up when students have to borrow a device and forget to edit the zoom name.)

I **request** the following:

- Please be on camera. Non-verbal communication is important. Reading your faces is one way I gauge how long we need to spend on each topic. *I don't record your video. I only record the shared screen and audio.*
- If you cannot be on camera, then please put a picture in your zoom profile. Teaching a sea of black boxes is problematic.

- **Zoom Privacy Concerns:**

- I have set the record settings for our class so that the shared screen, i.e. slides and the tablet I am working problems out on is recorded & the audio track is recorded. Your video will not be recorded. *If you ask a question via audio your voice will be recorded. If you are uncomfortable with your voice being on the recording please use the public chat to ask your question.*

OFFICE HOURS:

My scheduled office hours as of the first day of class are listed below. I reserve the right to adjust this schedule to reflect unforeseen circumstances. **Please note homework assignments are due Tuesday evenings at 11:59 pm.**

I will be using Microsoft Bookings to schedule office hours at:

https://outlook.office365.com/owa/calendar/Shawn_Pfeil_Office_Hours@WCUPA.onmicrosoft.com/bookings/. Please note: I am available on short notice during the entire office hour, but you must book ten minutes ahead of time. The use of a scheduler is simply to avoid having to stay logged into Zoom if no one is present.

Monday	Tuesday	Friday
2:00-3:00 pm	9:00 am – 12 pm	2:00 pm – 3:00 pm

Office hours are available by appointment for students with an ongoing conflict with my scheduled hours.

REQUIRED COURSE MATERIALS & INCLUSIVE ACCESS:

Textbook and Homework System: Physics 5/e by Walker with Modified Mastering Physics.

The textbook, in an e-book form, and homework for this system are provided through WCU's inclusive access program. This means you should see a \$112.93 charge for Mastering Physics for Physics 5/e by Walker appear on your Bursar's account. This is a discounted from the online purchase price of \$146.65. Both are for 24 month access which is typically long enough to complete PHY 130 and PHY 140.

Gaining Access: You will be able to register for Modified Mastering Physics with the e-book included directly from the courses D2L (course management) website.

If You Already Have Access or Drop the Course: You can opt-out of inclusive access until the drop/add deadline of September 3rd. You should have received an e-mail with a link to do this. If you opt-out you receive a refund. *If you are retaking and already have a Modified Mastering Physics account opt out and use your old login to access the resources through D2L.*

If You Want a Paper Copy: You can order a loose-leaf copy of the book directly from the publisher while logged into Modified Mastering Physics. There is a "Purchase Option" link on this website. The cost from Pearson is \$44.99.

Calculator: You will want a basic scientific calculator for this course. Something at the level of a Ti-30 or nicer is recommended. These cost as little as \$15. You do not need a graphing calculator.

Please note you will never be able to use your cell-phone as a calculator in class. It may however be worth finding a nice calculator application for your phone for doing homework. If you do this, try to get an emulator for the same model as you purchase.

TIME COMMITMENT:

The life of a college student is not easy. A full time student can expect to spend about 40+ hrs per week on coursework, or about 10+ hrs per week per course. This is significantly more than our formal meeting time of 5.3 hrs a week including lab. You should be spending 4.7+ hrs a week outside of our meetings doing homework problems, reading, & practice problems.

HOW YOUR GRADE WILL BE CALCULATED (ASSESSMENT):

I will be using the D2L grade-book feature to post course grades. Please check it periodically.

- **Laboratory** (15%): You will be assigned a percentage in lab by your lab instructor. I will use this to calculate the laboratory portion of your grade.
- **Homework** (15%): Homework assignments are due at 11:59 pm on Tuesdays **All assignments have a clearly labeled due date on Modified Mastering Physics. It is your responsibility to check Modified Mastering Physics periodically for assignment updates.**

Solutions to all homework problems are available on the online system immediately after the assignment is due. Because solutions are available immediately late homework will not be considered.

- **Recitation Problems** (3%): Our second meeting on most Wednesdays will be used for recitation, a problem solving session. In this recitation you will be split into groups of 3-4 students and asked to work on a set of problems. At the end of the recitation period you will turn in a write-up of one specific problem as a group. Each recitation problem set will be graded as either satisfactory 1 point or unsatisfactory 0 points. Guidelines will be given for what is considered a satisfactory problem write-up. **Recitations problems will be collected on Crowdmark. I will drop your lowest recitation problem-set score.**
- **Exams:**

Regular Exams: (50%): We will have four (4) regular exams. *Your lowest regular exam score will be dropped.* This means each exam which is kept will count for 16.67% of your final grade.

