

PHYSICS 130: GENERAL PHYSICS I

WEST CHESTER UNIVERSITY – FALL 2016

COURSE SYLLABUS

UPDATED: August 25, 2016

INSTRUCTOR

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COURSE SECTION DETAILS

Section	Time	Days	Location	Final Exam
130-02	12:00–12:50 pm	MWF	Merion 109	W 12/14, 1:00–3:00 pm
130-01	1:00–1:50 pm	MWF	Merion 112	F 12/16, 1:00–3:00 pm
Office hrs	3:00–4:45 pm	MWF	Merion 132	–

COURSE DESCRIPTION

Physics 130: General Physics I is a non-calculus introductory course in physics. Topics covered include kinematics, Newton's Laws, energy, rotational dynamics, the mechanics of solids and fluids, heat and temperature, kinetic theory, and wave motion. In less technical language, we will cover the mathematical description of motion (kinematics), how forces give rise to changes in motion (dynamics), and a number of applications on the macroscopic and microscopic scale.

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

This course is part of a two-semester non-calculus introduction to physics (Cf. *Physics 140: General Physics II*). This sequence is suitable for students pursuing programs in biological and health sciences, as well as programs outside the sciences. Consult the [WCU Undergraduate Catalog](#) to determine which introductory sequence is appropriate for your program.

PREREQUISITES

This course requires proficiency with pre-calculus mathematics, including algebra, trigonometry, and basic Euclidean geometry.

STUDENT LEARNING OUTCOMES

This course (PHY130) is an approved general education course in the Sciences (see the [WCU Undergraduate Catalog](#)) and as such meets the following general education goals:

- General Education Goal #2: Ability to employ quantitative concepts and mathematical methods. (Secondary Goal of Science General Education Courses)
- General Education Goal #3: Ability to think critically and analytically. (Primary Goal of Science General Education Courses)

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

1. **Mathematically describe** mechanical systems using the language of kinematics and kinetic theory.
2. **Recognize** canonical Newtonian forces, including gravitational, normal, friction, tension, and central forces.
3. **Analyze** mechanical systems using concepts of Newtonian mechanics, including force, work and energy, momentum, torque, wave phenomena, harmonic motion, and heat.
4. Combine the above elements in order to **solve** multi-part problems as well as formulate **quantitative predictions** for physical experiments.

These goals will be met through the following exercises:

- Class presentation and readings will introduce the tools of mathematical description, Newtonian forces, as well as the concepts employed in physical analysis.
- Collaborative in-class exercises and homework assignments will develop and practice analysis and problem-solving strategies in a low-risk setting.
- Homework problems and exams will guide students through synthetic, multi-part problems.
- Laboratory sessions and demonstrations will further refine students' abilities to recognize canonical forces as well as test their power of prediction.

A secondary goal of the course is to develop **science literacy**. This will be accomplished through readings and activities which address threats to learning science as well as how to discern science from "pseudoscience." Students will also read and discuss research literature.

COURSE STRUCTURE

The concepts of physics and the problem-solving strategies physicists employ are analytic tools of broad applicability. Your task as students is to master the use of these tools, not memorize equations or miscellany. With this in mind, this course is designed with the philosophy that these tools are most readily learned in an interactive, low-risk environment.

- **CLASS:** Class time will be interactive and involve several types of activities. Most of our time will be filled with short lectures combined with “clicker questions” designed to help emphasize concepts and point out common pitfalls, get feedback from students, and encourage peer instruction. We will also have occasional demonstrations, group discussions, and problem-solving activities. Attendance is mandatory.

- **PROBLEM SETS:** Homework assignments are intended to be collaborative exercises. Problem sets are “open everything” – you may consult any people and references you like. However, you should complete every assignment yourself.

Assignments will be accessed and completed through [WileyPlus](#). The due date and time for each assignment will be clearly labeled on the site. Expect one assignment due each week.

Solutions to all homework problems are available on [WileyPlus](#) immediately after the assignment is due. For this reason, late homework will not be considered. Note that each individual assignment contributes only about 1% toward your course grade.

- **EXAMS:** The purpose of exams is to test your understanding of concepts. The exams will be challenging!

During an exam you may use any written materials you bring with you as well as a stand-alone calculator (see page 4). Exams, like all aspects of the course, are “cumulative”; however, each exam is focused on a set of material listed on the course schedule. There will be three in-class exams administered in class during the semester as well as a final exam given during the Final Exam Period.

- **READINGS:** On a few occasions I will assign a short supplemental reading. We will discuss these readings in class, so you should complete the reading prior to the class listed on the course schedule. Do the readings – I may quiz you.

