

General Physics I (PHY130)

COURSE MEETING TIME AND PLACE:

| Course Section | Meeting Time | Location |
|----------------|--------------------|------------|
| 130-02 | MWF 12:00-12:50 PM | Merion 109 |
| 130-04 | MWF 1:00-1:50 PM | SSL 151 |

INSTRUCTOR INFORMATION:

Dr. Tianran Chen

e-mail: tchen@wcupa.edu (please include **PHY130** in the subject line of any e-mail)

phone: (610) 436-3563

office: Merion Science Center 128

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.

| Monday | Wednesday | Thursday | Friday |
|----------------|----------------|----------------|----------------|
| 2:00 – 3:00 PM | 2:00 – 3:00 PM | 1:00 – 2:00 PM | 2:00 – 4:00 PM |

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

REQUIRED COURSE MATERIALS:

- *Physics* by Cutnell and Johnson, 9th ed. Wiley **including** WileyPlus access code for *Physics* 9th ed.
(registration link: www.wileyplus.com/class/462574)
- *West Chester Department of Physics 130 Spring 2015 Laboratory Manual* by Mathew M Waite and Shawn H. Pfeil
- Laboratory Notebook (BookFactory)

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 scale. *Physics 130 is primarily a service course for students in biological and health science fields, so we will emphasize applications to these fields, and to a lesser extent geophysics.*

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 covered in the lecture.

Prerequisite: 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.*

WEST CHESTER UNIVERSITY GENERAL EDUCATION LEARNING OUTCOMES:

This course (PHY130) is an approved general education course in the Sciences (see pg. 39 of the 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)

- Students will apply quantitative and mathematical methods to solve problems from introductory mechanics and thermodynamics.

Virtually every topic discussed in the class will have a quantitative aspect that will require algebraic reasoning. These methods will be employed during class examples, midterm exams, and laboratory sessions.

General Education Goal #3: Ability to think critically and analytically. (Primary Goal of Science General Education Courses)

- Students will analyze physical situations and identify what aspects are fundamental to physical modeling.

Mechanics and thermodynamics, the primary subject matter of this course, involve the complex interplay of such concepts as force, momentum, and potential energy. Critical and analytical thinking are essential for applying these concepts to efficiently solve homework and exam problems. One of the many examples might be making assumptions and inferences necessary to analyze the collision of a projectile with a hanging block.

ADDITIONAL LEARNING OUTCOMES:

1. Ability to mathematically model physical situations using the concepts of introductory physics.

- Students will demonstrate the ability to identify the crucial elements of open ended problems (on homework, in class, and on exams) and identify the appropriate physical concepts to solve them.

2. Ability to solve physics problems arising from modeling.

- Students will demonstrate the ability to identify forces and break them into components.
- Students will demonstrate the ability to apply the concepts of Work, Energy, and Conservation of Energy.
- Student will demonstrate the ability to apply the concepts of Momentum and Angular Momentum.
- Students will demonstrate the ability to apply the concept of torque.

3. Ability to combine multiple concepts to solve “two-step” problems.

- Students will demonstrate the ability to use two or more concepts or methods in series to solve more complicated problems. For example, students will demonstrate the ability to calculate the force on an object, the work that force does, and using the Work-Energy theorem the change in velocity of the object.

ASSESSMENT:

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

- **Laboratory** (15%): Please see laboratory syllabus for details.
- **Homework** (15%):
Weekly homework assignments are typically due at **10:00pm on Friday**. All assignments have a clearly labeled due date on WileyPlus. It is your responsibility to check WileyPlus periodically for assignments. Solutions to all homework problems are available on WileyPlus immediately after the assignment is due. **Because solutions are available immediately, late homework will not be considered.**
- **Regular Exams** (3×15% = 45%): Four regular exams will be given during the semester. I will keep your highest three scores.

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.) In all other cases a missed exam will be treated as your dropped exam.

If you have an OSSD letter pertaining to exams: You are responsible for making the appropriate arrangements at least one week prior to the exam date and time.

