

**West Chester University**  
**Department of Physics**  
**Physics 130 – General Physics I**

**Meeting Time:** MWF 12:00 - 12:50 pm (Sect.01); MWF 1:00 - 1:50 pm (Sect.02)

**Meeting Place:** Merion Science Center 112

**Instructor:** Jeffrey J. Sudol (Dr. Jeff)

**Office:** Merion Science Center 130

**Office Phone:** 610-436-2572

**Office email:** [jsudol@wcupa.edu](mailto:jsudol@wcupa.edu)

**Office Hours:** to be determined\*

\* During the first week of class, I will survey the class to determine which hours will best serve everyone. At the end of the first week of class, I will post my official office hours for the remainder of the semester on BlackBoard.

During the first week of class, I will be available Monday through Friday from 10-11 am and 3-5 pm.

### **Course Description**

Physics 130 is the first of two courses that serve as an introduction to the principles of physics. The content areas of this course are kinematics (motion), dynamics (how mass responds to an applied force), statics (forces in equilibrium), collisions, work and energy, and thermodynamics. High school algebra and trigonometry are prerequisites for this course. Students will be tested on the first day of class to determine if they have the prerequisite skills and knowledge in math and science to succeed in this course.

### **Required Course Materials**

- ✓ *College Physics: A Strategic Approach*. Knight, Jones, and Field<sup>1</sup>
- ✓ *College Physics: A Strategic Approach, Student Workbook*. Knight and Andrews<sup>1,2</sup>
- ✓ *Ranking Tasks in Physics*. O'Kuma et al.<sup>2</sup>
- ✓ a scientific calculator

<sup>1</sup>If you plan to take PHY140, purchase volumes 1 and 2, otherwise only volume 1 is required.

<sup>2</sup>You must have a "clean" (unused) copy of this book.

## Lab

This course has a laboratory component. Your lab grade will be factored into your final grade for this course. You will not receive a separate lab grade on your transcript. Note, also, that lab specific questions will appear on each exam.

Consult the lab syllabus for your particular lab section for more information. Satisfactory completion of all of the labs is required to pass the course.

## Website

This course has a BlackBoard website associated with it. I will post all of the course documents and announcements on the website on a regular basis. Please check Blackboard everyday for updates.

Note that students in Section 02 of the course will be enrolled in Section 01 *on BlackBoard*. In other words, all of the students enrolled in PHY130 have access to the same website. I have no reason to distinguish between the two sections.

## Course Goals\*

1. Exercise and develop language skills (reading, writing, and discourse).
2. Exercise and develop reasoning skills.
3. Exercise and develop metacognitive skills.
4. Develop and improve those mental models needed to solve qualitative and quantitative problems in the content areas of the course: kinematics, dynamics, statics, collisions, work and energy, and thermodynamics.

\*The course goals include but are not limited to the following University goals for a general education science course:

1. Ability to communicate effectively.
2. Ability to employ quantitative concepts and mathematical models.
3. Ability to think critically and analytically.

## Pedagogical Notes

*Let's talk about door knobs.*

Consider the door knob. If you go to a hardware store looking for a door knob, you are likely to find a hundred different varieties. Door knobs come in different shapes and sizes and colors and styles, but you expect all of them to work the same way. You have in your head a "mental model" about how doorknobs work. You grab the handle, you turn the handle to the right (clockwise), the latch moves free of the catch, and the door is free to open. Despite all of the varieties of doorknobs out there, all of them function the same way, more or less. So, instead of having to learn to recognize all of the varieties of doorknobs in the world and how each particular one works, you only need this one mental model of how a doorknob works in order to open doors without having to stop and think about how to open a door each time you encounter one. That is, until you go to Japan. You grab the handle, you turn it to the right, and nothing happens. That's because doorknobs in Japan turn to the left.

I will admit that I do not know if door knobs do in fact turn to the left in Japan, but I want to illustrate the point that sometimes your expectations of how things should work are inconsistent with how things do in fact work because your mental model is either incomplete or inaccurate. That particular moment when your expectations (the door is open) and reality (the door is not open) are in conflict is quite a powerful moment. It is in that moment that your brain is ready to change its mental model of the world.

This whole thing about door knobs is highly simplified, but the point is this. You have in your head "mental models" about how things work that are often incomplete or inaccurate. You have many "misconceptions," especially when it comes to "physics." It's ok. It's expected. It's "human nature."

I have designed this course to challenge your existing mental models and to help you change them and build more robust and accurate mental models of the world. I want you to know right now that there is no "natural talent" for physics. Anyone who is good at doing physics has had to go through the same process that you will go through.

For a cogent discussion about "mental models," I recommend that you read *The Implications of Cognitive Studies for Teaching Physics* by E.F. Redish, available at <http://www.physics.umd.edu/perg/papers/redish/cogsci.html>.

For a complete discussion on my teaching philosophy and practices, as well as tips on how to succeed in this course, it is imperative that you read *How to Succeed in Physics*, now available on BlackBoard.

## Assessment

Your "grade" in this course will be based on your performance in the following categories of assessment with the following weights.

Lab .....	5%
Regular Exams.....	75%
Final Exam .....	20%

Regular exams are those exams that occur in lecture during the course of the semester. **At the end of the semester, I will drop your lowest regular exam score and average the remaining exam scores.** The final exam is cumulative, and it counts.