Cumulative Final: (17%): We will have a cumulative final worth 17%.

If you miss a regular exam : If you miss an exam for a **University Sanctioned Event** you must notify me in advance so that we can arrange for you to take the exam in a manner consistent with its integrity. You must also provide some form of documentation (performing arts program, competition schedule etc.) If you miss an exam due to sickness, a death in the family, or another reasonable reason, talk to me.

If you have an OSD letter pertaining to exams: You are responsible for making the appropriate arrangements **prior** to the exam date and time. Please note the proctoring center requires that you schedule at least a week in advance.

I will be using the official WCU scale for grades. However, I reserve the right to adjust the weights of individual components, or the scale to account for unforeseen circumstances.

I use the standard WCU grade scale (see below). I round up on 0.5. For example, 92.5% is an A not an A-.

Letter	Grade Points	Percentage	
A	4.000	93 - 100	Excellent
A-	3.670	90 - 92	
B+	3.330	87 - 89	Superior
B	3.000	83 - 86	
B-	2.670	80 - 82	
C+	2.330	77 - 79	Average
C	2.000	73 - 76	
C-	1.670	70 - 72	
D+	1.330	67 - 69	Below Average
D	1.000	63 - 66	
D-	0.670	60 - 62	
F	0.000	59 or lower	Failure

SOFTWARE AND WEB RESOURCES

This course does not require you to purchase anything other than the license for MasteringPhysics (the homework system.) However, we do use a couple of different online resources.

D2L:

- When you log into D2L and select our course PHY 130-02. You will land on an entry page. All of the material you need to access for the course is one or two clicks away at this point. The navigation bar at the top has been edited to allow quick navigation. **It is your responsibility to check these resources periodically for any updates and announcements. You may want to set D2L to notify you when new content is posted.**
- **Lecture slides on D2L:** You can find a copy of the lecture slides, without the example problems filled in, on D2L prior to lecture. You may want to print a copy to annotate during lecture. After lecture, typically within 24 hours, I will post an annotated version of the notes from lecture. *Although lecture slides are posted for the entire semester, I reserve the right to update or edit the notes.* I will announce any change on D2L.

CROWDMARK:

We will be using Crowdmark.com to collect exams and recitation problems. I'll send information about it in a separate document.

MASTERING PHYSICS:

We will be using Modified Mastering Physics, the publisher's homework system. A link is integrated into D2L. Homework assignments are to be performed on Modified Mastering Physics.

ATTENDANCE POLICY:

Attendance is taken for this course. Attending lecture, while highly correlated with success in this course is not graded.

PHYSICS TUTORING:

Physics tutoring is available through LARC (610) 436-2535. In the past peer tutoring has also been available from SPS (the Society of Physics Students). If SPS tutoring becomes available this semester I will make an announcement. **These should be considered in addition to my office hours, which are the first place you should stop for additional help.**

INTELLECTUAL PROPERTY STATEMENT:

I, the instructor, utilize copyrighted materials under the “Freedom and Innovation Revitalizing the United States Entrepreneurship Act of 2007” (Fair Use Act). Apart from such copyrighted materials, all other intellectual property associated with this course is owned and copyrighted by the instructor, including, but not limited to, lectures, course discussions, course notes, slides, assessment instruments such as exams, and supplementary materials posted or provided to students authored by the instructor. No recording, copying, storage in a retrieval system, or dissemination in any form by any means of the intellectual property of the instructor, in whole or in part, is permitted without prior written permission of the instructor. When such permission is granted, it must specify the utilization of the intellectual property and all such permissions and waivers shall terminate on the last day of finals of the semester in which this course is held.

