West Chester University

Department of Physics

Physics 170 – Physics I

Section 01 – Lecture

Section 91 – Recitation

Meeting Times:	MWF 11:00 - 11:50 am (Lecture)
	R 2:00 - 2:55 pm (Recitation)
Meeting Place:	Merion Science Center 112
Instructor:	Jeffrey J. Sudol (Dr. Jeff)
Office:	Merion Science Center 130
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Office email:	jsudol@wcupa.edu
Office Hours:	M1-3, W1-2, F1-3

Course Description

Physics I is the first of two courses that serve as an introduction to the principles of physics. The content areas of this course are kinematics, dynamics, rotational kinematics and dynamics, static equilibrium, work and energy, impulse and momentum, thermodynamics, fluid mechanics, simple harmonic motion, and waves.

Required Course Materials

- ✓ *Fundamentals of Physics*, 9th edition, Volume 1, (Halliday & Resnick) Walker

Require Lab Materials

- ✓ *An Introduction to Error Analysis*, 2nd edition, Taylor
- ✓ *The Physics 170 Fall 2013 Laboratory Workbook*, Waite
- ✓ A "Laboratory Notebook" from the BookFactory
  (soft cover, blue, 162 pages, quadrille ruled paper)
- ✓ A scientific calculator

Attendance Policy

Attendance is required.

Recitation

A recitation section is associated with this course. Recitation is dedicated to the discussion of problem solving techniques in physics (as opposed to the principles of physics) and the solutions to homework assignments.

Lab

This course has a laboratory component. Your lab grade is factored into your final grade for this course. You will not receive a separate lab grade on your transcript. Consult the lab syllabus for your particular lab section for more information. **Satisfactory completion of all labs is required to pass the course, and a passing grade in lab is required to pass the course.**

Website

This course has a D2L website associated with it. I will post all of the course documents and announcements on the D2L website on a regular basis. Please check D2L every day for updates.

Physics Tutoring

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

Course Goals*

1. Exercise and develop language skills.
2. Exercise and develop reasoning skills.
3. Exercise and develop metacognitive skills.
4. Develop and advance the mental models required to solve qualitative and quantitative problems in the content areas of the course.

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*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 door knob, turn the knob 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 in 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 doorknob works, you need only 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 reach for the handle, you turn to the right, and nothing happens. That's because doorknobs in Japan turn to the left.

I will admit that I do not actually know if door knobs turn to the left in Japan, but I want to illustrate the point that sometimes your expectation of how things should work is inconsistent with how things do in fact work because your mental model is either incomplete or broken. That particular moment, when your expectation (the door is open) and reality (the door is not open) are in conflict, is quite powerful. It is in that moment that your brain is prepared 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 broken. You have many "misconceptions" about how things work, especially when it comes to "physics." It's ok. It's expected. It's "human nature."

I have designed this course to expose and challenge your existing mental models and to help you build more robust and accurate mental models. 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: challenging and advancing their mental models about how the world works.

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

Assessment

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

Lab	20%
Regular Exams	60%
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 (see the section on University sanctioned events below), 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. If you miss an exam, though, I recommend that you make arrangements with me to take the exam as it will serve to test your knowledge of physics and prepare you for the final exam, which is cumulative, and it counts.

I created this exam policy this for several reasons, but the two most important reasons are as follows. (1) Sometimes, other events in life take priority over physics. I'm ok with that. (2) It takes me about eight hours to write an exam. The exams are exquisitely crafted to test the objectives of the course. The exam scores therefore represent an accurate assessment of how well you (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 follows from a professional code of ethics – 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 the education system in which we operate does not allow for such huge time sinks.

Also, please bear in mind that exams are not a learning tool. Exams represent summative assessment. (If you are unfamiliar with the concept, read *How to Succeed in Physics*, the companion document to the syllabus.) I will not return the exams to you. I keep all of the exams in my office, and they are only available for review in my office up until the time of the next exam. The reproduction of any exam question in any manner represents a violation of academic integrity.

I assign letter grades according to the following scale, rounding appropriately.

93 - 100	A
90 - 92	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.

Disability Statement

If you require 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 the 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 dates on the schedule will not change), 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 the Undergraduate Catalog.

