PHY 170 - Physics I

Instructor: Dr. Kevin B. Aptowicz

Spring 2009

(updated: April 5^{th}, 2009)

Course Summary

Welcome to Physics I! In this course, you will learn about (1) physical phenomena (like gravity, friction, and buoyancy); (2) the mathematical framework to analyze physical phenomena (like scalars, vectors, and the addition or multiplication of these quantities); (3) central concepts used to analyze physical situations (like conservation of energy, conservation of momentum, and simple harmonic motion); and finally (4) the procedures devised to attack physics problems in a methodical fashion.

Wait! We aren't done yet. This course will also reinforce or develop your time-management skills, your critical and analytical thinking skills, and your communications skills (in particular exchanging ideas about how the physical world works). And, if dreams do come true, this course will nurture in you a long-lasting love (or at least appreciation) for the field of physics. This syllabus will serve both as a contract between instructor and student on how the course will be run and as a guide for the student on the design and content of the course. Please flip through all of the sections and become familiar with the content. I am looking forward to getting to know you through the coming months.

Contents

1 Objectives

This course serves as a required course for certain majors and as a general education science elective. Below are the objectives for both of these roles.

1.1 Physics Objectives

Upon comletion of this course, you should be comfortable analyzing and solving the following problems.

- Projectile Motion
- Circular Motion
- Newton's Laws applied to translational motion
- Conservation of energy for translational motion
- Conservation of momentum for translational motion
- Newton's Laws applied to rotational motion
- Conservation of energy for rotational motion
- Conservation of momentum for rotational motion
- Simple Harmonic Motion

In order to solve these problems, you need to firmly grasp the physical phenomena that are at play as well as master the mathematical tools available *and* thoroughly understanding the procedures devised for each type of problem. This is no easy task and will require a whole semester of effort on both our parts. However, the results of your hard work will bear fruits and I think you'll be delighted withthe results.

1.2 General Education Objectives

This course strives to have students meet the following general education goals.

- Ability to communicate effectively
- Ability to employ quantitative concepts and mathematical methods
- Ability to think critically and analytically

2 Course Structure

How do we accomplish the objectives set forth in Section 1? It will require a great deal of effort on both our parts. You will need to be a dedicated student with good time-management skills as well as enough confidence to keep your chin up during rough stretches. I will need to develop pedagogically sound teaching tools that make efficient use of your valuable time and directly addresses those concepts or material that you find most challenging. This section get at the heart of both of our roles in the course and addressed how your time will be spent inside and outside the classroom.

2.1 The Calculation ... Student's Time on Task

The life of a student isn't easy. You have many demands on your time beyond this course. I need to be reasonable by not assigning more work than is humanly possible. This calculation is an attempt to due just that. In order to determine how much time a student can commit to my course, I've made the following assumptions.

- The student (that's you!) spends a total of 54 hours a week on their college studies.
- The student course load is 15 credits.

Therefore, the total time a student is able to commit per week to this course is $\frac{54 \text{ hours}}{15 \text{ credits}} \times 4 \text{ credits} = 14.4 \text{ hrs}$. These precious hours are allotted to the following tasks.

Table 1: Student time on task per week.

Task	**Time (hrs)**
actively participating in lecture, lab, and recitation	6
preclass reading	3
practice problems	4
laboratory assignments	1.4

Details about each of these tasks are given in the next subsection.

2.2 Course Components

Here is a list of the different aspects of the course and the thinking behind each one.

Preclass Reading Yes, you must read before coming to class. Since we have so little lecture time, we must focus on the more challenging concepts in the course. Thus, it critical that you come to lecture knowing the basic elements which we will build on in lecture that day. I have allotted for one hour of reading before each lecture. The reading for each day will compose of approximately 5 pages. You need to think deeply about the content and might need to read certain section multiple times. To help you focus on the import points in the text I will devise reading questions for each reading assignment.

Lecture You should be familiar with this part. I attempt to make it as informal as possible and encourage lots of questions.

Concept Questions This is a pedagogical tool to test whether you understand the main point I'm trying to make during lecture. I might also use it to check if you are clear about a subtle issue. Concept Questins also improve your ability to discuss and explain your critical and analytical thinking with your classmates. Finally, they promote active thinking during lecture time (rather than rote note taking) which is critical to the learning process.

Practice Problems These are problems assigned from the back of the text. They serve to reinforce the course material as well as to act as practice problems for the exam. You are expected to work on these problems after each lecture. If you find yourself struggling with the problems, please seek out a study group, a tutor, or my help. Of course, recitation is an excellent time to receive additional help.

Recitation I use recitation to reinforce problem solving skills that you need to perform well on the exam. At times, I also use recitation to assess the course.

