

PHYSICS 130: GENERAL PHYSICS I

WEST CHESTER UNIVERSITY
FALL 2019



SYLLABUS

UPDATED: August 18, 2019

INSTRUCTOR

Prof. Ian A. Morrison

🏠 Merion Science Center 132

✉ imorrison@wcupa.edu

☎ +1 (610) 436-3297

🌐 ramwebs.wcupa.edu/imorrison/

OFFICE HOURS

Day	Time
Monday	1:05–1:45 pm and 3:00–4:30 pm
Wednesday	1:05–1:45 pm and 3:00–4:30 pm
Friday	9:05–9:45 am

COURSE SECTION DETAILS

SECTION 130-05:

	Day	Time	Location
Class:	Monday, Wednesday, Friday	2:00–2:50 pm	Merion 112
	Tuesday	1:00–1:55 pm	Merion 112
Final exam	Friday, December 13	3:30–5:30 pm	Merion 112

COURSE DESCRIPTION

Physics 130: General Physics I is an algebra-based introductory course in mechanics. Topics include kinematics, forces, energy, momentum, rotational motion, oscillations, waves, fluids, and thermodynamics. In less technical language, we will learn the mathematical description of motion (kinematics), how forces give rise to changes in motion (dynamics), and a number of applications. Laboratory (2 hours per week) provides hands-on exploration of the physical laws and concepts discussed in class. Discussion section (1 hour per week) provides guided problem-solving exercises. This course is part of a two-semester sequence designed for students pursuing programs in biological and health sciences, as well as programs outside the sciences – consult the [WCU Undergraduate Catalog](#) to determine which physics sequence is appropriate for your program.

PREREQUISITES

This course uses mathematics, including algebra, trigonometry, and basic graphing skills, on a daily basis. Students who have not completed a “pre-calculus” math course in high school or college may not be prepared for this course. If you are concerned about your preparedness, please consult with me prior to the drop/add deadline of **Tuesday, September 3**.

TIME COMMITMENT

This is a 4 credit-hour course. There are 4 hours of class and 2 hours of laboratory each week. In addition, this course requires (on average) 4-6 hours of reading, assignments, and studying outside of scheduled class time each week.

STUDENT 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 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 and think-pair-share exercises 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 in-class quizzes and the final exam, 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: a student must (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. Interactive video assignments, lecture, in-class "concept quizzes", 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 in-class quizzes and the final exam.

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 multiple choice questions and free response problems posed on in-class quizzes and the final exam, as well as through written Lab Exercises.

3. **CALCULATOR:** You will need a stand-alone calculator with no internet or communication capabilities that can compute powers, trigonometric functions, and operate in scientific notation. You may not use a watch or mobile phone.

Your laboratory section may require additional materials; consult your lab section syllabus.

ASSESSMENT

This course follows the official WCU scale for grades:

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	Failure

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:

Percent	Category
15%	Laboratory
5%	Videos
15%	Homework
45%	In-class quizzes (highest scores)
20%	Final exam

15% **LABORATORY:** The lab grade is determined by the instructor of your lab section. Refer to your lab section syllabus for details.

5% **VIDEOS:** Most weeks, there is a brief video assignment on [Mastering Physics](#). These videos are interactive and may contain multiple-choice questions or short tutorials. Video assignments are due **Tuesday evenings at 11:59 pm**. You will receive no credit for work submitted after the deadline. The course [Mastering Physics](#) site includes an easy-to-read assignment calendar – consult this calendar for details.

Each video assignment is worth about 2 points, and your total video grade for the course is simply: $100 \times (\text{points earned}) / (\text{points available})$. Be aware that when an assignment includes interactive features you must complete these features in order to receive credit – you do not earn credit simply for playing the video.

15% **HOMEWORK:** Homework assignments are completed on [Mastering Physics](#). There is a homework assignment corresponding to each lecture (e.g., Homework 3 covers material from Lecture 3). Assignments are due every week at **11:59 pm on Tuesday evening**. The course [Mastering Physics](#) site includes an easy-to-read assignment calendar – consult this calendar for details.

Each homework question is worth 1 point, and your total homework grade for the course is simply: $100 \times (\text{points earned}) / (\text{points available})$. You are allowed **six attempts** to solve each problem for full credit; after these attempts the problem will close and you will receive partial or no credit. Any work completed prior to the deadline will be counted – you do not have to complete the assignment to receive partial credit.