It sounds nice, but here's the catch!

Except for University sanctioned events, there are no excused absences. There are no makeup exams, and you cannot take an exam early or late.

What does this mean? It means that if you miss a regular exam, you receive a score of a zero on that exam, regardless of the reason for missing the exam. I drop the lowest exam score, so you can miss one regular exam, and it will not affect your final grade. I recommend, however, that you make arrangements with me to take the exam as it will serve to test your knowledge and prepare you for the final exam, which is cumulative, and it counts.

I do this for the following reason. It takes me about eight hours to write an exam. The exams are exquisitely crafted to test the objectives of the course so that the exam scores represent an accurate measurement of how well the students (and I) have met the objectives of the course (we are a team). If I were to allow students to take exams at different times, I would have to write multiple exams to preserve the integrity of each exam (this is an ethical code; it's nothing personal), and I would have to do so in a way that all of the exams test the same objectives equally well. So, "makeup exams" represent a huge time sink, and I simply cannot afford that time sink.

I assign letter grades according to the following scale.

93 - 100	A
90 - 93	A-
87 - 89	B+
83 - 86	B
80 - 82	B-
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.	
and so on...	

I do not norm-reference (or scale) grades.

I also reserve the right to introduce different forms of assessment as needed and to alter the weight of each of the categories of assessment in the event of some unforeseen circumstance.

### **Physics Tutoring**

Physics tutoring is available through three different forums: the Learning Assistance & Resource Center (LARC), the Society for Physics Students, and private tutors. More information about tutoring will become available during the second week of the semester.

### **Disability Statement**

If you require special accommodations because of a disability, please meet with me as soon as possible to discuss your needs. Supporting documentation is required.

### **Academic Integrity Statement**

If you commit a violation of academic integrity, you will receive zero credit for the entire course. This is not negotiable. For more information regarding violations of academic integrity, consult pages 50-55 of the 2009-2010 Undergraduate Catalog.

### **University Sanctioned Events**

If you will be participating in a University-sanctioned event that occurs at the same time as an exam (the exam times on the schedule are fixed), you must notify me prior to the exam. Documentation supporting your participation in this event is required. We will then make arrangements for you to take the exam either prior to or at the scheduled exam time through a proctor. For more information on University Sanctioned Events, consult page 48 of the 2009-2010 Undergraduate Catalog.

	<u>Date</u>	<u>Topic</u>	<u>Chapter</u>	<u>Lab</u>
M	Aug. 31	SKBT		<i>No Lab</i>
W	Sep. 02	FMCT		
F	Sep. 04	Kinematics: Introduction	1	
M	Sep. 07	<i>No class - Labor Day</i>		Data Analysis
W	Sep. 09	1-D Kinematics	2	
F	Sep. 11	1-D Kinematics	2	
M	Sep. 14	1-D Kinematics	2	1-D Kinematics
W	Sep. 16	Vectors	1,3	
F	Sep. 18	2-D Kinematics	3	
M	Sep. 21	2-D Kinematics	3	2-D Kinematics
W	Sep. 23	2-D Kinematics	3	
F	Sep. 25	2-D Kinematics	3	
M	Sep. 28	Exam #1	1-3	"g"
W	Sep. 30	Newton's Laws	4	
F	Oct. 01	Newton's Laws	4	
M	Oct. 05	Newton's Laws	5	Force Table
W	Oct. 07	Newton's Laws	5	
F	Oct. 09	Newton's Laws	5	
M	Oct. 12	<i>No Class - Fall Break</i>		Inclined Plane
W	Oct. 14	Newton's Laws	5	
F	Oct. 16	Circular Motion	3,6	
M	Oct. 19	Circular Motion	3,6	Torque
W	Oct. 21	Torque and Rotational Motion	6,7	
F	Oct. 23	Torque and Rotational Motion	6,7	
M	Oct. 26	Exam #2	4-7	Biomechanics- Equilibrium
W	Oct. 28	Static Equilibrium	8	
F	Oct. 30	Collisions	9	
M	Nov. 02	Collisions	9	Conservation of Momentum
W	Nov. 04	Work and Energy	10	
F	Nov. 06	Work and Energy	10	
M	Nov. 09	Work and Energy	10	<i>No Lab</i>
W	Nov. 11	Work and Energy	10	
F	Nov. 13	Work and Energy	10	
M	Nov. 16	Exam #3	8-10	FMCT
W	Nov. 18	Temperature and Kinetic Theory	11,12	
F	Nov. 20	Heat	11,12	
M	Nov. 23	Heat	11,12	<i>No Lab</i>
W	Nov. 25	<i>No class - Thanksgiving Break</i>		
F	Nov. 27	<i>No class - Thanksgiving Break</i>		
M	Nov. 30	Thermodynamics	11,12	Calorimetry
W	Dec. 02	Thermodynamics	11,12	
F	Dec. 04	Thermodynamics	11,12	
M	Dec. 07	Exam #4	11-12	<i>No Lab</i>
W	Dec. 09	Fluid Mechanics	13	
F	Dec. 11	Fluid Mechanics	13	
M	Dec. 14	Fluid Mechanics	13	
W	Dec. 16	Sect.02 Final Exam <b>1-3</b>	1-13	
F	Dec. 18	Sect.01 Final Exam <b>1-3</b>	1-13	