General Physics I (PHY 130)

Spring 2022, sections 1 & 2

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 several applications on the macroscopic and microscopic world. A laboratory portion of this course will provide experience with these phenomena discussed in lecture and provide hands on experience. ***PHY 130 is an approved science distributive course in the WCU general education program (details provided later in the syllabus.)***

Prerequisites: This course has no formal prerequisites but assumes a good working knowledge of Algebra. If you have mastered the material in either of WCU's Algebra offerings (MAT 113 or MAT 115), or the topics covered in a High School Algebra course, you should be in good shape.

INSTRUCTOR INFORMATION:

Dr. Shawn H. Pfeil (*last name pronounced "file"*)
e-mail: spfeil@wcupa.edu (please identify which course you are contacting me about)
phone: (610) 430-4084
office: SECC 363

COURSE MEETING TIME AND PLACE:

Course Section	Meeting Time	Location
130-01 (lecture)	MWF 9:00-9:50 am	Brandywine 033
130-91 (fourth hour)	W 2:00-2:55 pm	SEC 112
130-02 (lecture)	MWF 10:00-10:50 am	Brandywine 033
130-92 (fourth hour)	W 3:00-3:55 pm	SEC 112

Students **must** attend the lecture and discussion for which they are registered.

Due to the current COVID situation, the first two weeks of classes will be held synchronously online via zoom. You can find the Zoom links on the D2L page. Click "Zoom" on the main page header. Please make sure to click the link for your class. This is a combined D2L page for both sections.

WEST CHESTER UNIVERSITY'S COVID-19 CLASSROOM PROTECTION REQUIREMENTS

We, as a community of educators and learners, should work together to create a culture that protects our most precious resource: each other. As such, it is the expectation of all members of the University community to continue to do their part to protect the health and safety of others. In our classrooms where the university's primary function is carried out, the following protocols are being implemented:

- Unless otherwise directed by the faculty member, students must wear a cloth or disposable face mask that covers both the nose and mouth the entire time they are in class.
    - Face shields and gaiters do ***not*** meet the university's mask requirement.
- Eating and drinking in the classroom are only permitted if they are medically necessary.
    - Please work with the Office of Services for Students with Disabilities to notify the university and your professors of this necessity.

We want you to succeed in this class, but we will have to ask you to leave if you do not follow these guidelines, so please – make the most of this opportunity and help keep our campus safe.

OFFICE HOURS:

My scheduled office hours are listed below. I reserve the right to adjust this schedule to reflect unforeseen circumstances or ongoing student scheduling conflicts. Please note homework assignments are **due Tuesday evenings at 11:59 pm**.

In Person Office Hours:

Per University COVID policy, students are required to have a mask on during office hours. Due to the physical size of my office only one student will be able to attend at a time. In-person office hours are drop-in and first come first served. ***When we go back on campus, I will inform you of which office hours will be in-person.***

Virtual Office Hours:

I will also hold some office hours over Zoom. These office hours must be scheduled. You can schedule these office hours by clicking on the "Office Hours Scheduler" link on the courses D2L page (Look in the header of the first page you land on.)

Tuesday	Wednesday	Friday
10 am – 12 pm	12 pm – 2 pm	11 am – 12 pm

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

REQUIRED COURSE MATERIALS

Textbook

The textbook and homework system we are using Physics 5/e by Walker with Modified Mastering Physics, are through *inclusive access.* This means that you should see a $112.93 charge for the show up on your Bursar's account for the book. This is a discounted from the online purchase price of $124.99. 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 Drop the Course: You can opt-out of inclusive access until the drop/add deadline. You should have received an e-mail with a link to do this. If you opt-out you receive a refund. *The deadline to opt-out is the add/drop deadline 01/31/2022.*

If You Are Retaking the Course: During the registration process in D2L, opt-out of inclusive access, and use your old login for Physics 5/e.

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. You don't need anything fancy or expensive. For example, a Ti-30Xa, retail price $8.99, is perfectly sufficient.

Please note you will never be able to use your cellphone, tablet, etc., as a calculator in class. If you own a fancier calculator, with a memory function, you may use it provided you clear the memory prior to each exam.