I do not require you to read the textbook in advance of the class presentation. I will not quiz you on textbook reading.

- **WRITINGS:** On a few occasions I will ask you to perform a very brief writing assignment. These assignments will only take about 15 minutes each and may be written in a casual style.

- **LABORATORY:** Refer to the syllabus of your lab section for details.

COURSE MATERIALS

- TEXTBOOK: The course textbook is

Physics, 10th Ed.

by Cutnell and Johnson

ISBNs: 1118899202, 9781118899205



The textbook is available new or used in various formats. There are also several previous editions which might be more affordable, though you will be responsible for translating between editions. Available at the [WCU campus store](#), though I recommend you check online sellers for the best price.

- ONLINE PLATFORM: Purchase a registration code for the [WileyPlus](#) companion to *Physics, 10th Ed.*, by Cutnell and Johnson. The online platform contains an electronic version of the textbook which can be accessed online but not downloaded. If you plan to purchase the textbook (new or used), it will likely be most affordable to purchase the textbook and [WileyPlus](#) registration code as a package. Available at the [WCU campus store](#) and online.
- “CLICKER”: You will need a Turning Technologies remote and valid Turning Account License. I recommend the most basic remote, [Turning Technologies ResponseCard RF LCD](#), but other models are fine. The [WCU campus store](#) offers new clicker/license pairs; alternatively, if you already have a clicker you can purchase a license from the [Turning Technologies](#) website. I require that you use a remote – you may not use your phone or computer as a clicker unless necessary for accessibility.

You will need to link your remote to this course on [D2L](#). For details about purchasing and setting up your remote see these instructions from the [WCU Digital Corner](#).

- CALCULATOR: For exams you will need a stand-alone calculator with no internet or communication capabilities. You will want a calculator that can compute exponentials, powers, and operate in scientific notation. You may not use your mobile phone.
- LAB MANUAL: *West Chester Department of Physics 130 Fall 2016 Laboratory Manual*, by Waite and Pfeil. Available only at the [WCU campus store](#).
- LAB NOTEBOOK: Available at the [WCU campus store](#); however, it may be cheaper to purchase from [BookFactory](#).

COURSE WEBSITES

- [D2L](#): The course [D2L](#) site will contain all course materials, including an up-to-date syllabus and schedule, my lecture and class activity notes, supplementary readings, and practice exams. You will use this site to submit writing assignments. I will use the [D2L](#) grade-book feature to post your homework and exam scores.

- **WileyPlus:** Homework assignments will be posted and submitted through this site. This site also contains an electronic copy of the textbook and many interactive study tools; you will want to play around with it. The quick link to our course site on **WileyPlus** is:

www.wileyplus.com/class/521821

- **PUBLIC SITE:** Most course materials will also be available at the course public site:

ramwebs.wcupa.edu/imorrison/PHY130/PHY130.html

STUDENT RESPONSIBILITIES

Achieving in academics requires planning, active participation in class, and careful studying outside class.

When planning:

- **EMAIL:** Regularly access, read, and respond to course communications sent to your university email account. I will only correspond via university email (mine and yours). Please include your course number in the subject of your correspondence.
- **COURSE PLATFORMS:** Regularly check the course platforms on **D2L** and **WileyPlus**. I may not announce in class changes to course content on these platforms. As with all technology, these platforms can have glitches and unscheduled service outages. For this reason, check these platforms frequently and do not leave homework assignments to the last minute.
- **ATTENDANCE:** Attend class prepared to be an active learner. Bring your functioning clicker.
- **UNIVERSITY-SANCTIONED EVENTS:** If you will not be able to perform an aspect of the course due to a University-Sanctioned Event you must notify me in advance so that we can make arrangements. You must also provide official documentation verifying your participation in the event.
- **ACCOMMODATION:** If you require additional accommodation for any aspect of the course you must notify me in advance so that we can make arrangements. Depending on the accommodation, you may need to provide a letter from the **Office of Services for Students with Disabilities** (OSSD).
- **FINAL EXAM PERIOD:** The final exam time and date are arranged by the Registrar's Office and can change. You should plan to be available the entire Final Exam Period (December 13-17, 2016).

When studying:

- **TEXTBOOK READING:** Read the sections of the textbook indicated in the course outline. You are not required to read the textbook before class, but you should read the textbook in tandem with the in-class presentation. It is up to you to determine how best to incorporate reading into your studying.
- **LABORATORY READING:** You are expected to read the laboratory manual prior to your lab session. Refer to the syllabus of your lab section for details.
- **OFFICE HOURS:** If you are struggling with any aspect of the course, or if you wish to know more about a particular topic, please attend my office hours (which are listed on page 1).

