

**Syllabus**  
**Physics 100-05, 100-06: Elements of Physical Science**  
**Spring Semester 2021**

**COURSE AND INSTRUCTOR INFORMATION**

**Meeting Time for Physics 100-05:** Monday, Wednesday, 7:15-8:30, On-line via Zoom

**Meeting Time for Physics 100-06:** Tuesday, Thursday, 12:30-1:45, On-line via Zoom

**Instructor:** William H. Sawyer, Ph.D.

**Office Location:** On-line via Zoom

**Email:** [wsawyer@wcupa.edu](mailto:wsawyer@wcupa.edu)

**Office Hours:** Unfortunately, because of Covid-19 my office hours this spring will be held via Zoom meetings.

I will be on Zoom and available during the following times each week:

Monday and Wednesday 9:30 AM to 10:45 PM and 6:00 PM to 7:00 PM

Tuesday and Thursday 1:00 PM to 2:00 PM; and

If these times are not convenient please make an appointment by email.

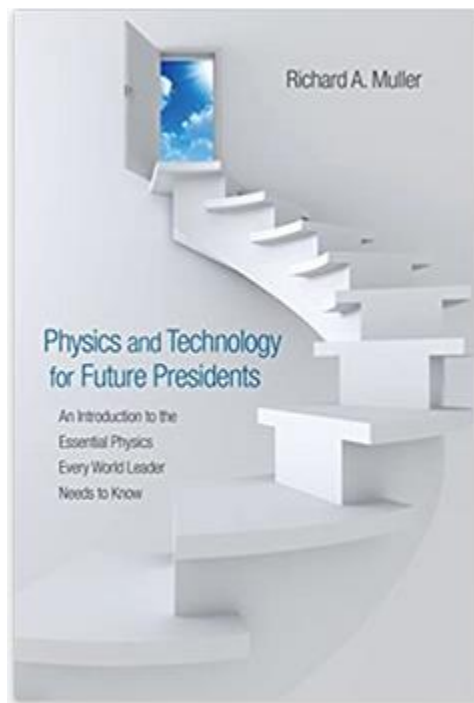
**COURSE MATERIALS**

**Physics and Technology for Future Presidents: An Introduction to the Essentials of Physics**

**Every World Leader Needs to know;** Author: Richard A. Muller

Publisher: Princeton University Press, ISBN 978-0-691-13504-5 (Cloth: also Paper)

Available at the University Book Store or on Amazon. Amazon also has it as in eBook.



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**COURSE DESCRIPTION**

An entirely new approach to Physics 100, 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. It has been designed to provide you with knowledge of the principles of physics, its perspectives, and the related skills necessary for you to be a successful citizen of the state and the world. It uses a modified case study approach to examine some of the critical decisions to be faced by tomorrow's leaders. Although input from all the disciplines from anthropology to zoology could and probably will affect these decisions in one way or another 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. Mathematics is an important tool if you are doing Physics. This course assumes you are not planning to be a physicist, (if you are you are in the wrong course) 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. Using modified case studies, examples and experimentation you will have the opportunity to develop informed decision-making skills.

**COVID-19 STATEMENT:**

Part of West Chester University's response to the COVID-19 pandemic was to switch the vast majority of instruction to remote. This decision was made out of an abundance of caution to protect the health of all members of the WCU community. Faculty have been asked to make every effort to adapt their courses to this novel situation while still meeting the critical learning outcomes of the course. Students are asked to discuss any problems with the new course format and schedule directly with their instructors. Patience and flexibility on everyone's behalf are critical to our community's navigation of this public health crisis.

For this particular course, we will meet on-line via Zoom at the scheduled times.

**GOALS**

PHY 100 is an approved course in the West Chester University General Education program.

**Gen Ed Goal # 2** Develop the ability to employ quantitative concepts and mathematical methods. This goal will be met through lectures, in class examples with class participation, homework, team projects, quizzes, and exams.

**Gen Ed Goal # 3** Develop the ability to think critically and analytically. This goal will be accomplished through a combination of activities including lectures, class discussion, homework, team projects, quizzes, exams and peer evaluations

**OUTCOMES**

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

- Apply conceptual knowledge to identify assumptions, make logical inferences, identify

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- 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 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**

**I. Preparation**

This class uses a text book; **Physics and Technology for Future Presidents** by Richard Muller. 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, you will be asked questions during the class and discussion among you and your classmates will be encouraged.