Answers to homework problems are available on [Mastering Physics](#) shortly after the assignment deadline. Solutions are available to students during office hours.

45% **IN-CLASS QUIZZES:** There will be 6 in-class quizzes administered during the semester. The tentative dates for these quizzes are listed on the [Course Schedule](#). Quizzes are “closed book”: the only aids allowed are a stand-alone calculator (which students must provide) and the course equation sheet (which I provide). The equation sheet is updated throughout the term; the most recent version is available on [D2L](#).

Quiz scores may be scaled (“curved”) to conform to a standard distribution of grades. Failure to take a quiz results in a 0 score.

When calculating your course grade, I will “drop” your lowest quiz score(s). For students who attempt all 6 quizzes, I will drop your lowest 2 quiz scores. For students who fail to take one or more quizzes, I will drop only your 1 lowest score.

20% **FINAL EXAM:** The comprehensive final exam is scheduled for the time listed on page 1. The final exam is “closed book” in the same manner as the in-class quizzes. Final exam scores may be scaled (“curved”) to conform to a standard distribution of grades. Failure to take the exam results in a 0 score. There is no final exam “exemption.”

Grades for video and homework assignments may be viewed on the [Mastering Physics](#) grade book. Quiz grades are posted on [D2L](#). Final exam scores and final laboratory grades will be posted on [D2L](#) once they are determined.

Although unlikely, I reserve the right to alter the assessment scheme in order to accommodate for unforeseen circumstances or to better serve the learning objectives of the course. Due dates of assignments as well as the dates of quizzes may change.

WHAT I EXPECT FROM YOU

The remainder of this syllabus is concerned with details. Before we get into all that, let me briefly summarize *what you're supposed to do* in this course. I expect you to do the following things:

1. **BE RESPECTFUL:** Treat your lab partners, your peers, and me with respect.
2. **IN CLASS:** Come to every class on time and ready to be an active learner. Bring a calculator and the course equation sheet. Take notes, ask questions, participate. Do not bring distractions (for yourself or others) into the classroom.
3. **AFTER CLASS:** Read the assigned sections of the textbook. Give your best effort to complete the homework and videos. Start assignments early so that you have time to ask questions in class or at office hours. Do not cheat.
4. **LABORATORY:** Read the lab chapter prior to your lab meeting. Attend lab and follow your instructor's directions. Complete the post-lab assignment.
5. **STUDY FOR QUIZZES AND THE FINAL EXAM.**
6. **GET HELP WHEN YOU NEED IT:** Every student in this course will at some point struggle with the material. When you're stuck, unstick yourself by asking questions in class, coming to office hours, or contacting me.

ATTENDANCE POLICY

You are expected to attend all course meetings, including laboratory, lecture, and discussion sections. Attendance is taken at every class after the drop/add deadline. Obviously, if you are sick or unwell then you should not attend class. However, students who frequently miss class will be reported as having poor attendance. Students who fail the course while having poor attendance may receive a "Z" grade – see the [WCU Title IV Federal Financial Aid Compliance Policy](#).

If you miss a class it is your responsibility to make up the missed learning opportunity by reviewing the lecture notes, text, and other course materials. You are welcome to seek assistance in office hours, but I cannot reproduce an entire lecture outside of class. Missing class does not excuse you from completing other aspects of the course on time.

EXCUSED ABSENCES

This course adheres to the WCU [Excused Absences Policy](#). If you are unable to perform an aspect of the course due to a conflict recognized by this policy (which includes University-Sanctioned Events) you must notify me in advance so that we can make arrangements. **Documentation verifying your participation in the event must be submitted via D2L** (path: Assessments>Assignments>Documentation for excused absences).

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 documentation.

- **OSSD:** If you have an ongoing medical condition which effects your ability to meet the course expectations then you should register with the [Office of Services for Students with Disabilities](#) (OSSD). **To receive accommodation you must submit your OSSD letter via D2L** (path: Assessments>Assignments>OSSD letters of accommodation).
- **HEALTH/WELLNESS CONDITIONS:** If you have a medical condition which causes you to miss at least three consecutive school days then you may seek accommodation from [Student Assistance](#).
- **PERSONAL EMERGENCIES:** Rarely, a personal emergency can arise which prevents a student from meeting course expectations. In such a rare circumstance I am happy to work with the student in order to make appropriate arrangements. I require documentation which verifies the emergency. [Student Assistance](#) will act as a liaison and provide confidential verification of the emergency.