ASSESSMENT

This course follows the official WCU scale for grades (see the [WCU Undergraduate Catalog](#)):

Grade	Quality Points	Percentage	Interpretation
A	4.00	93–100	Excellent
A–	3.67	90–92	
B+	3.33	87–89	Superior
B	3.00	83–86	
B–	2.67	80–82	
C+	2.33	77–79	Average
C	2.00	73–76	
C–	1.67	70–72	
D+	1.33	67–69	Below Average
D	1.00	63–66	
D–	0.67	60–62	
F	0.00	<60	

Refer to the [WCU Undergraduate Catalog](#) for description of NG (No Grade), W, Z, and other grades. Elements of the course will contribute to the course grade as follows:

- 20% **LABORATORY:** The lab grade is determined by the instructor of your lab section. Refer to the syllabus of your lab section for details.
- 10% **IN-CLASS PARTICIPATION:** Your participation grade is determined by your contribution to class discussions as well as your interaction through clicker questions. For the clicker questions, you will be graded on participation only, not on the accuracy of your responses. There is no way to make up missed attendance in class, nor can I accurately assess participation if you fail to use your clicker.
- 15% **HOMEWORK:** Homework assignments will be accessed through one of the online platforms [WileyPlus](#) or [D2L](#). The due date and time for each assignment will be clearly labeled on the online platform. Solutions to all homework problems are available shortly after the assignment is due. Late homework will not be considered.

30% **IN-CLASS EXAMS:** There will be three exams administered in class during the semester. Each exam is worth 10% of your course grade. Both in-class and final exam scores may be scaled (“curved”) to conform to a standard distribution of grades. Failure to take an exam results in a 0 score.

25% **FINAL EXAM:** The comprehensive final exam is tentatively scheduled for the time listed on page 1. Failure to take the exam results in a 0 score.

I will use the [D2L](#) grade-book feature to post homework and exam scores.

POLICY ON LATE OR MISSED WORK

All deadlines are strict and late work will not be accepted. Rarely, a personal emergency can arise which prevents a student from completing an assignment but does not require the student to withdraw from the course. In such a rare circumstance I am happy to work with the student in order to make appropriate arrangements.

ELECTRONIC DEVICE POLICY

Your personal electronic devices (mobile phone, tablet, laptop) are great learning tools, but they also have the ability to distract you and those sitting near you. The use of devices in class is limited by the course electronic device policy. However, this policy is up to you! I have posted a preliminary electronic device policy on [D2L](#). For the first two weeks of the course students can discuss and suggest amendments to the policy. I will post the final policy will be posted to [D2L](#) on Monday, Sept. 12.

ACADEMIC INTEGRITY

Students are expected to follow all WCU rules and guidelines on academic integrity as described in the [WCU Undergraduate Catalog](#). In particular, let me highlight a few relevant issues for this class:

- **COLLABORATION:** Students are encouraged to study together and collaborate on assignments. However, you should go through the process of solving each homework problem yourself. Submitting solutions which you have not yourself obtained is fraud.
- **ONLINE PLATFORMS:** [D2L](#) and [WileyPlus](#) are extensions of the classroom and as such all WCU rules regarding student behavior apply on these platforms. Do not violate the copyrights of these sources or misrepresent your identity on these platforms.
- **CLICKERS:** Misrepresenting your identity by using someone else’s clicker is fraud.

ADDITIONAL RESOURCES

- **PHYSICS TUTORING:** Physics tutoring is available through the [Learning Assistance & Resource Center](#). 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.

- ALTERNATE TEXTS:

- *Fundamentals of Physics*, by Halliday and Resnick. This book is used for the PHY170–180 series and utilizes basic calculus. I prefer the presentation of this book over our course textbook.
- *Physics: A Conceptual World View*, by Kirkpatrick and Francis. This book is used for PHY100 courses and is less mathematically rigorous than the course textbook.

- ONLINE REFERENCES: Probably the most complete online reference available to you is the [WileyPlus](#) companion to the textbook. [WileyPlus](#) has many interactive features, example problems, and study guides. However, since the site is essentially an extension of the textbook it will not offer a different perspective on the material. You may also wish to consider:

- [Wikipedia](#)
- [HyperPhysics](#)
- [Wolfram Alpha](#)
- [Wolfram MathWorld](#)

INTELLECTUAL PROPERTY

The instructor utilizes 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.

COURSE SCHEDULE

Attached to this syllabus is a tentative schedule of course activities. The precise course trajectory may be altered to better meet our needs as well as to accommodate unforeseen circumstances. I will maintain an up-to-date course schedule on [D2L](#).