**II. Attendance**

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

**III. Class participation – 25% of your total grade**

- a. It will be assumed that you have read any material assigned prior to a particular lecture and are prepared to discuss it in class.
  - b. Class attendance and participation in discussions is expected and will be part of your grade.
  - c. If you have questions about the material to be covered in class you should be prepared to ask them and assist in providing answers to your fellow student's questions.
  - d. Assume that from time to time you will be called upon to answer questions about the material being discussed.
  - e. At the beginning of each class I will give you a series of 3 or 4 questions on key ideas presented in the previous lecture.
- a. In addition to the review questions at the beginning of each lecture, there will be questions throughout the lecture. These questions are designed to stimulate discussion and help you test your understanding of the ideas that were just presented.
    - i. You will receive 3 points for answering the question and 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.
    - ii. 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,

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- ii. If you answered all of the questions but all of your answers were wrong you would still receive 7.5 points.
- iii. **Unexcused absence**: you will receive a 0 for any unexcused absence. (See Attendance policy below.)

**IV. Homework – 25% of your total grade**

- a. **Homework will be due every Sunday night by 11:30 pm.**
  - i. The homework questions are in your textbook. Chapter and question numbers are shown in each homework assignment on D2L. Look up the question in your text then select the appropriate answer on D2L.
- b. 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 midnight (12:00 am).
- c. Since homework is done on line and you have a week to complete it there is no reason for it to be late. Late homework will not be graded.
- d. **Do not do your homework using your smart phone!** D2L may not register what you have done.

**V. Semester Exams - 30% of your total grade**

- a. There will be three semester exams. Each one will cover the material from the previous exam up until the current exam.
- b. Each exam will be worth 10% of your final grade.

**VI. Final Exam - 20% of your final grade**

- a. The final exam will be comprehensive: it cover all of the material we have discussed during the semester. It will be worth 20% of your final grade.

**ASSESSMENT**

**Valuation**

- |                                       |                |
|---------------------------------------|----------------|
| 1. Homework                           | 25%            |
| 2. Attendance and Class participation | 25%            |
| 3. 3 Semester Exams                   | 30% (10% each) |
| 4. Final Exam                         | 20%            |

**Grading**

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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	
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

Refer to the Undergraduate Catalog for description of NG (No Grade), W, Z, and other grades.

**CONTACT POLICY**

**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.

**Email:** [WSawyer@wcupa.edu](mailto:WSawyer@wcupa.edu) please include:

Your name,  
Your section,  
A one or two word subject.

**ATTENDANCE POLICY**

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

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

**Please remember** there will be review questions at the beginning of each class. Missing one or more of these will hurt your day's participation grade.

**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. In order for you to have an excused absence you will need to show me this sheet prior to your missing the class.

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**EXAM POLICY:**

- **Exam procedure:**
  - a. There will be three exams plus the final. All exam grades count. I ***do not*** drop one exam. All exams will be held during our regular class time. I will be on Zoom to answer any questions you may have. The exams will be open book and on-line using D2L. You will have 75 minutes to complete each of the 3 in-class exams and 2 hours to complete the final the final exam
- **You must take each exam during its scheduled time.**
  - a. You have the class time to complete the exam.
    - i. You will not have the opportunity to take the exam at a later time.
    - ii. *No exceptions.*
- **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.

You must take the final exam at the assigned time. This is a University rule.

**ELECTRONIC DEVICES POLICY**

**CELL PHONES –**

- **Use of cell phones and texting in class and during exams is not allowed.** Please turn off your cell phones and put away during class and exams..

**D2L**

- This course has a D2L web page. Homework assignments will be posted on Mondays at midnight (12:00 AM) 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.

**SEXUAL HARASSMENT AND SEXUAL VIOLENCE (Title IX)**

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, Ms. Lynn Klingensmith. The only exceptions to the faculty member's reporting obligation are when incidents of sexual violence are communicated by a student during a

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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 Social Equity at [http://www.wcupa.edu/\\_admin/social.equity/](http://www.wcupa.edu/_admin/social.equity/).

