

Physics 100-06 Physical Science Spring 2015

COURSE AND INSTRUCTOR INFORMATION

Meeting Time:

PHY 100-06: Tuesday and Thursday 9:30 – 10:45

Meeting Location: Merion 112

Instructor: William H. Sawyer, Ph.D.

Office Location: Merion Hall Room 132

Office Hours: Monday, Wednesday and Friday: 1:00-2:00; Tuesday and Thursday: 11:00-12:30; or by appointment

Email: wsawyer@wcupa.edu

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 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 on what we know, what we need to know and how we get there. 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. This course will not focus on solving equations and doing calculations. Rather the emphasis is on important concepts, methods for investigation, sound reasoning, facts, and how to develop and integrate these to make informed decisions. So put your calculators away, prepare to challenge your preconceived ideas, and think.

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 understand how to approach a real world problem and attempt to identify the most critical issues influencing it. You should understand how to use these issues to build a simple model of the problem, test your model and draw conclusions from your results. You should be able to draw conclusions based on data given to you in various forms such as graphs and charts. In addition you should have a basic understanding of the nature of energy, heat, electricity, light, and radiation, a historical perspective regarding the development of these concepts and some of the ethical issues surrounding their application.

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EXPECTATIONS

This course does not use a formal textbook however there is a list of required reading, please see below. Class attendance is mandatory. If you have to be absent for some reason please let me know ahead of time, refer to the **ATTENDANCE POLICY** below.

I. Class work

- 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 required 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 students questions.
- d. Assume that from time to time you will be called upon to answer questions about the material being discussed.
- e. Random quizzes can be expected just to make sure you are keeping up.

II. Homework and Quizzes

- a. You ***may work together*** to develop your solutions to the homework assignments but the work you turn in must be your own.
- b. Homework is due on the Thursday by 4:00 PM. Since homework is done on line there is no reason for it to be late. Late homework will not be graded.
- c. From time to time, there may be short unannounced quizzes over any assigned reading material. Your total quiz scores will be added to your homework score when your final course grade is calculated so it is to your benefit to keep up with the reading assignments.
- d. Homework and Quizzes are worth 20% of your final grade.

III. Projects

- a. There will be three group projects assigned during the semester. Each will be worth 10% of your final grade.
- b. The objective is for you gain a greater understanding of a particular principle through devising a way to illustrate (demonstrate) it to the rest of the class.
- c. I will divide the class into groups of five. Everyone in the group will receive the same grade. If one member of a group does not participate, taking advantages of their colleagues desire to accomplish something and it is called to my attention I will decide based on a discussion with the individual and the circumstances how to handle the situation.
- d. Each project will result in a demonstration or a presentation of some type as defined in the assignment. The groups will present their projects or demonstrations to the class on demonstration days. You will be graded by the other members of the class. Everyone will be given a scoring sheet to use for grading the projects. I reserve the right to edit the grade your group receives if I feel it is inappropriate.
- e. Although you will be given some time in class to organize and work on your projects most of your work will have to be done on your own time.

IV. Exams

- a. There will be three semester 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.

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

ASSESSMENT

- **Valuation**
 1. Homework and Quizzes 20%
 2. Projects 30% (10% each)
 3. 3 Semester Exams 30% (10% each)
 4. Final Exam 20%
- **Grade Range**
 1. 93% - 100% A
 2. 85% - 92% B
 3. 75% - 84% C
 4. 65% - 74% D

COURSE MATERIALS

Fear of Physics (A guide for the Perplexed) Author: Lawrence M. Kraus

Publisher: Basic Books, 2007;

ISBN-13 978-0-465-00218-4 (pbk. : alk. Paper)

ISBN-10: 0-465-00218-8 (pbk. : alk.paper)

This is available only in paperback or as in eBook for kindle software. The software is available as a free download from Amazon.com

Physics for Future Presidents: The Science Behind the Headlines; Author: Richard A. Muller
(Sep 21, 2009)

Publisher: W. W. Norton & Company, a Norton paperback, 2009

ISBN 978-0-393-33711-2 pbk

This is available only in paperback or as in eBook for kindle software. The software is available as a free download from Amazon.com

SPECIFIC COURSE OBJECTIVES

- Develop the ability to identify the critical factors that influence an issue
- Develop a practical understanding of the scientific method and how to use it
- Develop a practical understanding of the basic principles of physics and how to use them to make informed real world decisions

CONTACT POLICY

- Email: WSawyer@wcupa.edu (please include your name, the course number, and one or two words indicating the purpose of your email in the subject line.
- Office Phone: 610 436 2897

ATTENDANCE POLICY

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

Illness:

The Pennsylvania Department of Health has noted a significant increase in the incidence of influenza (flu) and the norovirus (responsible for severe vomiting and diarrhea) in our region this winter. Influenza is now becoming widespread through much of the country. Both of these viruses can be easily spread from person to person.

West Chester University Student Health Services will follow CDC recommendations directed towards reducing the burden of the disease and minimizing its spread. The CDC recommends that individuals with flu stay at home for at least 24 hours after fever is gone without the use of a fever-reducing medicine. The CDC also recommends that individuals with unexplained vomiting or diarrhea should be advised to stay home until they are completely well.