Statements Common to All WCU Undergraduate Syllabi

ACADEMIC & PERSONAL INTEGRITY

It is the responsibility of each student to adhere to the university’s standards for academic integrity. Violations of academic integrity include any act that violates the rights of another student in academic work, that involves misrepresentation of your own work, or that disrupts the instruction of the course. Other violations include (but are not limited to): cheating on assignments or examinations; plagiarizing, which means copying any part of another’s work and/or using ideas of another and presenting them as one’s own without giving proper credit to the source; selling, purchasing, or exchanging of term papers; falsifying of information; and using your own work from one class to fulfill the assignment for another class without significant modification. Proof of academic misconduct can result in the automatic failure and removal from this course. For questions regarding Academic Integrity, the No-Grade Policy, Sexual Harassment, or the Student Code of Conduct, students are encouraged to refer to the Department Undergraduate Handbook, the Undergraduate Catalog, the Ram’s Eye View, and the University website at www.wcupa.edu.

STUDENTS WITH DISABILITIES

If you have a disability that requires accommodations under the Americans with Disabilities Act (ADA), please present your letter of accommodations and meet with me as soon as possible so that I can support your success in an informed manner. Accommodations cannot be granted retroactively. If you would like to know more about West Chester University’s Services for Students with Disabilities (OSSD), please visit them at 223 Lawrence Center. Their phone number is 610-436-2564, their fax number is 610-436-2600, their email address is ossd@wcupa.edu, and their website is at www.wcupa.edu/ussss/ossd. In an effort to assist students who either receive or may believe they are entitled to receive accommodations under the Americans with Disabilities Act and Section 504 of the Rehabilitation Act of 1973, the University has appointed a student advocate to be a contact for students who have questions regarding the provision of their accommodations or their right to accommodations. The advocate will assist any student who may have questions regarding these rights. The Director for Equity and Compliance/Title IX Coordinator has been designated in this role. Students who need assistance with their rights to accommodations should contact them at 610-436-2433.

EXCUSED ABSENCES POLICY

Students are advised to carefully read and comply with the excused absences policy, including absences for university-sanctioned events, contained in the WCU Undergraduate Catalog. In particular, please note that the “responsibility for meeting academic requirements rests with the student,” that this policy does not excuse students from completing required academic work, and that professors can require a “fair alternative” to attendance on those days that students must be absent from class in order to participate in a University-Sanctioned Event.

REPORTING INCIDENTS OF SEXUAL VIOLENCE

West Chester University and its faculty are committed to assuring a safe and productive educational environment for all students. In order to comply with the requirements of Title IX of the Education Amendments of 1972 and the University’s commitment to offering supportive measures in accordance with the new regulations issued under Title IX, the University requires faculty members to report incidents of sexual violence shared by students to the University’s Title IX Coordinator. The only exceptions to the faculty member’s reporting obligation are when incidents of sexual violence are communicated by a student during a classroom discussion, in a writing assignment for a class, or as part of a University-approved research project. **Faculty members are obligated to report sexual violence or any other abuse of a student who was, or is, a child (a person under 18 years of age) when the abuse allegedly occurred to the person designated in the University Protection of Minors Policy.** Information regarding the reporting of sexual violence and the resources that are available to victims of sexual violence is set forth at:

https://www.wcupa.edu/_admin/diversityEquityInclusion/sexualMisconduct/default.aspx

EMERGENCY PREPAREDNESS

All students are encouraged to sign up for the University’s free WCU ALERT service, which delivers official WCU emergency text messages directly to your cell phone. For more information, visit www.wcupa.edu/wcualert. To report an emergency, call the Department of Public Safety at 610-436-3311.

ELECTRONIC MAIL POLICY

It is expected that faculty, staff, and students activate and maintain regular access to University provided e-mail accounts. Official university communications, including those from your instructor, will be sent through your university e-mail account. You are responsible for accessing that mail to be sure to obtain official University communications. Failure to access will not exempt individuals from the responsibilities associated with this course.

ALL OTHER ACADEMIC POLICIES

For any university wide academic policy not explicitly covered in this document, such as No Grade policies. Please consult your major advising handbook, the Undergraduate Catalog, the Ram’s Eye View, or the University Website.

COURSE SCHEDULE: (next page): A tentative schedule for the course follows. Although I will endeavor to stick closely to the schedule as posted below, I reserve the right to modify it as needed over the course of the semester.

