PHY140 – 02 General Physics II Fall 2022

Course Meeting Times and Locations:

Lecture: MWF 10:00-10:50 a.m. (SECC 208)

Discussion: W 11:00-11:50 a.m. (SECC 213)

INSTRUCTOR INFORMATION

Prof. Robert Thornton
e-mail: rthornton@wcupa.edu (please include "**PHY140**"in the subject line of any e-mail)
phone: (610) 436-2614
office room number: SECC 364
Office hours (help also available outside these hours by appointment):
M 1-2 p.m.
Wed 2-3 p.m.
Th 2-3 p.m.
If you want to schedule time to meet remotely during office hours (in person is recommended), please sign up for a 15-minute slot using Calendly
Zoom meeting ID: 944 330 2731 (for remote meetings by appointment)
Zoom password: rjtwcu

COURSE DESCRIPTION

PHY140 is the second semester of a year-long introductory physics sequence. In PHY130 we discussed the properties of motion arising from mass. A passing grade in PHY130 is the prerequisite for this course. We will be using concepts from PHY130 on a daily basis as well as a good deal of algebra. If you feel that your skills are weak in either of these two areas, please feel free to come and see me during office hours or by appointment. I am willing to work with you and help you catch up.

REQUIRED COURSE MATERIALS & INCLUSIVE ACCESS

Textbook and Homework System: Physics 5/e by Walker with Modified Mastering Physics. An e-text of this book is directly accessible from the course D2L page. This is provided through WCU's **Inclusive Access Program**. This means you should see a $112.93 charge appear on your Bursar's account. This is a discounted price. You may also upgrade to a physical copy at additional cost.

If you have used/purchased Inclusive Access last semester for PHY130 at WCU: You won't be charged again by the University.

If you Drop the Course: You can opt-out of ***Inclusive Access*** until the drop/add deadline. To opt out you must use the link provided in the email sent to your WCUPA email account from the WCU campus store. If you opt-out before the deadline, you receive a refund. Questions about Inclusive Access should be directed to: inclusiveaccess@wcupa.edu

This course uses the online platform Modified Mastering Physics for readings and homework assignments. You can access the Modified Mastering Physics from the **Access Vital Source** widget on our D2L course site. If you experience any technical problems, there are instructions on D2L for how to proceed. Problems with accessing Modified Mastering Physics are rare, but even so do not leave submitting the homework until the last few hours. I recommend that you always use a "real computer" (not a mobile device) and the Mozilla Firefox web browser when working on "Modified Mastering Physics". More information on homework is provided in the section "Homework policies" later in this document.

REQUIRED LAB MATERIALS:

- **Lab Manual:** *West Chester Department of Physics 140 Laboratory Manual Fall 2022* (see lab syllabus for details)
- **Laboratory Notebook** (see lab syllabus for details)

GRADING:

- Laboratory (15%): Please see laboratory syllabus for details.
- Homework (10%)
- Midterm Exams (55% - distributed equally among 3 midterms)
- Final Exam (20%)

Letter grades will, for the most part, be based on overall class performance, and therefore will not necessarily follow the official university grading scheme (for example, a 70% an exam does not necessarily mean the grade is a C–). There are several reasons I do things this way. Each time I grade an exam, I will show the class distribution and give a very approximate description grading scheme. The grades are not binding, but I will use a similar approach for the final grades in the class.

COURSE GOALS

The course goals for PHY 140 can be roughly divided into the following areas:

- analyze problems involving electrical forces and fields
- analyze problems involving electrical potential energy and electric potential
- categorize and analyze electrical circuits
- analyze problems involving magnetic forces and fields
- summarize and interpret Faraday's and Lenz's laws
- synthesize an understanding of mechanical wave interference with interference of electromagnetic waves
- analyze problems involving geometric optics, and specifically the geometrical optics of thin lenses and mirrors

SPECIFIC COURSE OUTCOMES

Students completing this course will be able to

- Develop a fundamental understanding of principles of electrostatics, electric current, magnetostatics, electromagnetic induction, geometrical and physical optics, and modern physics.
- Apply these concepts in solving numerical problems
- Exercise and develop reasoning and problem-solving skills

EXPECTATIONS

This is a fast-paced course. For successful completion, you are expected to not only come to the class regularly, but also take notes in the class, solve the problems assigned in the class, and read the example problems from the textbook. In order to keep up with the pace of the course, I strongly suggest you read the sections in the text indicated in the schedule before you get to class.