POLICIES ON LATE OR MISSED WORK

If you suspect that you will not be able to meet a course deadline you should notify me in advance so that we can discuss possible resolutions. The default policies on late and missed work are as follows:

- **VIDEOS:** There are **no extensions** for videos.
- **HOMEWORK:** I **can** provide individual extensions on homework assignments, though I do not recommend it. Extensions are not automatic. You must request an extension at least 24 hours before the deadline so that I have time to change your deadline on [Mastering Physics](#).
- **QUIZZES:** Quizzes are not offered at alternate times, unless a quiz conflicts with an event which is recognized by the WCU [Excused Absences Policy](#)– see [Excused Absences](#)

above. Failure to take a quiz results in a 0 score. Note that when calculating course grades I drop the lowest quiz score(s) – see [Assessment](#) above.

- **FINAL EXAM:** This course follows the WCU [Final Exam Policy](#). The time and date of the final exam are set by the Registrar and can change. The final exam is not offered at alternate times. There is no final exam “exemption.”

ELECTRONIC DEVICE POLICY

No electronic devices may be used in class. Devices such as mobile phones, smart watches, ipods, tablets, and laptop computers are not conducive to the kind of note-taking necessary for this course. Their use distracts the user and students around them. It’s fine if you have these devices with you, but they must remain silent and out of sight. If I see or hear one of your devices then I will ask you to leave the class.

COURSE SCHEDULE

The attached [Course Schedule](#) provides a tentative schedule of course activities, including lecture topics, readings, assignment deadlines, lab activities, quizzes, and the final exam. This schedule may be updated in order to better meet our needs or accommodate unforeseen circumstances. An up-to-date [Course Schedule](#) is available on [D2L](#) (path: Content>Syllabus).

You are expected to be available to attend lab every week of term. The tentative lab schedule (included on the [Course Schedule](#)) includes weeks without a lab, but that schedule may change.

The final exam time and date are arranged the by the Registrar’s Office and can change. You should plan to be available the entire Final Exam Period (**December 10-14, 2019**).

D2L, EMAIL, AND ALL THAT

- **COURSE PLATFORMS:** All course documents are maintained on the course [D2L](#) and [Mastering Physics](#) sites. I use the [D2L](#) announcement tool to make class-wide announcements. You are responsible for regularly checking these course platforms. I may not announce in class changes to course content on these platforms. As with all technology, these platforms can have glitches and service outages. For this reason, check these platforms frequently and do not leave assignments to the last minute.
- **EMAIL:** I use email for individual correspondence and for time-sensitive class-wide communications. Except in the event of a technical failure or an emergency, I will only use WCUPA email accounts (mine and yours) to correspond.
- **COMMUNICATION:** All electronic communication should be written with appropriate language and etiquette. Please consult the guide [here](#).

- **DISCUSSING GRADES:** I am happy to discuss your progress in the course in person during office hours or by appointment. Due to limitations set by federal law (FERPA), I will not discuss grades over email.

ADDITIONAL RESOURCES

- **PHYSICS TUTORING:**
 - Physics tutoring is available through the [Learning Assistance & Resource Center](#). This service is free, but availability is limited.
 - In the past, WCU physics majors have offered free tutoring through the Society of Physics Students (SPS). If this occurs this semester, details will be announced in the first few weeks of term.
 - Some physics majors also offer one-on-one private tutoring for a fee. A list of available private tutors will be posted on [D2L](#).
- **ALTERNATE TEXTS:**
 - *College Physics*, by Etkina et. al. This modern, algebra-based physics textbook is full of problem-solving strategies and approaches for conceptual understanding. This is an excellent complement to our textbook.
 - *Fundamentals of Physics*, by Halliday and Resnick. This was my introductory textbook and is still used today for the PHY 170–180 courses. The book occasionally uses calculus, but can be understood without it.
 - *MCAT Physics and Math Review*, by The Princeton Review. This is not a good text for learning physics, but it does provide an efficient review for the MCAT exam.