**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](http://www.wcupa.edu).

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All rights reserved. No part of the lecture slides or associated notes used in this course may be reproduced, distributed, or transmitted in any form or by any means, including photocopying, recording, or other electronic or mechanical methods, without the prior written permission of Dr. William H. Sawyer, except in the case of brief quotations embodied in critical reviews and certain other noncommercial uses permitted by copyright law. For permission requests, write to Dr. William H. Sawyer, Ph.D. at the address below.

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**STUDENTS WITH DISABILITIES**

# Syllabus

## Physics 100-05, 100-06: Elements of Physical Science

### Spring Semester 2021

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 at <https://www.wcupa.edu/universityCollege/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 FOR UNIVERSITY-SANCTIONED EVENTS**

Students are advised to carefully read and comply with the excused absences policy 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, Ms. Lynn Klingensmith. 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 Social Equity at <http://www.wcupa.edu/admin/social.equity/>.

#### **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**



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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.

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<b>Physics 100-05, Meets M, W 7:15-8:30 Lecture Schedule and Assignment Due Dates,</b>						
<b>Date</b>	<b>Day</b>	<b>Lecture</b>	<b>Reading</b>	<b>Homework</b>		
				<b>Assignment</b>	<b>Opens Mondays at 12:00 AM</b>	<b>Due Sundays at 11:59 PM</b>
25-Jan	Monday	Introduction to Physics 100-05 & 06				
27-Jan	Wednesday	Lecture 1: Introduction, Keep it simple +C2C3:C5	Chapter 1	Homework 1	1-Feb	9-Feb
1-Feb	Monday	Lecture 2: Energy and Power	Chapter 1			
3-Feb	Wednesday	Lecture 3: Coal & natural gas	Chapter 1			
8-Feb	Monday	Lecture 4: Hydrogen Fuel Cell	Chapter 1	Homework 2	8-Feb	16-Feb
10-Feb	Wednesday	Lecture 5: Wind and Water	Chapter 1			
15-Feb	Monday	Lecture 6: Two Types of Energy	Chapter 1	Homework 3	15-Feb	23-Feb
17-Feb	Wednesday	Lecture 7: Heat and Work	Chapter 1			
22-Feb	Monday	Lecture 8: Simple Machines, Power and Light	Chapter 1	Homework 4	22-Feb	2-Mar
24-Feb	Wednesday	Review	<b>Chapter 1</b>			
1-Mar	Monday	<b>Exam I</b>	Chapter 2	Homework 5	1-Mar	9-Mar
3-Mar	Wednesday	Lecture 9: Heat: kinetic energy				
8-Mar	Monday	Lecture 10: Sound & Sound Waves	Chapter 2	Homework 6	8-Mar	16-Mar
10-Mar	Wednesday	Lecture 11: Resonance, Harmonics, How we hear	Chapter 2			
15-Mar	Monday		<b>Spring Break</b>			
17-Mar	Wednesday					
22-Mar	Monday	Lecture 12: Speed of Sound	Chapter 2	Homework 7	22-Mar	30-Mar
24-Mar	Wednesday	Lecture 13: Thermal Expansion	Chapter 3			
29-Mar	Monday	Lecture 14: Temperature, Pressure and Volume	Chapter 3	Homework 8	29-Mar	6-Apr
31-Mar	Wednesday	Lecture 15: Work from heat	Chapter 3			
5-Apr	Monday	Lecture 16: Chaos and Time reversal	Chapter 3	Homework 9	5-Apr	13-Apr
7-Apr	Wednesday	Exam II Review	Chapter 2 & 3			
12-Apr	Monday	<b>Exam II</b>	<b>Chapter 2 &amp; 3</b>	Homework 10	12-Apr	20-Apr
14-Apr	Wednesday	Lecture 17: A little bit about atoms	Chapter 4			
19-Apr	Monday	Lecture 18: A little bit about nuclear physics	Chapter 4	Homework 11	19-Apr	27-Apr
21-Apr	Wednesday	Lecture 19: Nuclei and Radioactivity	Chapter 4			
26-Apr	Monday	Lecture 20: Radiation Dose and Excess Cancers	Chapter 4	Homework 12	26-Apr	4-May
28-Apr	Wednesday	Exam III Review	Chapter 4			
3-May	Monday	<b>Exam III</b>	<b>Chapter 4</b>			
5-May	Wednesday	Final Exam Review				
<b>Final Exam Schedule</b>						
<b>PHY100-0 (class meets M, W 7:15-8:30) Final is on Monday May 10th from 8:00 to 10:00</b>						