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, university protocols need to be followed.**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**.

D2L

This course has a D2L page, where I will post grades, partial lecture slides, problems etc. I will make a good faith effort to post drafts of partial lecture slides prior to the lecture, *but these may have few revisions*.

HOMEWORK POLICIES

This course will utilize an online homework system via **Modified Mastering Physics**. **Please note that prompt enrollment in Modified Mastering Physics is a course requirement.** Homework will generally be assigned every week, starting from the first week of classes. However, due to holidays, exams, and other schedule adjustments, homework frequency and due dates vary. Changes may be announced in class (but you will have plenty of notification if the date is moved up (this should be rare)). Please also check **Modified Mastering Physics** regularly. Partial solutions to all homework problems will be available on Modified Mastering Physics immediately

after the assignment is due. So, no late submissions are allowed. Homework due dates on the schedule below are only approximate. No homework grades are dropped.

Please remember that you are responsible for completing homework assignments in a timely manner and informing me of problems, if any, in accessing the homework. Failure to complete an assignment because you could not access the homework an hour before it is due is not an excuse.

REGULAR EXAM POLICY

Three in-class exams (closed book) will be given during the semester. These exams will focus on problem solving but may also contain some multiple choice and/or short answer questions (both conceptual and numerical). Students are expected to show all the work (math steps). No exams grades will be dropped.

If you miss an exam without an excused absence, you will receive a zero on that 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 a makeup exam. All makeup exams are different from the regularly scheduled exams. You must also provide some form of documentation (performing arts program, competition schedule etc.).

FINAL EXAM

The final exam (closed book) will include all topics covered (cumulative) in the course and is mandatory. The final exam will consist of mostly multiple-choice questions (conceptual and numerical) and few open-ended questions. Missing the final exam will result in a zero for the exam unless extreme circumstances apply.

The date and time of the final exam for this course (as set by the registrar) is **Wednesday Dec 14 10:30 a.m. – 12:30 p.m.** ***You should plan to be available for the entire finals week in case of inclement weather, etc.*** We have in past semesters had to reschedule finals due to weather related events.

LABORATORY

This course has a laboratory component. Your lab grade will be factored into your final grade for this course. Please see the lab syllabus for more details.

ATTENDANCE POLICY

A regular attendance to the lectures is an important part of this course and I highly recommend it. This is your chance to ask questions, see examples and get help in solving problems. I am here to guide you through the material. Attendance will benefit your understanding and therefore grade. However, **I grade on performance and therefore do not give an attendance grade**. Students must understand that they are responsible for all material covered and assigned during their absences (excused and unexcused) and that they are responsible for the academic

consequences of their absences. The lab component of this course, however, has a different attendance policy. **Please see the lab syllabus for lab attendance policy**.

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.

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 laptops are allowed in class unless you have a valid reason (from observing others' classes I have found 99% of the time laptops are used for things other than the current class). Anyone seen texting or using his/her cell phone will be asked to leave the classroom.

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.

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.

E-MAIL POLICY 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.

INCLUSIVE LEARNING ENVIRONMENT AND ANTI RACISM STATEMENT.

Diversity, equity, and inclusion are central to West Chester University's mission as reflected in our Mission Statement, Values Statement, Vision Statement and Strategic Plan: Pathways to Student Success. We disavow racism and all actions that silence, threaten, or degrade historically marginalized groups in the U.S. We acknowledge that all members of this learning community may experience harm stemming from forms of oppression including but not limited to classism, ableism, heterosexism, sexism, Islamophobia, anti-Semitism, and xenophobia, and recognize that these forms of oppression are compounded by racism.