The University is strongly urging students with flu or norovirus to go home to rest and recover. Students who are unable to go home should not attend classes or any public gatherings.

I understand absenteeism can have an impact on your semester. If you miss class due to flu or the nor virus I will make every reasonable effort to enable you to complete your course work.

- If you miss an exam because you were sick, you will be required to present a note from the University Health Service or a physician in order to take a make-up exam.

You may find the following links helpful <http://www.cdc.gov/flu/> and <http://www.cdc.gov/norovirus/>

DISABILITY STATEMENT

West Chester University will make accommodations for persons with disabilities. Consult the Office of Services for Students with Disabilities (ext. 3217) and bring the resulting documentation to me as soon as possible.

ELECTRONIC DEVICES POLICY

Use of cell phones and texting in class is not allowed. Please arrange for all electronic devices to be turned off and put away.

- **If you use your cell phone for any reason during class you will be asked to leave immediately and you will not be given the opportunity make up work you miss.**
- 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 above.

EMAIL AND D2L POLICY

Faculty, staff, and students are expected to activate and maintain regular access to University provided email accounts; you are responsible for accessing that email to be sure to obtain official University communications. ***Failure to access your email will not exempt you from your responsibilities and liabilities.*** Therefore check your campus email regularly. Be sure you can log in, and that your email is updated.

- This course has a D2L web page. Homework assignments will be posted on the Thursday's of the week before they are due.
- From time to time other important information may also be posted there.

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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.

UNIVERSITY SANCTIONED EVENTS

If you will be participating in a University-sanctioned event during a class, **please notify me in advance.**

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.

DIVERSITY

I fully support the West Chester University's Mission Statement that says, in part, "We appreciate the diversity the members of our community bring to this campus and give fair and equitable treatment to all; acts of insensitivity or discrimination against individuals based on their race, gender, ethnicity, age, sexual orientation, abilities, or religious beliefs will not be tolerated."

INTELLECTUAL PROPERTY STATEMENT

Please note in this course from time to time I will utilize copyrighted materials under the "Freedom and Innovation Revitalizing 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 copyright protected by the instructor, including, but not limited to, lectures, course discussions, course notes and supplementary materials posted or provided to students authored by the instructor, assessment instruments such as quizzes and exams, and Power Point presentations. No recording, copying, storage in a retrieval system, or dissemination in any form, whether electronic or other format, by any means of the intellectual property of the instructor, either in whole or in part, is permitted without the 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 in the semester in which this course is held.

Links and references to on-line resources provided by the instructor may lead to other sites. The instructor does not sponsor, endorse or otherwise approve of any information appearing in those sites, nor is responsible for the availability of, or the content located on or through, external sites. Apart from materials used in accordance with the Fair Use Act, the instructor takes no responsibility for material that is otherwise offered at web sites and makes no warranty that such material does not infringe any third party rights. However, should any of this type of material be present and this fact is brought to the attention of the instructor, they will remove references to it from course materials.

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CLASS SCHEDULE

(I reserve the right to make changes to this schedule subject to the vicissitudes of reality)

	DATE	Day	Topic	Due Dates
Unit I - A Little Background				
1	January 20	Tuesday	Consider a Cow	
2	January 22	Thursday	Tools for an Informed Decision-maker	
3	January 27	Tuesday	Building on the shoulder of Giants I	
4	January 29	Thursday	A great Leap Forward	Homework 1
5	February 3	Tuesday	The language of Physics, Angular Motion	
6	February 5	Thursday	Theory and Fact & Review	Homework 2
7	February 10	Tuesday	Exam I	Exam I
Unit II - Combating Terrorism				
8	February 12	Thursday	Nine-Eleven & Risk Assessment	Homework 3
9	February 17	Tuesday	Terrorists, Nukes	
10	February 19	Thursday	Project Day	Homework 3, Project I
11	February 24	Tuesday	Terrorists and Nukes	
12	February 26	Thursday	The Next Terrorist Attack	Homework 4
Unit III - Energy, What are the choices?				
13	March 3	Tuesday	A Love Affair	
14	March 5	Thursday	If Not This One Then Who	Homework 5
	March 9-13	Spring Break	Spring Break	
15	March 17	Tuesday	The Manhattan Project & Review	
16	March 19	Thursday	Radioactivity Nuclear Weapons & Review	Homework 6
17	March 24	Tuesday	Exam II	Exam II
18	March 26	Thursday	Nuclear Power and Nuclear Fusion	Homework 7
Unit IV – Global Warming				
19	March 31	Tuesday	14,000 Years and The Hockey Stick ,	
20	April 2	Thursday	Distortion and Exaggeration, Choices	Homework7
21	April 7	Tuesday	Project Day	Project II
Unit V – Space the Next Frontier?				
22	April 9	Thursday	Space, Telescopes Satellites & Drones	Homework 8
23	April 14	Tuesday	Humans in Space	
24	April 16	Thursday	Flying Saucers, SETI and ETL, Review	Homework 9
25	April 21	Tuesday	Exam III	
Unit V – Space the Next Frontier?				
26	April 23	Thursday	The Early Days and The Rays	Homework 10, Exam 3
27	April 28	Tuesday	Project Day	Project III

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28	April 30	Thursday	The Reds and Review	Homework 11
			Final Exam	