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 4.5+ hrs a week outside of our meetings doing homework problems, reading, & practice problems.

GRADED COURSE COMPONENTS, WEIGHTS, POLICY ON MISSED EXAMS

I will be using the D2L grade-book feature to post course grades. Please check it periodically. (*Please note that I reserve the right to change the weights of course components in the event of unforeseen circumstance.)*

- **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 is not accepted for credit.
- **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.
- **Final:** (20%): We will have a cumulative final worth 20%. All students are required to take the final exam. The final exam score may not be dropped.

If you miss an exam: If you plan to ask for a make-up exam you need to let me know as soon as is feasible. I will give a make-up exam, or provide other adjustment, under the following conditions:

- You missed the exam for a **University Sanctioned Event,** notified me in advance, and provide some form of documentation (performing arts program with you listed as cast, competition schedule signed by your coach etc.)
- You missed an exam due to a truly unavoidable commitment and you let me know in advance. You must let me know in advance, so that we can make sure that we agree the commitment is truly unavoidable. (This is the category that includes family weddings and funerals etc.) Again, you'll need to provide documentation.
- You missed the exam due to some completely unforeseeable event which is completely out of your hands. For example, you are driving to the exam and get into a car accident, get admitted to the hospital, your roommate tells you they have COVID the night before the exam and you must quarantine. In this case you need to tell me as soon as it is feasible and safe to do so. (For example, if you got into a non-injury accident, and have your cell phone, you could e-mail me while you are waiting for the tow truck.)

If the exam you want to makeup has occurred sufficiently long ago that solutions have been posted, I reserve the right to adjust the weighting of your final exam or replace your missing exam score with the sub-score on the same material in the final exam.

If you have or need an accommodation under the ADA for an exam: You are responsible for making the appropriate arrangements **at least a week prior** to the exam date and time. These arrangements must include getting a letter from OSSD. Please see the "Students with Disabilities" statement. ***This is also the proper way to deal with temporary disabilities.*** For example, if you break your writing-hand and need more time on exams because you must write with your non-dominant hand.

GRADE CALCULATION:

I will be using the standard WCU scale for grades (see table below). I round your course-grade up at 0.5, and calculate them to the tenths place. For example, 92.5% rounds to 93% so it 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:

We use BrightSpace by D2L as our course portal. What you will find in D2L:

- VitalSource: This is the link to the inclusive access portal for the textbook. You will use this to do homework using the online homework system, to see a calendar of when assignments are due, and to access the electronic textbook.
- D2L announcements – the landing page for D2L has an announcements tool, which I will use to communicate with you.
- D2L gradebook – The gradebook feature will allow you to see your current grade in the course. (However, please note the laboratory grade updates infrequently since it is calculated by your lab instructor independently.)
- Microsoft OneNote Notebooks: If you have access to a tablet and stylus, this is a good way to work together in online office hours. If you don't have these devices, don't worry. There are other good ways to proceed.

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 counterarguments (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.

ATTENDANCE POLICY:

Attendance is taken for this course. Attending lecture, while highly correlated with success in this course is not graded. *Please note that I am required to report attendance to the University, and that this attendance can have financial aid implications.*

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.

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.

ONLINE RESOURCES AND ACADEMIC INTEGRITY:

Posting of any of the homework or exam questions from this course to Chegg, Course Hero, or any other site where solutions are made available for a fee is a violation of the academic integrity policy. Copying solutions to problems from these websites is a form of plagiarism, since any student that does so passes off others work as their own. Solutions from any website which charges fees counts as buying solutions. Posting any materials which I have written, i.e. any exam questions in the course, is a violation of both academic integrity and a misuse of my intellectual property. Posting or accessing any exam course exam questions on these sites, at any time, will result in sanctions.

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.

