

**Syllabus**  
**Physics 100-01 & 06: Elements of Physical Science**  
**Fall Semester 2022**

## Course and Instructor information

1. **Meeting Time for Physics 100-01:** Tuesday, Thursday, 11:00-12:25,
2. **Location:** SECC 112
3. **Meeting Time for Physics 100-06:** Tuesday, Thursday, 9:30-10:45,
4. **Location:** SECC 112
5. **Instructor:** William H. Sawyer, Ph.D.
  - a. **Office Location:** SECC 330
  - b. **Email:** [wsawyer@wcupa.edu](mailto:wsawyer@wcupa.edu)
6. **Office Hours:**
  - a. Monday 9:30 AM to 10:45 AM
  - b. Tuesday 3:00 PM to 5:00 PM
  - c. Thursday from 1:00 PM to 3:00 PM
  - d. If these times are not convenient, please make an appointment by email.
    - i. Please include your name, class, and section number in the subject line.

## Course Description

This course is designed to stimulate your imagination, challenge your preconceived notions about the world around you, and help you develop real-world decision-making skills. If you have no intention of working in a field related to science this course has been designed for you. It will introduce you in an interesting and non-threatening way to key principles in physics you never thought you would need to know until you did. And these times will come! We will examine some of the critical issues to be faced by tomorrow's leaders. We will focus on the decision-making process and the critical role the techniques and concepts of physics will play in them.

The emphasis is critical thinking; what we know, what we need to know, and how we get to know it. This course assumes you are not planning to be a physicist, (if you are you are in the wrong course). The only math prerequisite is you can add, subtract, multiply and divide on a simple calculator. But all of you will be decision-makers. Some of you will be leaders making decisions that affect not only your lives and those of your family but the lives of many others as well.

## Goals

PHY 100 is an approved course in the West Chester University General Education program. The class meets the following General Education Program goals as required.

- a. **Gen Ed Goal # 2** Develop the ability to employ quantitative concepts and mathematical methods.
  - i. This goal will be met through lectures, in-class examples with class participation, homework, team projects, quizzes, and exams.
- b. **Gen Ed Goal # 3** Develop the ability to think critically and analytically.
  - i. This goal will be accomplished through a combination of activities including lectures, class discussion, homework, team projects, quizzes, exams, and peer evaluations

## Outcomes

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At the end of this course you should be able to accomplish the following:

- Apply conceptual knowledge to identify assumptions, make logical inferences, identify defective logical inferences, and reach reasonable conclusions.
- Unpack multipart problems into their constituent parts, identify reliable problem-solving methods that are appropriate to solving each part of the problem, then describe how to integrate these partial solutions to provide a complete solution.
- Identify the presence of multiple perspectives and explain the contextual factors that account for these perspectives.
- You should be able to examine data that is presented to you in a context such as a chart or a graph and draw reasonable conclusions based on data.
- You should be able to identify the critical information necessary to solve a quantitative real-world problem, then use this information and the basic mathematics to solve it.

## Expectations

### 1. Preparation

- a. This class uses a textbook; **Physics and Technology for Future Presidents** by Richard Muller and Poll Everywhere for in-class participation. You will be expected to read about 30 pages per week and come to class prepared to discuss what you have read. Although the class is large, I will ask you questions during class. In many cases, you will be allowed to discuss these among your classmates before you answer.

### 2. Attendance

- a. Class attendance is mandatory. If you must be absent for some reason please email me ahead of time, refer to the **ATTENDANCE POLICY** below.

### 3. Class participation – 25% of your total grade

- a. It will be assumed that you have read any material assigned before each lecture and are prepared to discuss it in class.
  - b. Class attendance and participation in discussions will be part of your grade.
  - c. If you have questions about the current reading assignment of a previous lecture you should be prepared to ask them.
  - d. At the beginning of each class, I will ask 2 or 3 review questions on key ideas presented in your reading assignment or the previous lecture.
4. In addition to the review questions at the beginning of each lecture, I will ask questions throughout the lecture. These questions are designed to stimulate discussion and help you test your understanding of the ideas that were just presented.
- a. You will receive 3 points for answering the question 4 points for answering it correctly and a 0 for an unanswered question so **if you don't know an answer please guess**. If you answer all the questions wrong, you still get 75%. If you have some unanswered questions unfortunately your score drops very quickly.
  - b. Each day at the end of the class your score will be normalized on a 10-point scale and posted on D2L.
    - i. If you answered all the questions correctly you will get 10 points,
    - ii. If you answered all the questions but all your answers were wrong, you would still receive 7.5 points.
    - iii. You will receive **10 points** for an excused absence for which you have notified

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me by email ([wsawyer@wcupa.edu](mailto:wsawyer@wcupa.edu)) ahead of time or presented a written doctor's or health center note. (See attendance policy below.) **You are allowed 3 excused absences** unless you have special circumstances which I have approved. Otherwise more than 3 excused absences will be treated as unexcused