- **Final Exam** (25%): The final is cumulative and will require synthesis of concepts from different parts of the course.
The dates and times of the final exams for this course (as set by the registrar) are listed below. **You should plan to be available for the entire finals week.** We have in past semesters had to reschedule finals due to weather related events.

| Course Number | Date and Location of Final | Time of Final |
|---------------|-----------------------------|-------------------|
| 130-02 | Wednesday 12/09, Merion 109 | 1:00 PM – 3:00 PM |
| 130-04 | Friday 12/11, SSL 151 | 1:00 PM – 3:00 PM |

I will be using the official WCU scale for grades, see p.48 in the undergraduate catalog. However, I reserve the right to adjust the weights of individual components, or the scale to account for unforeseen circumstances.

In terms of the WCU standard and the courses point system grades are as follows.

| 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 |

TIME COMMITMENT AND WORK FLOW:

The life of a college student is not easy. A full time student can expect to spend about 50 hrs per week on coursework, or about 12.5 hrs per week per course. Here is how I recommend you spend your 12.5 hours for Physics 130. (Please note some students may need more than 12.5 hrs/week to master the material.)

| Activity | Time Commitment |
|------------------------|-----------------|
| Reading Prior to Class | 1.5 hrs/week |
| Class | 2.5 hrs/week |
| Post Lecture Study | 1.5 hrs/week |
| Homework After Lecture | 3.75 hrs/week |
| Reading Prior to Lab | 0.25 hrs/ week |
| In Lab Time | 2 hrs/week |
| Post Lab Write-Up | 1 hrs/week |
| | |
| Total Time Spent | 12.5 hrs/week |

TENTATIVE COURSE SCHEDULE: I reserve the right to modify it as needed over the course of the semester. Please note that if the University is closed (due to snow etc.) for a regularly scheduled lab session we will use one of the weeks marked “No Lab*” to make up the canceled lab sections.

| Date | | Lecture | Reading | Laboratory |
|------|--------|--|---|-----------------------|
| M | Aug 24 | Introduction, Units, and Trigonometry | 1.2 - 1.4 | FCI Test |
| W | Aug 26 | Scalars & Vectors; Vector Addition and Subtraction | 1.5 - 1.6 | |
| F | Aug 28 | Components of a Vector | 1.7 - 1.8 | |
| M | Aug 31 | No Class – Labor Day | | Measurement |
| W | Sep 2 | Motion in 1-D: Displacement, Speed & Velocity | 2.1 – 2.2 | |
| F | Sep 4 | Motion in 1-D: Acceleration, Equations of Kinematics | 2.3 – 2.4 | |
| M | Sep 7 | Equations of Kinematics in 1D & 2D | 2.5, 3.1 – 3.2 | Kinematics |
| W | Sep 9 | Force and Mass, Newton’s Laws of Motion | 4.1 – 4.5 | |
| F | Sep 11 | Gravitational Force | 4.6 – 4.7 | |
| M | Sep 14 | Free Fall | 2.6 | Free Fall |
| W | Sep 16 | Projectile Motion | 3.3 | |
| F | Sep 18 | Projectile Motion cont’d | 3.3 | |
| M | Sep 21 | Normal Force, Static Friction | 4.8 – 4.9 | Projectile Motion |
| W | Sep 23 | EXAM 1: Chapters 1 – 3 | | |
| F | Sep 25 | Kinetic Friction, Tension Force | 4.9 – 4.10 | |
| M | Sep 28 | Equilibrium Applications of Newton’s Laws | 4.11 | Comparison |
| W | Sep 30 | Non-equilibrium Applications of Newton’s Laws | 4.12 | |
| F | Oct 2 | Equilibrium and non-equilibrium problems | 4.11 – 4.12 | |
| M | Oct 5 | FALL BREAK | | NO LAB |
| W | Oct 7 | Work and Kinetic Energy | 6.1 – 6.2 | |
| F | Oct 9 | Gravitational Potential Energy | 6.3 – 6.4 | |
| M | Oct 12 | Conservation of Energy | 6.5 | Mechanical Energy |
| W | Oct 14 | Non-Conservative Forces, Power | 6.6 – 6.7 | |
| F | Oct 16 | Impulse and Momentum | 7.1 – 7.2 | |
| M | Oct 19 | Collisions in 1 – Dimension & Center of Mass | 7.3, 7.5 | Collisions-I |
| W | Oct 21 | Rotational Motion | 8.1 – 8.3 | |
| F | Oct 23 | EXAM 2: Chapters 4 – 6 | | |
| M | Oct 26 | Centripetal Acceleration, Uniform Circular Motion | 5.1 – 5.3 | Collisions-II |
| W | Oct 28 | Tangential Acceleration, Rolling Motion | 8.4 – 8.6 | |
| F | Oct 30 | Torque and Equilibrium | 9.1 – 9.2 | |
| M | Nov 2 | Center of Gravity and Newton’s III law for rotation | 9.3 – 9.4 | Biomechanics |
| W | Nov 4 | Rotational Kinetic Energy and Angular Momentum | 9.5 – 9.6 | |
| F | Nov 6 | Elasticity, Energy Stored in a Spring | 10.1, 10.3, 10.7 | |
| M | Nov 9 | Simple Harmonic Motion | 10.2 – 10.6 | Elasticity |
| W | Nov 11 | Waves and Sound: Waves on a String | 16.1 – 16.3 | |
| F | Nov 13 | EXAM 3: Chapters 7 – 9 | | |
| M | Nov 16 | Sound: Speed of Sound, Intensity, and the Doppler Effect | 16.5 – 16.9 | Archimedes’ Principle |
| W | Nov 18 | Superposition, Standing Waves and Resonance | 17.1, 17.5, 17.6 | |
| F | Nov 20 | Fluids: Pressure and Pascal’s Principle | 11.1 – 11.5 | |
| M | Nov 23 | Fluids: Archimedes’ Principle and Continuity | 11.6 – 11.8 | NO LAB |
| W | Nov 25 | THANKSGIVING BREAK | | |
| F | Nov 27 | | | |
| M | Dec 30 | Fluids: Bernoulli’s Principle and Viscosity | 11.9 – 11.11 | FCI Test |
| W | Dec 2 | EXAM 4: Chapters 10, 16, 17 | | |
| F | Dec 4 | Temperature and Heat | 12.1 – 12.2, 12.4 – 12.7 | |
| M | Dec 7 | Kinetic Theory, The laws of Thermodynamics | 14.1 – 14. 15.1 – 15.3, 15.7 – 15.9 | NO LAB |