TENTATIVE 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)
01/24	M	Syllabus, Math Prerequisites, Resources	0	None	No Lab
Week 1	W1	Units, Dimensions, SI multipliers, Scalars and Vectors	1	1.1-1.3,1.5-1.7	
	W2	Position, Displacement, Avg. Velocity, Avg. Speed	2	2.1-2.2	
	F	Instantaneous Velocity and Acceleration	3	2.3-2.5	
01/31	M	The velocity and position relationships	4	2.5	Introduction to lab Zoom
Week 2	W1	When we don't care about Δt, more examples	5	2.5-2.6	
	W2	When Objects are free to Fall	6	2.7	
	F	Vectors Part I	7	3.1-3.5	
02/07	M	Vectors Part II	8	3.1-3.5	LAB 1A Data Analysis
Week 3	W1	Kinematics in 2D – General Concerns	9	4.1-4.2	
	W2	Projectile Motion – Horizontal Launch	10	4.2-4.3	
	F	Problems Motion – Launch at an Angle	11	4.4-4.5	
02/14	M	Newton's 1st and 2nd Laws	12	5.1-5.3	LAB 1B Measurement
Week 4	W1	Newton's 3rd Law, Forces as Vectors	13	5.4-5.5	
	W2	*Kinematics and Vectors Review Problems*	R1		
	F	**Exam 1: Kinematics and Vectors (CH 1-4)**			
02/21	M	Weight	14	5.6	LAB 2 1D Kinematics
Week 5	W1	Normal Force	15	5.7	
	W2	Static Friction	16	6.1	
	F	Kinetic Friction	17	6.1	
02/28	M	Tension and Spring Forces	18	6.2	LAB 3 Free Fall
Week 6	W1	Translational Equilibrium	19	6.3	
	W2	Centripetal Acceleration	20	6.5	
	F	Centripetal Force	21	6.5	
03/07	M	Work and Kinetic Energy	22	7.1	LAB 4 Projectiles
Week 7	W1	Work-Energy Theorem	23	7.2	
	W2	*Force Problem Review*	R2		
	F	**Exam 2: Forces (CH 5-6)**			
03/14 Week 8		**Spring Break**			**NO LAB**
03/21	M1	Work Done by a Variable Force & Power	24	7.3 – 7.4	NO LAB
Week 9	W1	Conservative and Nonconservative Forces, Potential Energy	25	8.1-8.2	
	W2	Conservation of Mechanical Energy, Work Done by Non-Conservative forces	26	8.3-8.4	
	F	Momentum and Impulse	27	9.1-9.3	
03/28	M	Applying Momentum Conservation	28	9.4-9.5	LAB 5 Friction
Week 10	W1	Finishing up Momentum	29	9.5-9.6	
	W2	Center of Mass (or catch-up)	30	9.7	
	F	Rotational Kinematics Part I	31	10.1-10.3	

04/04	M1	Rotational Kinematics Part II	32	10.3-10.5	LAB 6 Energy Conservation
Week 11	W1	Rotational Energy and Inertia	33	10.5-10.6	
	W2	*Energy and Momentum Review Problems*	R3		
	F	**EXAM 3: Energy and Momentum**			
04/11	M	Torque	34	11.1-11.2	LAB 7 Momentum
Week 12	W1	More Torque	35	11.3-11.4	
	W2	Static Equilibrium	36	11.3-11.4	
	F	Periodic Motion	37	13.1-13.4	
04/18	M	Oscillations about Equilibrium Part II	38	13.4-13.8	LAB 8 Angular Dynamics
Week 13	W1	Introduction to Waves and Waves on a String	39	14.1-14.2	
	W2	Sound Waves and Intensity	40	14.4-14.5	
	F	The Doppler effect	41	14.6	
04/25	M	Superposition and Interference	42	14.7	LAB 9 Hooke's Law
Week 14	W1	Standing Waves	43	14.8	
	W2	Pressure, Density, & Static Equilibrium in Fluids	44	15.1-15.3	
	F	*Review Problems: Rotation, SHM, Waves*	R4		
05/02	M	**Exam 4: Rotation, SHM, and Waves**			**NO LAB**
Week 15	W1	Pascal and Archimedes Principles	45	15.4-15.5	
	W2	Application of Archimedes' Principle	46	15.4-15.5	
	F	*Review Problems: All Topics*	R5	15.9	
5/11	W	**PHY 130-01 Final Exam 8-10 am (Same Room as Lecture)**			
5/13	F	**PHY 130-02 Final Exam 8-10 am (Same Room as Lecture)**			