ACADEMIC INTEGRITY

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

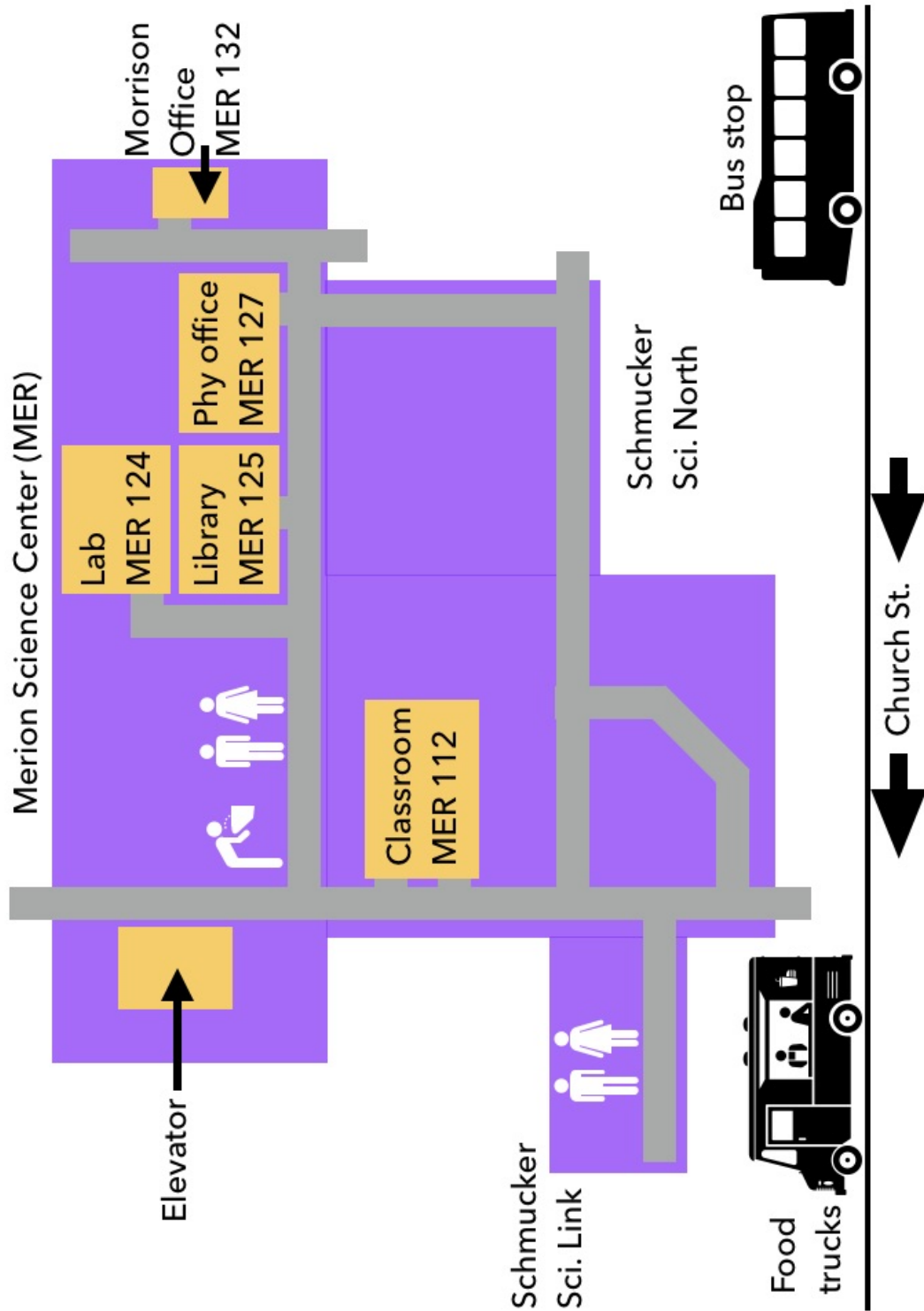
- **ONLINE PLATFORMS:** [D2L](#) and [Mastering Physics](#) are extensions of the classroom and as such all WCU rules regarding student behavior apply on these platforms. Do not violate the copyrights of these sources or misrepresent your identity on these platforms.
- **COLLABORATION:** Students are encouraged to study together and collaborate on assignments. However, you should go through the process of solving each homework problem yourself. Submitting answers which you have not yourself obtained is fraud.
- **ONLINE RESOURCES:** Students are welcome to use online resources to help them complete assignments. However, “resources” does not include specific solutions to assigned problems, whether found online or elsewhere. **Submitting answers which you have not yourself obtained is fraud.**