UNIVERSITY STATEMENTS

UPDATED: JUNE 2016

The following required statements are common to undergraduate course syllabi. Further information regarding university-wide academic policies may be found in the [WCU Undergraduate Catalog](#) as well as your respective major department handbook.

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 [Physics Department Undergraduate Handbook](#), the [WCU 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 [Office of Services for Students with Disabilities](#) (OSSD), please visit them at [223 Lawrence Center](#). The OSSD hours of Operation are Monday – Friday, 8:30 a.m. – 4:30 p.m. Their phone number is [610-436-2564](tel: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.

EXCUSED ABSENCES POLICY FOR UNIVERSITY-SANCTIONED EVENTS

Students are advised to carefully read and comply with the excused absences policy 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 meet this commitment and to comply with Title IX of the Education Amendments of 1972 and guidance from the Office for Civil Rights, the University requires faculty members to report incidents of sexual violence shared by students to the University's Title IX Coordinator, [Ms. Lynn Klingensmith](#). 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 the webpage for the [Office of Social Equity](#) at http://www.wcupa.edu/_admin/social.equity/.

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.

COURSE SCHEDULE

UPDATED: August 25, 2016

This schedule is a living document; the most recent version is available on the course [D2L](#) site.

Assignments are categorized as reading (R), writing (W), or problems (P). Reading assignments must be completed prior to class on the date listed. Writing and problem assignments must be submitted by the time listed on [D2L](#) or [WileyPlus](#).

Class	Date	Day	Topic	Reading	Assignment
	8/29	M	Course introduction	1.1-1.4	
1	8/31	W	Position, velocity	2.1-2.2, 2.7	
2	9/02	F	Acceleration	2.3-2.5, 2.7	W1
	9/05	M	LABOR DAY	–	
3	9/07	W	Free-fall, graphical integration	2.6-2.7	
4	9/09	F	Learning science	–	R1, P1
5	9/12	M	Vectors	1.5-1.8	
6	9/14	W	2d kinematics	3.1-3.2	
7	9/16	F	Projectiles, relative motion	3.3-3.4	P2
8	9/19	M	Uniform circular motion	5.1-5.2	
9	9/21	W	Newton's 1st and 2nd	4.7-4.8	
10	9/23	F	Gravity and normal force	4.7-4.8	P3
	9/26	M	EXAM 1: Ch. 1-3	–	
11	9/28	W	Newton's 3rd	4.5	
12	9/30	F	Friction	4.9	P4
13	10/03	M	Tension, workshop	4.10-4.12	W2
14	10/05	W	Uniform circular motion	5.3-5.7	W3
15	10/07	F	Fundamental forces, workshop	4.6	P5
	10/10	M	FALL BREAK	–	
16	10/12	W	Science in the media	–	R2
17	10/14	F	Work & energy	Ch. 6	P6
18	10/17	M			
19	10/19	W			
20	10/21	F	Linear momentum	Ch.. 7	P7
	10/24	M	EXAM 2: Ch. 4-6	–	
21	10/26	W			
22	10/28	F	Rotational kinematics	Ch. 8	P8
23	10/31	M			
24	11/02	W	Rotational dynamics	Ch. 9	
25	11/04	F			P9

Class	Date	Day	Topic	Reading	Assignment
26	11/07	M	Simple harmonic motion	Ch. 10	
27	11/09	W			
28	11/11	F	Waves & sound	Ch. 16	P10
29	11/14	M			
30	11/16	W	Superposition	Ch. 17	
31	11/18	F			P11
	11/21	M	EXAM 3: Ch. 7-10	–	
	11/23	W	THANKSGIVING	–	
	11/25	F	THANKSGIVING	–	
32	11/28	M	Gravitational waves	–	R3
33	11/30	W	Fluids	Ch. 11	
34	12/02	F			P12
35	12/05	M	Temperature & heat	Ch. 12	W4
36	12/07	W			W5
37	12/09	F	Kinetic theory of gasses	Ch. 14	P13
38	12/12	M			

LABORATORY SCHEDULE

Week	Date	Lab
1	8/29	Measurements
2	9/05	Kinematics
3	9/12	Free fall
4	9/19	–
5	9/26	Projectile motion
6	10/03	Conservation of energy
7	10/10	–
8	10/17	Momentum
9	10/24	Biomechanics
10	10/31	–
11	11/07	Pendulum or Archimedes' principle
12	11/14	Pendulum or Archimedes' principle
13	11/21	–
14	11/28	Standing waves
15	12/05	Lab final
16	12/12	–