Our core commitment as an institution of higher education shapes our expectation for behavior within this learning community, which represents diverse individual beliefs, backgrounds, and experiences. Courteous and respectful behavior, interactions, and responses are expected from all members of the University. We must work together to make this a safe and productive learning environment for everyone. Part of this work is recognizing how race and other aspects of who we are shape our beliefs and our experiences as individuals. It is not enough to condemn acts of racism. For real, sustainable change, we must stand together as a diverse coalition against racism and oppression of any form, anywhere, at any time.

Resources for education and action are available through WCU's Office for Diversity, Equity, and Inclusion (ODEI), DEI committees within departments or colleges, the student ombudsperson, and centers on campus committed to doing this work (e.g., Dowdy Multicultural Center, Center for Women and Gender Equity, and the Center for Trans and Queer Advocacy).

Guidance on how to report incidents of discrimination and harassment is available at the University's Office of Diversity, Equity and Inclusion.

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

There will be 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.

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.

TENTATIVE COURSE SCHEDULE (SEE NEXT PAGE): I reserve the right to modify it as needed over the course of the semester. Changes will be posted to D2L. I will try to announce these changes, but you are ultimately responsible for staying up to date on them. 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.

Lect.	Date	Lecture and Discussion	Readings	HW Out / Due	Lab
1	M Aug 29	**19:** Electric charge, insulators, and conductors	19.1−19.2	HW1 19.1 − 19.4 out ~8/29 due ~ 9/6	Introduction
2	W Aug 31	**19:** Coulomb's Law	19.3		
3	W Sept 2	**19:** Electric Fields	19.4		
	F Sept 2	Problem solving (≈ 19.1 – 19.4)			
	M Sep 5	**Labor Day – No Classes**			NO LAB
4	W Sept 7	**19:** Electric Field Lines	19.5	HW2 19.5 − 20.3 out ~ 9/6 due ~ 9/18	
5	W Sept 7	**19:** Electric Flux and Gauss's Law	19.6-19.7		
6	F Sept 9	**20:** Electric Potential and Electric Potential Energy	20.1		
7	M Sept 12	**20:** Electric Potential Energy, Electric Potential of an Arrangement of Charges	20.2-20.3		Electric charge
8	W Sept 14	**20:** Equipotential Surfaces and the Electric Field	20.4		
	W Sept 14	Problem Solving(≈ 20.1 – 20.3)			
9	F Sept 16	**20:** Capacitors and Dielectrics	20.5	HW3 20.4 − 20.6 out ~ 9/18 due ~ 9/23	
10	M Sept 19	**20:** Electrical Energy Storage	20.6		Electric potential & Electric fields
11	W Sept 21	**21:** Electric Current, Resistance, and Ohm's Law	21.1-21.2		
	W Sept 21	Problem Solving (≈ 20.5 – 21.2)			
12	F Sept 23	**21:** Energy and Power in Electric Circuits	21.3		
	M Sept 26	**EXAM 1: CHAPTERS 19 AND 20**			Resistors and Ohm's Law
13	W Sept 28	**21:** Resistors in Series and Parallel	21.4-21.5	HW4 21.1− 21.6 out ~ 9/23 due ~ 10/2	
	W Sept 28	Problem Solving (≈ 21.3 – 21.6)			
14	F Sept 30	**21:** Circuits Containing Capacitors	21.6		
15	M Oct 3	**21:** RC Circuits	21.7	HW5 21.7 − 22.2 out ~ 10/3 due ~ 10/9	NO LAB
16	W Oct 5	**22:** Magnetic Fields and Magnetic Force on Point Charges	22.1-22.2		
	W Oct 5	Problem Solving (≈ 21.7 – 22.2)			
17	F Oct 7	**22:** Motion of charged particle in a magnetic field	22.3		
18	M Oct 10	**22:** Magnetic force on a current-carrying wire & loop	22.4-22.5	HW6 22.3 − 22.6 out ~ 10/10 due ~ 10/17	Resistors in Series
19	W Oct 12	**22:** Magnetic Fields and Ampere's Law	22.6		
	W Oct 12	Problem Solving (≈ 22.3 – 22.6)			
20	F Oct 14	**22:** Current loops, solenoids, & magnetism matter	22.7-22.8		