Date (mm/dd)	Day	Topic	Lecture #	Reading	Lab (Wed or later)
01/25	M	Introduction and Units	1		No Lab
Week 1	W1	More Units and Dimensional Analysis	2	1.1-1.3,1.5-1.7	
	W2	Position, Displacement, Average Velocity	3	2.1-2.2	
	F	Instantaneous Velocity and Acceleration	4	2.3-2.4	
2/01	M	More 1D Kinematics	5	2.5-2.6	Orientation LAB 1A
Week 2	W1	When Objects are free to Fall	6	2.7	
	W2	1D Kinematics Problem Solving			
	F	Vectors Part I	7	3.1-3.5	
02/08	M	Vectors Part II	8	3.1-3.5	LAB 1B
Week 3	W1	2D Kinematics, Projectile motion w/ horizontal launch	9	4.1-4.3	
	W2	Vectors and Projectile Motion w/ horizontal launch			
	F	Problems Projectile motion with an arbitrary angle	10	4.4-4.5	
02/15	M	Newton's 1 st and 2 nd Laws	11	5.1-5.3	LAB 2
Week 4	W1	Newton's 3 rd Law	12	5.4-5.5	
	W2	Exam 1: Kinematics and Vectors		Coverage: Lectures 1-10	
	F	Weight and Normal Force Part I	13	5.6-5.7	
02/22	M	Weight and Normal Force Part II	14	5.6-5.7	LAB 3
Week 5	W1	Friction	15	6.1	
	W2	Newton's Law Problem Solving			
	F	Tension and Spring Forces	16	6.2	
03/01	M	Translational Equilibrium	17	6.3	LAB 4
Week 6	W1	Centripetal Acceleration and Centripetal Force	18	6.5	
	W2	More Newton's Law Problem Solving			
	F	Work and Kinetic Energy	19	7.1-7.2	
03/08	M	Work-Energy Theorem	20	7.2-7.3	LAB 5
Week 7	W1	Work done by a variable force, Power	21	7.3-7.4	
	W2	Work-Energy Problems			
	F	Exam 2: Forces		Lectures 11-18	
03/15		Spring Break			NO LAB
Week 8					
03/22	M1	Conservative and Nonconservative Forces, Potential Energy	22	8.1-8.2	NO LAB
Week 9	W1	Conservation of Mechanical Energy, Work Done by Non-Conservative forces	23	8.3-8.4	
	W2	Energy Conservation Problems			
	F	Momentum and Impulse	24	9.1-9.3	
03/29	M	Applying Momentum Conservation	25	9.4-9.6	LAB 6
Week 10	W1	Finishing up Momentum		9.4-9.6	
	W2	Energy and Momentum Problems			
	F	Rotational Kinematics Part I	27	10.1-10.3	

04/05	M1	Rotational Kinematics Part II	28	10.3-10.4	LAB 7
Week 11	W1	Rotational Energy and Inertia	29	10.5-10.6	
	W2	EXAM 3: Energy and Momentum			
	F	Torque	30	11.1-11.2	
04/12	M	Static Equilibrium & Center of Mass	31	11.3-11.4	LAB 8
Week 12	W1	Oscillations about Equilibrium Part I	32	13.1-13.5	
	W2	<i>Static Equilibrium Problem</i>			
	F	Oscillations about Equilibrium Part II	33	13.5-13.8	
04/19	M	Introduction to Waves and Waves on a String	34	14.1-14.2	LAB 9
Week 13	W1	Sound Waves and Intensity	35	14.4-14.5	
	W2	<i>Simple Harmonic Motion Problems</i>			
	F	The Doppler effect	36	14.6	
04/26	M	Superposition and Interference	37	14.7-14.8	LAB 10
Week 14	W1	Standing Waves	38	14.7-14.8	
	W2	<i>Wave Problems</i>			
	F	Pressure, Density, & Static Equilibrium in Fluids	39	15.1-15.3	
05/03	M	Pascal and Archimedes Principles	40	15.4-15.5	NO LAB
Week 15	W1	Application of Archimedes' Principle	41	15.4-15.5	
	W2	Exam 4: Rotation, SHM, and Waves			
	F	*Fluid flow and continuity, Viscosity and Surface tension	42	15.9	
05/10	M	Review			NO LAB
		Final Exam 130-01, Wednesday 5/12/2021, 8-10 am 130-02, Friday 5/14/2021, 8-10 am			