Lab The laboratory portion of this course is separate from the lecture portion. Your lab instructor will provide you with a syllabus on how the laboratory section will be run.

3 Instructor and Course Information

Course:	PHY 170
Text:	Halliday, D, R. Resnick, and J. Walker. 2005. Fundamentals of Physics (Eighth Edition). Hoboken, NJ: John Wiley & Sons.
Website:	http://courses.wcupa.edu/kaptowicz/courses/phy170/PHY170.html
Lecture Location:	112 Boucher Hall
Lecture Time:	MWF 11:00 am - 11:50 am
Recitation Location:	190 Schumucker Science Center North
Recitation Time:	Tu 9:30 am to 10:30 am

Instructor:	Kevin B. Aptowicz (Dr. Aptowicz)
Office Location:	Boucher 128
Office Phone:	(610) 436-3010
Email:	kaptowicz@wcupa.edu
Office Hours:	MW 2 pm - 3 pm Tu 10:30 -12:00 pm F 1 pm - 2:30 pm

4 Grading Procedure

Grades! For some, this is the only section that matters. Enjoy.

4.1 Methods for Calculating Your Grade

Two methods will be used to calculate your grade. The resulting highest grade will be your grade for the course.

Method #1	
Regular Exams	66%
Final Exam	22%
Lab	12%

Method #2	
Regular Exams	60%
Final Exam	20%
Lab	12%
Reading Quizzes	4%
Practice Problems	4%

4.2 Grading Components

Regular Exams: There are a total of four regular exams that will occur though-out the semester. The highest three will be averaged to determine your grade for this component.

Final Exam: The final exam is a cumulative exam that occurs at the end of the course. It will focus on the nine problems listed in Subsection 1.1.

Lab: The grade for this component will be determined by your lab instructor.

Reading Quizzes: Twelve times during the semester you will be asked to take a multiple choice reading quiz. The scoring for that quiz is

Number Correct	**Score**
0	10%
1	50%
2	80%
3	100%

The highest nine scores of these twelve reading quizzes will be averaged to determine your grade for this component.

Practice Problems: Practice Problems are the weekly assigned problems. At random times of the year, I will collect your *rough* work at recitation and determine whether or not it meets class standards. I will return it to you during lab. There will be no grades assigned just a check for meets class standards or a NG for not gradeable. Your grade for this component will be the fraction that meet standards multiplied by 100. Thus the highest score for this component is an 100.

4.3 Letter Grade Assignment

I assign letter grades according to the following scale.

Numerical Grade	Letter Grade
93.4 - 100.0	A
90.0 - 93.3	A-
86.7 - 89.9	B+
83.4 - 86.6	B
80.0 - 83.3	B-
76.7 - 79.9	C+
73.4 - 76.6	C
70.0 - 73.3	C-
66.7 - 69.9	D+
63.4 - 66.6	D
60.0 - 63.3	D-
below 60.0	F

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

5 Course Policies

There are numerous course policies that can be found below. If you need more details or have a question, stop by my office.

5.1 Exams Policy

There are no make-up exams. Since one exam is dropped, please do not miss more than one exam.

5.2 Academic Integrity Statement

If you violate the University policies of academic integrity, you will receive zero credit for the entire course. This is not negotiable, and I will not waste time on the odd student who does not have a proper respect for the education process. Ignorance of what constitutes a violation of academic integrity is not an excuse. See the section on Academic Integrity starting on page 47 of the Undergraduate Catalog for more details.

5.3 Practice Problems

Practice problems (aka problem sets or homework) will not be graded. However, they will be randomly collected to determine how much effort you are putting into the course. More information can be found in subsection 4.2.

5.4 Attendance and Lateness Policy

If you are late to class and the reading quizzes have been collected, you will not be allowed to take the quiz and receive a 0 for that quiz grade. Note, a fraction of the quiz grades are dropped when calculating your final grade. More information can be found in subsection 4.2.

5.5 Teaching Style

This course will rely heavily on lectures using the chalk boards as well as concept questions projected onto a screen. If you have problems seeing the chalk board or reading my handwriting, please move to the front of the class.

5.6 LGBTQA Ally

Based on West Chester University's commitment to diversity, I believe that everyone in my classroom should feel safe. I have completed the University's Lesbian, Gay, Bisexual, Transgender, Queer, Questioning Ally training. In becoming an ally I made the commitment to offer a safe space for all of my students, not just those who identify as LGBTQA. If you or someone you know would like to know more about this program, or needs to speak confidentially about issues of sexual orientation or gender identity, please feel free to see me during my office hours.

5.7 Disability

We at West Chester wish to make accommodations for persons with disabilities. Please make your needs known by contacting the Office of Services for Students with Disabilities at extension 3217 as well as myself. Sufficient notice is needed in order to make the accommodations possible. The University and I desire to comply with the ADA of 1990.