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<b>Physics 100-06, Lecture Schedule and Assignment Due Dates,</b>							
<b>Date</b>	<b>Day</b>	<b>Lecture</b>	<b>Reading</b>	<b>Assignment</b>	<b>Opens Mondays at 12:00 AM</b>	<b>Due Sundays at 11:59 PM</b>	
26-Jan	Tuesday	Introduction to Physics 100-05 & 06					
28-Jan	Thursday	Lecture 1: Introduction, Keep it simple +C2C3:C5	Chapter 1	Homework 1	1-Feb	7-Feb	
2-Feb	Tuesday	Lecture 2: Energy and Power	Chapter 1				
4-Feb	Thursday	Lecture 3: Coal & natural gas	Chapter 1				
9-Feb	Tuesday	Lecture 4: Hydrogen Fuel Cell	Chapter 1	Homework 2	8-Feb	14-Feb	
11-Feb	Thursday	Lecture 5: Wind and Water	Chapter 1				
16-Feb	Tuesday	Lecture 6: Two Types of Energy	Chapter 1	Homework 3	15-Feb	21-Feb	
18-Feb	Thursday	Lecture 7: Heat and Work	Chapter 1				
23-Feb	Tuesday	Lecture 8: Simple Machines, Power and Light	Chapter 1	Homework 4	22-Feb	28-Feb	
25-Feb	Thursday	Review	<b>Chapter 1</b>				
2-Mar	Tuesday	<b>Exam I</b>	Chapter 2	Homework 5	1-Mar	7-Mar	
4-Mar	Thursday	Lecture 9: Heat; kinetic energy					
9-Mar	Tuesday	Lecture 10: Sound & Sound Waves	Chapter 2	Homework 6	8-Mar	14-Mar	
11-Mar	Thursday	Lecture 11: Resonance, Harmonics, How we hear	Chapter 2				
16-Mar	Tuesday	<b>Spring Break</b>					
18-Mar	Thursday						
23-Mar	Tuesday	Lecture 12: Speed of Sound	Chapter 2	Homework 7	22-Mar	28-Mar	
25-Mar	Thursday	Lecture 13: Thermal Expansion	Chapter 3				
30-Mar	Tuesday	Lecture 14: Temperature, Pressure and Volume	Chapter 3	Homework 8	29-Mar	4-Apr	
1-Apr	<b>Thursday</b>	Lecture 15: Work from heat	Chapter 3				
6-Apr	Tuesday	Lecture 16: Chaos and Time reversal	Chapter 3	Homework 9	5-Apr	11-Apr	
8-Apr	Thursday	Exam II Review	Chapter 2 & 3				
13-Apr	Tuesday	<b>Exam II</b>	<b>Chapter 2 &amp; 3</b>	Homework 10	12-Apr	18-Apr	
15-Apr	Thursday	Lecture 17: A little bit about atoms	Chapter 4				
20-Apr	Tuesday	Lecture 18: A little bit about nuclear physics	Chapter 4	Homework 11	19-Apr	25-Apr	
22-Apr	Thursday	Lecture 19: Nuclei and Radioactivity	Chapter 4				
27-Apr	Tuesday	Lecture 20: Radiation Dose and Excess Cancers	Chapter 4	Homework 12	26-Apr	2-May	
29-Apr	Thursday	Exam III Review	Chapter 4				
4-May	Tuesday	<b>Exam III</b>	<b>Chapter 4</b>				
6-May	Thursday	Final Exam Review					
<b>Final Exam Schedule</b>							
<b>PHY100-06 (class meets T, Th 12:30 - 1:45) Final is on Thursday May 13th from 10:30 to 12:30</b>							