- iv. **Unexcused absence:** you will not receive any credit for an unexcused absence.
- 5. Homework – 25% of your total grade**
- Homework will be due every Sunday night by 11:59 pm.*
  - The homework questions are in your textbook. Their chapter and question numbers are listed in each homework assignment on D2L. Look up the question in your text then select the appropriate answer on D2L.
  - The next week's Homework will be posted on D2L every Sunday night 30 minutes after the current week's home has closed; that is Sunday night at midnight.
  - Since homework is done online and you have a week to complete it there is no reason for it to be late. Late homework will not be graded.
  - Do not do your homework using your smartphone!* D2L may not register what you have done.
- 6. Semester Exams - 30% of your total grade**
- There will be 3 exams. Each one will cover the material from the previous exam up until the current exam.
  - Each exam will be worth 10% of your final grade.
- 7. Final Exam - 20% of your final grade**
- The final exam will be comprehensive: it covers all the material we have discussed during the semester. It will be worth 20% of your final grade.

## Assessment

### 1. Valuation

- |                                       |                |
|---------------------------------------|----------------|
| a. Homework                           | 25%            |
| b. Attendance and Class participation | 25%            |
| c. 3 Semester Exams                   | 30% (10% each) |
| d. Final Exam                         | 20%            |

### 2. Grading

- a. A letter grade will be assigned based on performance in the course according to the following scale:

Grade	Quality Points	Percentage Equivalents	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	

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C-	1.67	70-72	
D+	1.33	67-69	Below Average
D	1.00	63-66	
D-	0.67	60-62	
F	0	< 60%	Failure

- b. Refer to the Undergraduate Catalog for a description of NG, W, Z, and other grades.

## Course Materials

### 1. Poll Everywhere Cell Phone App required

- a. **Poll Everywhere software** You will respond to the in-class questions using the Poll Everywhere app you load onto your cell phone. The app is free. Just go to the Google Play Store or your Apple store and type in “Poll Everywhere App” and download it and register. In class, I will give you a text address and message you are to type to that address. Once you have done that you will be good to go. When I ask a question, you will be able to text me the answer. Most of the time you will just send a letter indicating which multiple-choice answer you think is the correct one.

### 2. Textbook is required

- a. Physics and Technology for Future Presidents: **An Introduction to the Essentials of Physics Every World Leader Needs to Know**; Author: Richard A. Muller  
b. Publisher: Princeton University Press, ISBN 978-0-691-13504-5 (Available in Cloth-covered hardback, paperback, or as an eBook.)

## Contact Policy

1. **University 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 (me), 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.
2. **Email:** [WSawyer@wcupa.edu](mailto:WSawyer@wcupa.edu) please include:
- Your name,
  - Your section,
  - A one or two-word subject.

## Attendance Policy

1. Attendance will be taken. If you must miss a class, you must notify me ahead of time or have a note from the health service or a physician.

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**2. Late arrival: *More than 15 minutes late, you will not be seated***

- a. **Please remember** there are 2 or 3 clicker review questions at the beginning of each class. Missing one or more of these will hurt your day's participation grade.
- b. **Please let me know** if you come from a class on South Campus that ends just before our class starts. I will excuse you if you miss some of the early questions.

## University Sanctioned events

If you participate in a sport or other activity that requires you to miss a class for a university-sanctioned event your coach or advisor will provide you with an information sheet for you to give to your instructors. For you to have an excused absence, you will need to show me this sheet before you miss the class.

## EXAM POLICY

1. There will be three exams plus the final. All exam grades count. I ***do not*** drop one exam.
2. **Late arrival for an exam:** If you arrive for an exam after the first person has turned in their exam
  - a. **You will not be seated**
  - b. **You will not have the opportunity to take the exam later.**
  - c. ***No exceptions.***
3. **Exam Make-up Policy**
  - a. **Illness:** You may make up an exam if you were ill and **have a physician's note** on their letterhead.
  - b. **Family emergency:** You may make up an exam if you had a family emergency provided you **have a letter of explanation** from another family member or other reasonable documentation.
  - c. **University-sanctioned event:** You may take an exam on an alternate date provided you **have a signed form** from your coach or official sponsor.
  - d. ***Oversleeping or not knowing the date of an exam is not an acceptable excuse. You will receive a 0 for the exam and will not be allowed to make it up!***
4. **You must take the final exam with your assigned section.** This is a university rule. What is more, the class is full so there are no extra seats to accommodate you.

## ELECTRONIC DEVICES POLICY

- **Laptop computers - *Laptop computers are not permitted to be used in lectures***— The lecture slides are posted on D2L following each class. If you must take notes do so with pen and paper.

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- **Cell phones** – You will use your cell phones to respond to the polling questions asked during the class. Please leave your phone set on the Poll Everywhere URL I have given you for the class. If you leave that address for any reason and are not able to get back in time to respond to the polled question you will get a 0 for the question. It is not fair to everyone else to delay the class because you were doing something else with your phone.
- If you need to use a device to accommodate a disability, please tell me at the beginning of class and refer to the DISABILITY STATEMENT below.

