

# Physics 100-03 Physical Science

## COURSE AND INSTRUCTOR INFORMATION

**Meeting Time:** Tuesday and Thursday, 12:30 – 1:45

**Meeting Location:** Merion 112

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

**Office Location:** Merion Hall Room 132

**Office Hours:** As posted 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. Mathematics will not be important but concepts, facts, and how to integrate them to make an informed decision will be. So put your calculators away, prepare to challenge your preconceived ideas, and think.

## EXPECTATIONS

Since there is no textbook for this class (there is a required reading list however, 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. 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.
- c. Assume that from time to time you will be called upon to answer questions about the material being discussed.
- d. 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 every Friday by 9:00 AM. 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.

### **III. Projects**

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- a. There will be three group projects throughout the semester.
- 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. There will be one demonstration day for each project. They will take place on Thursdays in Room 122 of the Merion Science center during regular class time. The room will be available for setup if needed beginning the Wednesday afternoon before the demonstration day.
- e. 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.
- f. 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.
- b. The final exam will cover all of the material we have discussed during the semester. It will be worth 25% of your final grade.

### ASSESSMENT

- **Valuation**
  1. Homework and Quizzes 25%
  2. Projects 20%
  3. 3 Semester Exams 30% (10% each)
  4. Final Exam 25%
- **Grade Range**
  1. 93% - 100% A
  2. 85% - 92% B
  3. 75% - 84% C
  4. 65% - 74% D

### REQUIRED 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 100-03 Physical Science

**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](mailto: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**

**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**

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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 see tell me at the beginning of class and refer to the DISABILITY STATEMENT above.

### **D2L**

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

### **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.**

### **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

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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.

### **LECTURE SCHEDULE** (Subject to the vicissitudes of reality)

	<b>Physics 100-07 (Tentative Schedule)</b>			
	<b>Day</b>	<b>Week</b>	<b>Topics</b>	<b>Project</b>
			<b><u>Unit I - A Little Background</u></b>	
1	Tuesday	January 21st	Consider A Cow, Aristotle to the Renaissance	Scaling
2	Thursday	January 23th	Building on the shoulders of giants - Lex Parsimoniae	
3	Tuesday	January 28th	Theory, Fact, and Language	
4	Thursday	January 30th	Project Day	Due
			<b><u>Unit II - Combating Terrorism</u></b>	
5	Tuesday	February 4th	Inspection - how, what, and how effective	
6	Thursday	February 6th	Rogue Nukes and Home-made A-Bombs	
7	Tuesday	February 11th	What can we expect? Biological Terrorism?	
8	Thursday	February 13th	<b>First Exam</b>	
			<b><u>Unit III - Energy, What are the choices?</u></b>	
9	Tuesday	February 18th	A Few Basics and a Love Affair	Work
10	Thursday	February 20th	If Not Her Then Who Else	
11	Tuesday	February 25th	The End of the Affair	
12	Thursday	February 27th	Project Day	<u>Due</u>
			<b><u>Unit IV - Nuclear.....</u></b>	
13	Tuesday	March 4th	Radiation - The Double Edged Sword	
14	Thursday	March 6th	Weapons and Madness Power, Promise, and Waste	
15	Tuesday	March 11th	<b>Second Exam</b>	
			<b><u>Unit V - Why Space</u></b>	
16	Thursday	March 13th	Spy Satellites and Things That Go Bump In The Night	
	Tuesday	March 18th	<b><i>Spring Break</i></b>	
	Thursday	March 20th	<b><i>Spring Break</i></b>	
17	Tuesday	March 25th	Seeing with Invisible Light	
			<b><u>Unit VI - Global Warming: Fact, Myth, Don't know</u></b>	

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18	Thursday	March 27th	14,000 Years, The Hockey Stick , Carbon Dioxide,	
19	Tuesday	April 1st	The Green House Affect, A Very Likely Cause	Wind Energy
20	Thursday	April 3rd	Distortion and Exaggeration	
21	Tuesday	April 8th	Cherry Picking and New Bias	
22	Thursday	April 10th	Project Day	Due
23	Tuesday	April 15th	<b>Third Exam</b>	
			<b><u>Unit VII - What Can We Do, Non-solutions</u></b>	
24	Thursday	April 17th	Electric Automobiles	
25	Tuesday	April 21nd	and Hydrogen	
26	Thursday	April 23rd	The Fruit on the Ground	
27	Tuesday	April 28th	New Technologies	
28	Thursday	April 30th		