ELECTRONIC DEVICE POLICY:

The pace of the course is such that your undivided attention will be required for the entire lecture and lab period. Please set all electronics to silent or “vibrate mode” and put them away, so that both you and your neighbors will be able to concentrate on the material at hand. No texting or making phone calls is allowed in the classroom.

D2L/WILEYPLUS:

We will be using two online platforms for this course WileyPlus, the publisher’s homework system, and D2L. Homework assignments are to be performed on WileyPlus. To allow for *structured note taking* I will post my lecture slides prior to class. These slides intentionally leave some information, such as example solutions out, and provide space to fill that material in during lecture. **It is your responsibility to check these resources periodically for any updates and announcements.**

ATTENDANCE POLICY:

Attendance is not taken for this course. Attending lecture, however, is highly correlated with success in this course, and I strongly recommend it. This is your chance to ask questions, see examples and get help in solving problems, which will significantly improve your grade. The lab component of this course, however, has a different attendance policy.

DISABILITY STATEMENT:

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 contact the OSSD which is located 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, their fax number is 610-436-2600, their email address is ossd@wcupa.edu, and their website is at www.wcupa.edu/ussss/ossd.

ELECTRONIC COMMUNICATIONS STATEMENT:

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.

The subject of your emails to me should contain **“PHY130” (no space)**. I created a folder particularly for this course. Any email that does not have the correct headline format will not go into this folder, and may not get my reply in time.

UNIVERSITY SANCTIONED EVENTS:

If you will be participating in a University sanctioned event during class or an exam **you must notify me in advance**. Please see the discussion of University Sanctioned Events in the general catalog.

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 INTEGRITY & CONDUCT

I have a zero tolerance policy for breaches of academic integrity. Breaches of academic integrity will be investigated and sanctions imposed to the full extent available under University policy. For questions regarding the university Academic Dishonesty, the No-Grade Policy, Sexual Harassment, or the Student Code of Conduct, students are encouraged to refer to their major department's handbook, the Undergraduate Course Catalogue, the Rams Eye View, or the University Web Site. Please understand that improper conduct in any of these areas will not be tolerated and may result in immediate ejection from the class.

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.

PUBLIC SAFETY

The Emergency Communications Committee recommends that the number of WCU's Department of public safety be available on every course syllabi. WCU Department of Public Safety: (610) 436-3311.