5.8 Public Safety

The Emergency Communication Committee has made the recommendation that the emergency phone number for WCU's Department of Public Safety be listed on all course syllabi. That number is 610-436-3311. This specific recommendation is made to help the campus be prepared in case of an emergency situation.

6 Schedule

To accomplish all of the objectives set forth in Section 1 will require us to stick to a firm schedule. I've listed the schedule below. Note there are three buffer classes that will allow for some flexibility for when my family gains a new member. We are expecting the birth sometime around February 20th. I will send out more information at that time. However, no matter what, the exams for this course will fall on the designated days.

Table 2: Schedule of lectures and reciations.

Class	Date	Day	Lecture	Topic	Sections
1	Jan 12	M	0	Introduction	1-3, 1-4
	Jan 13	Tu		*Recitation*: FCMT	
2	Jan 14	W	1	Motion	2-1 to 2-5
3	Jan 16	F	2	Motion	2-6, 2-7, 2-9
	Jan 19	M		**No Class**	
	Jan 20	Tu		*Recitation*: Procedure ... 1-D problems	
4	Jan 21	W	3	Vectors	3-1 to 3-4
5	Jan 23	F		Class Cancelled	
6	Jan 26	M		Class Cancelled	
	Jan 27	Tu		*Recitation*: Cancelled	
7	Jan 28	W		Class Cancelled	
8	Jan 30	F	4	Vectors	3-5, 3-6, 3-8
9	Feb 2	M	5	Motion	4-1 to 4-4
	Feb 3	Tu		*Recitation*: Exam review ... projectile motion	
10	Feb 4	W	6	Motion	4-5 to 4-6
11	Feb 6	F	7	Newton's Laws	5-1 to 5-6
12	Feb 9	M	8	Newton's Laws	5-7, 5-8
	Feb 10	Tu		*Recitation*: Procedure ... Newton's laws	
13	Feb 11	W		**Exam #1 ... Chapters 1-4**	
14	Feb 13	F	9	Newton's Laws	5-9
15	Feb 16	M	10	Newton's Laws	6-1 to 6-3
		Tu		*Recitation:* Procedure ... work-energy	
16	Feb 18	W	11	Motion	4-7
17	Feb 20	F	12	Newton's Laws	6-5
18	Feb 23	M	13	Energy	7-1 to 7-5
	Feb 24	Tu		*Recitation:* Exam review ... applying Newton's laws	
19	Feb 25	W		**Exam #2 ... Chapters 5-6**	
20	Feb 27	F	14	Energy	7-6, 7-7
	Mar 2	M		NO CLASS	
	Mar 4	W		NO CLASS	
	Mar 6	F		NO CLASS	
21	Mar 9	M	15	Energy	8-1 to 8-4
	Mar 10	Tu		*Recitation:* Open	
22	Mar 11	W	16	Energy	8-5, 8-7
23	Mar 13	F	17	Energy	8-8
24	Mar 16	M	18	Energy	7-8, 7-9, 8-6
	Mar 17	Tu		*Recitation:* Procedure ... conservation of energy	
25	Mar 18	W		FCMT	
26	Mar 20	F	19	Momentum	9-1, 9-2
27	Mar 23	M	20	Momentum	9-4 to 9-6
	Mar 24	Tu		*Recitation:* Open	
28	Mar 25	W	21	Momentum	9-7
29	Mar 27	F	22	Momentum	9-8 to 9-10
30	Mar 30	M	23	Review Class	
	Mar 31	Tu		*Recitation:* Exam review ... conservation of energy	
31	Apr 1	W		**Exam #3 ... Chapters 7-9**	

Table 2: Schedule of lectures and reciations.

Class	Date	Day	Lecture	Topic	Sections
32	Apr 3	F	24	Rotation	10-1 to 10-4
33	Apr 6	M	25	Rotation	10-5 to 10-7
	Apr 7	Tu		*Recitation:* Procedure review ... angular acceleration	
34	Apr 8	W	26	Rotation	10-8, 10-9, 11-6
35	Apr 10	F	27	Rotation	11-7, 11-8, 11-10 to 11-11
36	Apr 13	M	28	Review	
37	Apr 15	W		**Exam #4 ... Chapters 10-11**	
38	Apr 17	F	29	Waves	15-1 to 15-3
39	Apr 20	M	30	Waves	15-4
40	Apr 22	W	31	Waves	15-7 to 15-9
41	Apr 24	F	32	Waves	16-1 to 16-5
42	Apr 27	M	33	Waves	16-9 to 16-13
	May 1	F		**Final Exam** (10:30 to 12:30)	