General Physics II (PHY140)

COURSE MEETING TIME AND PLACE:

Course Section	Meeting Time	Location
140-01	MWF 12:00-12:50 PM	Merion 112
140-02	MWF 1:00-1:50 PM	Merion 112

INSTRUCTOR INFORMATION:

Dr. Tianran Chen
e-mail: tchen@wcupa.edu (please include "**PHY140**" 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	Friday
2:00 – 4:00 PM	2:00 – 4:00 PM	2:00 – 3:00 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, 10th ed. Wiley **including** WileyPlus access code for *Physics* 10th ed. –You may use your login credentials from PHY130. (registration link: www.wileyplus.com/class/561293)
- *West Chester Department of Physics 140 Laboratory Manual* (AY2016-17) by Mathew M Waite and Anil Kandalam, Kendall Hunt
- Laboratory Notebook (BookFactory) - You may use your lab notebook from PHY130.

COURSE DESCRIPTION:

Physics 140 is a continuation of Physics 130, which covers electricity, magnetism, electrical circuits, optics, and quantum physics. The course can be roughly divided into four conceptual pieces:

- **The electric charge model** and the forces resulting from electric charges. (It turns out a lot of forces, almost all actually, we discussed in PHY 130 are manifestations of electrostatic interactions. For example, normal force, tension, and friction are electrical in origin.)
- **Field theory,** the conceptual core of the course is developing an understanding of Electric and Magnetic fields.
- Applications of electric and magnetic fields. This includes but is not limited to electromagnetic waves, optics, and forces on charged particles in electric and magnetic fields.
- Finally, we will discuss quantum mechanics and the structure of atoms.

Physics 140 is primarily a service course for students in biological and health science fields, so we will emphasize applications to these fields.

Prerequisite: A good working knowledge of the material in PHY130.

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.

WEST CHESTER UNIVERSITY GENERAL EDUCATION LEARNING OUTCOMES:

This course (PHY140) 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 electromagnetism and modern physics.

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.

Electromagnetism and modern physics, the primary subject matter of this course, involve the complex interplay of such concepts as electric fields, magnetic fields, and 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 operation of a mass-spectroscopy system.

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 PHY140 content knowledge.
   - Students will demonstrate the ability to apply the concepts of electric and magnetic fields to analyze the forces on moving charged particles.
   - Students will demonstrate the ability to determine the Electric and Magnetic fields arising from distributions of charges and currents.
   - Students will demonstrate the ability to evaluate the energy stored in electric and magnetic fields.
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 speed obtained by a charged particle traversing a parallel plate capacitor, and use that speed to find the radius of circular motion in a region of uniform magnetic field.

ASSESSMENT:

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

- **Laboratory** (20%): Please see laboratory syllabus for details.
- **Homework** (15%):
  Weekly homework assignments labeled "HW#" are typically due at **11:00pm on Saturday**. Assignments labeled "Ch#-practice" are NOT for credit but for additional practice only. 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.
  - Regular exam dates are subject to changes (snow days, WileyPlus maintenance, schedule adjustments, etc.). Be available for class days before & after.

- **Final Exam** (20%): 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) can be found at https://www.wcupa.edu/registrar/calendar/documents/Spring2017-FinalExamSchedule.pdf. **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.

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 140. (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	Jan. 23	Charge Model	18.1 – 18.3	Introduction
W	Jan. 25	Coulomb's Law	18.4 – 18.5	
F	Jan. 27	The Electric Field I	18.6	
M	Jan. 30	The Electric Field II	18.7	Electric Charges
W	Feb 1	The Electric Field III	18.8 – 18.9	
F	Feb 3	Electrical Potential Energy	19.1 – 19.2	
M	Feb 6	Voltage and Equipotential	19.3 – 19.4	**NO LAB***
W	Feb 8	Capacitance and Dielectrics	19.5	
F	Feb 10	Energy in Electric Fields	19.5 – 19.6	
M	Feb 13	Circuit I: Current, Ohm's Law	20.1 – 20.2	Equipotential Lines
W	Feb 15	Circuit II: Resistance, Power	20.3 – 20.4	
F	Feb 17	Circuit III: Resistor Circuits	20.6 – 20.8	
M	Feb 20	**EXAM 1: Chapters 18, 19**		Ohm's Law
W	Feb 22	Circuit IV: Loop Rules	20.8, 20.10	
F	Feb 24	Circuit V: RC circuits (to here)	20.12 – 20.13	
M	Feb 27	Magnetic Fields & Magnetic Force	21.1 – 21.2	Resistors in Series
W	Mar 1	Applications of Magnetic Force	21.3 – 21.4	
F	Mar 3	Force on a Wire and Motors	21.5 – 21.6	
M	Mar 6	Production of Magnetic Fields	21.7 – 21.9	Resistors in Parallel
W	Mar 8	Motional EMF & Magnetic Flux	22.1 – 22.3	
F	Mar 10	Faraday's Law & Lenz's Law	22.4 – 22.5	
M	Mar 20	Inductance and Energy Storage	22.8 – 22.9	RC Circuits
W	Mar 22	**EXAM 2: Chapter 20, 21**		
F	Mar 24	Electromagnetic Waves	24.1 – 24.3	
M	Mar 27	Energy carried by EM waves	24.4 – 24.5	EM Induction
W	Mar 29	Polarization and Doppler Effect	24.5 – 24.6	
F	Mar 31	Light Rays and Plane Mirrors	25.1 – 25.3	
M	Apr 3	Spherical Mirrors	25.4 – 25.5	**NO LAB***
W	Apr 5	The Mirror Equation	25.6	
F	Apr 7	Index of Refraction and Snell's Law	26.1 – 26.2	
M	Apr 10	Total Internal Reflection, Dispersion	26.3, 26.5	Snell's Law
W	Apr 12	Thin Lenses I	26.6 – 26.7	
F	Apr 14	**EXAM 3: Chapters 22, 24, 25**		
M	Apr 17	Lenses and the Thin Lens Equation	26.8	Thin Lenses
W	Apr 19	Lenses in Combination and the Eye	26.9 – 26.10	
F	Apr 21	Superposition and Young's Double Slit	27.1 – 27.2	
M	Apr 24	The Diffraction Grating	27.5, 27.7	Interference
W	Apr 26	Resolving Power	27.6 – 27.7	
F	Apr 28	Photons, Light Momentum	29.1 – 29.3	
M	May 1	Matter Waves, Debroglie Relations	29.4 – 29.5	**NO LAB***
W	May 3	**EXAM 4: Chapters 26, 27, 29**		
F	May 5	The Bohr Model of the Atom/Nuclear Physics	30.1 – 30.4	

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 **"PHY140"**. 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.