Students who violate WCU rules of academic integrity will receive a failing grade (F) in the course and an [Academic Integrity Violation Report](#). These actions will adversely affect your academic career and could result in expulsion from the University.

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 the semester in which this course is held.

MAP OF THE PHYSICS DEPARTMENT



Student Registration Instructions for Brightspace

First, enter your Brightspace course

1. Sign in to Brightspace and enter your Brightspace course.
2. Do one of the following:
 - » Select any Pearson link from any module.
 - » Select Pearson's MyLab and Mastering in the Pearson widget on the Brightspace course's home page. Next, select any course link on the Pearson page.

Next, get access to your Pearson course content

1. Enter your Pearson account **username** and **password** to **Link Accounts**. You have an account if you have ever used a MyLab or Mastering product.
 - » If you don't have a Pearson account, select **Create** and follow the instructions.
2. Select an access option:
 - » Enter the access code that came with your textbook or that you purchased separately from the bookstore.
 - » If available for your course,
 - Buy access using a credit card or PayPal.
 - Get temporary access.

If you're taking another semester of a course, you skip this step.
3. From the You're Done page, select **Go to My Courses**.

Note: We recommend you always enter your Mastering Physics course through Brightspace.

Get your computer ready

For the best experience, check the system requirements for your product at <https://www.pearsonmylabandmastering.com/system-requirements/>

Need help?

For help with Mastering Physics for Brightspace, go to https://help.pearsoncmg.com/integration/cg/brightspace/student/en/content/get_started.htm

NOTE: “Brightspace” is the official name of the D2L platform. Everywhere you see “Brightspace”, replace with “D2L”.

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 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. 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 Diversity, Equity, and Inclusion at <https://www.wcupa.edu/admin/diversityEquityInclusion/aboutUs.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.

PHY 130-05, Fall 2019 — Schedule

Week	Date	Day	#	Lesson	Reading	Lab
1	26-Aug	M	L1	Introduction; Physical quantities	1.1-1.5	
1	27-Aug	T	L2	Position, problem solving	2.1, 1.6, 1.8	NO LAB
1	28-Aug	W	D1	Graphs	—	
1	30-Aug	F	L3	Velocity & speed	2.2, 2.3	
2	2-Sept	M	—	NO CLASS — Labor Day	—	
2	3-Sept	T	L4	Acceleration	2.4	
2	3-Sept	T		Due: Homework 0, 1, 2, Video 1		1a. Introduction
2	4-Sept	W	L5	Uniform acceleration	2.5-2.7	& Data Analysis
2	6-Sept	F	D2	Uniform acceleration	—	
3	9-Sept	M	L6	Trigonometry & vectors	Suppl., 3.1-3.4	
3	10-Sept	T	L7	More vectors!	—	
3	10-Sept	T		Due: Homework 3, 4, 5, Video 2		1b. Repeated
3	11-Sept	W	L8	Vector kinematics	3.5, 4.1	Measurements
3	13-Sept	F	—	QUIZ 1: 1d kinematics	—	
4	16-Sept	M	L9	Projectile motion	4.2-4.5	
4	17-Sept	T	D3	Projectile motion	—	
4	17-Sept	T		Due: Homework 6, 7, 8, Video 3		2. 1d Kinematics
4	18-Sept	W	L10	Uniform circular motion	Suppl.	
4	20-Sept	F	L11	Forces, Newton's laws	5.1-5.3	
5	23-Sept	M	D4	Free body diagrams	5.5	
5	24-Sept	T	L12	Weight, normal, Newton's 3rd	5.4, 5.6, 5.7	
5	24-Sept	T		Due: Homework 9, 10, 11, Video 4		3. Free fall
5	25-Sept	W	L13	Friction	6.1	
5	27-Sept	F	—	QUIZ 2: 2d kinematics	—	
6	30-Sept	M	L14	Tension	6.2-6.4	
6	1-Oct	T	L15	Centripetal forces	6.5	
6	1-Oct	T		Due: Homework 12, 13, Video 5		4. Projectile
6	2-Oct	W	D5	Force workshop	—	Motion
6	4-Oct	F	—	Flex day 1	—	