Lect.	Date	Lecture and Discussion	Readings	HW Out / Due	Lab
	M Oct 17	**Fall Break – No Classes**			NO LAB
21	W Oct 19	**23:** Induced emf, magnetic flux, and Faraday's Law	23.1-23.2		
	W Oct 19	Problem Solving (≈ 22.7 – 23.2)		HW7 22.7 – 23.2 out ~ 10/16 due ~ 10/23	
22	F Oct 21	**23:** Law of Induction and Lenz's Law	23.3-23.4		
23	M Oct 24	**23:** Mechanical Energy and Electrical Energy	23.5		Resistors in Parallel
24	W Oct 26	**23:** Generators & Motors	23.6	HW8 23.3 – 23.6 out ~ 10/23 due ~ 10/30	
	W Oct 26	Problem Solving (≈ 23.3 – 23.6)			
25	F Oct 28	**23:** Inductance & Energy Stored in a Magnetic Field	23.7, 23.9		
26	M Oct 31	**25:** Production & Propagation of EM Waves	25.1-25.2	HW9 23.7,23.9 out ~ 10/30 due ~ 11/5	RC Circuits
27	W Nov 2	**25:** The Doppler Effect & the EM Spectrum	25.3		
	W Nov 2	Problem solving (≈ 23.7, 23.9, 25.1, 25.2)			
28	F Nov 4	**25:** Energy & Momentum in EM Waves	25.4		
	M Nov 7	**EXAM 2: CHAPTERS 21, 22, and 23**			NO LAB
29	W Nov 9	**25:** Polarization	25.5		
	W Nov 9	Problem solving (≈ 25.3 – 25.5)		HW10 25.1 – 25. 5 out ~ 11/5 due ~ 11/14	
30	F Nov 11	**26:** Reflection of Light & Plane Mirrors	26.1-26.2		
31	M Nov 14	**26:** Spherical Mirrors			EM Induction
32	W Nov 16	**26:** Ray Tracing and the Mirror Equation	26.3		
	W Nov 16	Problem Solving (≈ 26.1 – 26.4)		HW11 26.1 – 26.4 out ~ 11/14 due ~11/21	
33	F Nov 18	**26:** The Refraction of light and Ray Tracing for Lenses	26.4		
34	M Nov 21	**26:** Ray Tracing for Lenses and the Thin Lens Equation	26.5-26.6	HW12 26.5 – 26.7 out ~ 11/21 due ~ 12/2	Snell's Law
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35	M Nov 28	**26:** Thin Lens Equation & Dispersion	26.6-26.8		Thin Lenses
36	W Nov 30	**27:** The Human Eye and the Camera	27.1		
	W Nov 30	Problem solving (≈ 26.5 – 26.7)			
37	F Dec 2	**27**: Lenses in Combination & Corrective Optics	27.2	HW13 27.1 – 28.4 out ~ 12/2 due ~ 12/11	

Lect.	Date	Lecture and Discussion	Reading	HW Out / Due	Lab
	M Dec 5	**EXAM 3: CH 25 & 26**			NO LAB
38	W Dec 7	**28:** Superposition & Interference	28.1		
39	W Dec 7	**28:** Young's Exp & Diffraction	28.2		
	F Dec 9	Problem solving (≈ 27.1 – 28.2)			
40	M Dec 12	CATCH UP DAY			
FINAL EXAM: WEDNESDAY DEC 14 10:30 a.m. – 12:30 p.m.					