Intellectual Property

All of the course materials, including the PowerPoint lectures, worksheets, and exams, are either my intellectual property or the intellectual property of another author. Your use of these materials is restricted to your own studies for the duration of this course. It is a violation of Federal Law for you to distribute copies of these materials to anyone in any format at any time.

Electronic Equipment in the Classroom (Unplug)

I do not permit the use of cell phones, cameras, voice recorders, computers, or similar electronic equipment in the classroom unless you need to use such a device to accommodate for a disability, in which case you should schedule a meeting with me to discuss the use of the device as soon as possible. The spirit of the rule is that the classroom should be an electronic free zone where we tune out the distractions of the world and focus on learning physics. The classroom is a place of dialogue, and the electronic gadgets of our modern culture are not necessary for that dialogue to take place.

Course Schedule

Day	Lect	Date	Topic	Chapter	Lab
M		Aug. 26	Introduction	-	Estimating Uncertainties
W	1	Aug. 28	Kinematics: Distance and Displacement	2	
F	2	Aug. 30	Kinematics: Speed and Velocity	2	
M	-	Sep. 02	*No class - Labor Day*	-	Measuring Acceleration
W	3	Sep. 04	Kinematics: Constant Acceleration	2	
F	4	Sep. 06	Kinematics: Free-Fall	2	
M	5	Sep. 09	Vectors	3	Free Fall: Constant Acceleration
W	6	Sep. 11	Vectors	3	
F	7	Sep. 13	Kinematics: Displacement, Velocity, Acceleration in 3D	4	
M	8	Sep. 16	Kinematics: Projectile Motion Part I	4	*Quiz*
W	9	Sep. 18	Kinematics: Projectile Motion Part II	4	
F	-	Sep. 20	**Exam #1**	1-4	
M	10	Sep. 23	Dynamics: Newton's Laws	5	Free Fall: Projectile Motion
W	11	Sep. 25	Dynamics: Newton's Laws	5	
F	12	Sep. 27	Dynamics: Newton's Laws	5	
M	13	Sep. 30	Dynamics: Friction	6	Coefficient of Friction
W	14	Oct. 02	Dynamics: Friction	6	
F	15	Oct. 04	Dynamics: Interacting Objects	6	
M	-	Oct. 07	*No Class - Fall Break*	-	*No Lab*
W	16	Oct. 09	Dynamics + Kinematics	6	
F	17	Oct. 11	Circular Motion: Kinematics	4	
M	18	Oct. 14	Circular Motion: Dynamics	6	*Quiz*
W	-	Oct. 16	**Exam #2**	4-6	
F	19	Oct. 18	Work	7	
M	20	Oct. 21	Energy	7	Kepler's Third Law
W	21	Oct. 23	Energy Transfers and Transformations	8	
F	22	Oct. 25	Energy Transfers and Transformations	8	

Day	Lect	Date	Topic	Chapter	Lab
M	23	Oct. 28	Impulse and Momentum	9	Conservation of Momentum
W	24	Oct. 30	Impulse and Momentum	9	
F	25	Nov. 01	Circular Motion: Torque	10	
M	26	Nov. 04	Circular Motion: Angular Momentum	11	*Quiz*
W	-	Nov. 06	**Exam #3**	7-11	
F	27	Nov. 08	Static Equilbrium	12	
M	28	Nov. 11	Fluids: Pressure, Pascal's Principle	14	Biomechanics
W	29	Nov. 13	Fluids: Archimedes' Principle	14	
F	30	Nov. 15	Fluids: Continuity, Bernoulli's Equation	14	
M	31	Nov. 18	Simple Harmonic Motion	15	Spring-Mass Oscillator
W	32	Nov. 20	Waves	16	
F	33	Nov. 22	Waves	16	
M	34	Nov. 25	Waves	17	*No Lab*
W	-	Nov. 27	*No Class - Thanksgiving Break*	-	
F	-	Nov. 29	*No Class - Thanksgiving Break*	-	
M	-	Dec. 02	**Exam #4**	12-17	Standing Waves on a String
W	35	Dec. 04	Thermodynamics	18	
F	36	Dec. 06	Thermodynamics	19	
M	37	Dec. 09	Thermodynamics	20	
W	-	Dec. 11	**Final Exam** 10:30 am - 12:30 pm	1-20	