Week	Date	Day	#	Lesson	Reading	Lab
7	7-Oct	M	L16	Springs & energy	6.2	
7	8-Oct	T	L17	Work	7.1, 7.3	
7	8-Oct	T		Due: Homework 14, 15, Video 6		5. Newton's
7	9-Oct	W	L18	Work-energy theorem	7.2	2nd Law
7	11-Oct	F	—	QUIZ 3: Forces	—	
8	14-Oct	M	L19	Potential energy	8.1, 8.2	
8	15-Oct	T	L20	Conservation of energy	8.3	
8	15-Oct	T		Due: Homework 16, 17, 18, Video 7		NO LAB
8	16-Oct	W	D6	Conservation of energy	—	
8	18-Oct	F	L21	Linear momentum	9.1-9.3	
9	21-Oct	M	L22	Conservation of linear momentum	9.4, 9.5	
9	22-Oct	T	D7	Conservation of linear momentum	—	
9	22-Oct	T		Due: Homework 19, 20, 21		6. Energy
9	23-Oct	W	L23	Rotational kinematics	10.1, 10.2	Conservation
9	25-Oct	F	—	Flex day 2	—	
10	28-Oct	M	L24	Rolling	10.3, 10.4	
10	29-Oct	T	L25	Moment of inertia	10.5, 10.6	
10	29-Oct	T		Due: Homework 22, 23, Video 8		7. Momentum
10	30-Oct	W	L26	Torque	11.1, 11.2	
10	1-Nov	F	—	QUIZ 4: Energy & momentum	—	
11	4-Nov	M	L27	Static equilibrium	11.3, 11.4	
11	5-Nov	T	D8	Static equilibrium	—	
11	5-Nov	T		Due: Homework 24, 25, 26, Video 9		8. Angular
11	6-Nov	W	L28	Angular momentum	11.6, 11.7	Dynamics
11	8-Nov	F	L29	Simple harmonic motion	13.1, 13.2, 13.4	
12	11-Nov	M	L30	Applications of SHM	13.5, 13.6	
12	12-Nov	T	L31	Waves	14.1, 14.2	
12	12-Nov	T		Due: Homework 27, 28, 29, Video 10		9. Springs
12	13-Nov	W	L32	Sound & Doppler effect	14.4, 14.6	& Oscillations
12	15-Nov	F	—	QUIZ 5: Rotation	—	

Week	Date	Day	#	Lesson	Reading	Lab
13	18-Nov	M	L33	Interference	14.7	
13	19-Nov	T	L34	Standing waves	14.8	
13	19-Nov	T		Due: Homework 30, 31, 32, Video 11		10. Standing
13	20-Nov	W	D9	Wave graphs	—	Waves
13	22-Nov	F	—	Flex day 3	—	
14	25-Nov	M	—	NO CLASS — Thanksgiving break	—	
14	26-Nov	T	—	NO CLASS — Thanksgiving break	—	
14	27-Nov	W	—	NO CLASS — Thanksgiving break	—	NO LAB
14	28-Nov	R	—	Gobble gobble gobble !!!!	—	
14	29-Nov	F	—	NO CLASS — Thanksgiving break	—	
15	2-Dec	M	L35	Fluids	15.1-15.3	
15	3-Dec	T	L36	Buoyancy	15.4, 15.5	
15	3-Dec	T		Due: Homework 33, 34		NO LAB
15	4-Dec	W	D10	Archimedes Principle	—	
15	6-Dec	F	—	QUIZ 6: Oscillations & waves	—	
16	9-Dec	M	—	Review for final exam	—	
16	9-Dec	M		Due: Homework 35, 36		
16	10-Dec	T	—	NO CLASS	—	NO LAB
16	11-Dec	W	—	NO CLASS	—	
16	13-Dec	F	—	FINAL EXAM: 3:30-5:30 pm	—	