## D2L

- This course has a D2L web page. Homework assignments will be posted on Mondays at midnight and are due the following Monday by midnight. (see Homework above)
- From time to time other important information may also be posted there.
- Lecture slides will be posted after 4:00 PM on Tuesdays and Thursdays.

## 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 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 work from one class to fulfill the assignment for another class without significant modification. Proof of academic misconduct can result in 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](#).

## 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](mailto:ossd@wcupa.edu), and their [website is](#). 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.

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## 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. 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 students must be absent from class 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. To comply with the requirements of Title IX of the Education Amendments of 1972 and the University’s commitment to offering supportive measures by the new regulations issued under Title IX, 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 on the Sexual Misconduct page of the [University website](#).

## Inclusive Learning Environment and Anti-Racist Statement

Diversity, equity, and inclusion are central to West Chester University’s mission and are 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



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[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](#).

## 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](http://www.wcupa.edu/wcualert). To report an emergency, call the Department of Public Safety at 610-436-3311.

## ELECTRONIC MAIL POLICY

Faculty, staff, and students are expected to 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.



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## Physics 100-01 & 06: Elements of Physical Science

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Physics 100-01 & 06 Lecture Schedule and Assignment Due Dates,				
Date	Day	Lecture	Reading	Due Sundays 11:59 PM
30-Aug	Tuesday	Lecture 1: Introduction, A farmer and his cows	Chapter 1	
1-Sep	Thursday	Lecture 2: Energy & Power I: Battery cars	Chapter 1	Homework 1 (Due 9/4)
6-Sep	Tuesday	Lecture 3: Energy & Power II: BEVs & Coal	Chapter 1	
8-Sep	Thursday	Lecture 4: Energy & Power III: Natural Gas	Chapter 10 Pg 390-7	Homework 2 (Due 9/11)
13-Sep	Tuesday	Lecture 5: Hydrogen Fuel Cell Electric Vehicles	Chapter 1	
15-Sep	Thursday	Lecture 6: Renewable energy - solar power	Chapter 1	Homework 3 (Due 9/18)
20-Sep	Tuesday	Lecture 7: Wind Energy	Chapter 2	
22-Sep	Thursday	Review	Chapter 1	Homework 4 (Due 9/25)
<b>27-Sep</b>	<b>Tuesday</b>	<b>Exam I</b>	<b>Chapter 1</b>	
29-Sep	Thursday	Lecture 8: Two forms of energy and work	Chapter 2	Homework 5 (Due 10/02)
4-Oct	Tuesday	Lecture 9: Atoms and Heat	Chapter 2	
6-Oct	Thursday	Lecture 10: Work from heat	Chapter 2	Homework 6 (Due 10/9)
11-Oct	Tuesday	Lecture 11: How we create and hear sounds	Chapter 3	
13-Oct	Thursday	Lecture 12: Resonance	Chapter 3	Homework 7 (Due 10/16)
<b>18-Oct</b>	<b>Tuesday</b>	<b>Fall Break</b>		
<b>20-Oct</b>	<b>Thursday</b>	Lecture 13: Speed of Sound	Chapter 3	
25-Oct	Tuesday	Lecture 14: Motion	Chapter 3	
27-Oct	Thursday	Exam II Review	Chapter 3	Homework 8 (Due 10/23)
<b>1-Nov</b>	<b>Tuesday</b>	<b>Exam II</b>	<b>Chapter 2 &amp; 3</b>	
3-Nov	Thursday	Lecture 15: Momentum	Chapter 6	Homework 9 (Due 10/30)
8-Nov	Tuesday	Lecture 16: Force & Circular Motion	Chapter 6	
10-Nov	Thursday	Lecture 17: Gravity	Chapter 7	Homework 10 (Due 11/6)
15-Nov	Tuesday	Lecture 18: Satellites	Chapter 8	
17-Nov	Thursday	Lecture 19: Introduction to electricity	Chapter 9	Homework 11 (Due 11/13)
22-Nov	Tuesday	Lecture 20: Magnetism	Chapter 5	Homework12 (Due 11/20)
<b>24-Nov</b>	<b>Thursday</b>	<b>Thanksgiving Break</b>		
29-Nov	Tuesday	Lecture 21: Motors & Generators	Chapter 6	
1-Dec	Thursday	Exam III Review	Chapter 5-9	
6-Dec	<b>Tuesday</b>	<b>Exam III</b>	<b>Parts of Chpt 5-9</b>	
8-Dec	Thursday	Final Review	Chapters 1-9	
<b>13-Dec</b>	<b>Tuesday</b>	<b>PHY100-01 10:30-12:30 (Class met from 11:00 to 12:25 )</b>		
<b>15-Dec</b>	<b>Thursday</b>	<b>PHY100-06: Exam time 8:00-10:00 (Class met from 9:30 to 10:55 on Tuesdays and Thursdays)</b>		