PHYSICS 16 Introductory Physics I: Mechanics and Waves
Fall 2010 Sections 04/05

Instructor: Prof. Ashley Carter

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Office Hrs: Wednesday 12:00 – 2:00 pm and Thursday 11:00 – 1:00 pm
These are my official office hours, but you should feel free to stop by at any time. Also, you can make an appointment for a more convenient time.

Class Hours:
Lecture is Monday, Wednesday, and Friday at 11:00 - 12:00 pm, Merrill Lecture Room 1
Lab Section 04 is Thursday at 1:00 - 4:00 pm, Merrill Room 200
Lab Section 05 is Friday at 1:00 - 4:00 pm, Merrill Room 200

Catalog Description:
The course will begin with a description of the motion of particles and introduce Newton's dynamical laws and a number of important force laws. We will apply these laws to a wide range of problems to gain a better understanding of them and to demonstrate the generality of the framework. The important concepts of work, mechanical energy, and linear and angular momentum will be introduced. The unifying idea of conservation laws will be discussed. The study of mechanical waves permits a natural transition from the dynamics of particles to the dynamics of waves, including the interference of waves. Additional topics may include fluid mechanics and rotational dynamics. Three hours of lecture and discussion and one three-hour laboratory per week.
Requisite: Mathematics 11.

Text and Materials:
1) **Text**: *University Physics Volume 1* by Bauer and Westfall. Text is available at Amherst Books.
2) **Connect Physics Access Card**: It can be purchased online or it comes with the text if you buy it new. This access card allows you to enter the Connect Physics website where we will have our online homework. Please see the attached Access Card data sheet for registration details.
3) **Personal Response System (PRS) Transmitter or Clicker**: You will need to check out a clicker from the Amherst IT department in 110 Seeley Mudd. You must have a clicker by the second day of class, Friday, September 10, so you should check one out before then. For more information see the attached informational sheet.
4) **Laboratory Manual**: The manual will be passed out the first day of lab. In addition, the pdf version will be emailed to the class.

5) **Laboratory Notebook**: You will be given a laboratory notebook on the first day of lab. The department will then charge your student account for the cost of the notebook.
6) For lectures you will also need to bring a scientific calculator, a pen, and a notebook/binder for notes or to hold handouts.

Grading:

Your grade for the course will be based on your lecture and lab grades. There will be a total of 1000 points in the course; the lecture portion of the course is worth 76%, while the lab portion is worth 24%. Each week you will be required to turn in two homework assignments (one written and one online), as well as participate in class. There will also be 5 exams throughout the semester. For the lab portion of the course you will need to turn in a lab homework assignment and your lab notebook for each lab that you perform. There will also be 3 formal lab reports throughout the semester. The breakdown of the point values is listed below.

Assignment	Points	#	Total Pts	Lab	Lec
Online Hmwk	20	12	240		X
Written Hmwk	20	12	240		X
Exams	50	5	250		X
Participation	30	1	30		X
		Subtotal	760		
Online Lab Hmwk	10	9	90	X	
Lab Notebook	10	9	90	X	
Formal Lab Report	20	3	60	X	
		Subtotal	240		
		TOTAL	**1000**		

Homework:

In addition to reading roughly a chapter per week, you will be expected to complete two homework assignments each week. Online homework will be due on Sunday at 11:59 pm the week *before* the topic is discussed in class. Written homework will be due on Friday at 11:59 pm the week the topic is discussed in class. You will have 3 times that you can turn in homework (online or written) in late. The homework must be received by 11:59 pm the *next day*. These three times you may use for any reason (illness, family emergency, scheduled event, etc.).

Exams:

There will be five exams during the course. Two exams will be take-home and open note, three exams will be given during lab time. There will not be a final exam.

Exam 1: Math Review – Take-home Exam due September 12 at 11:59 pm

Exam 2: Newton's Laws – In-class Exam during lab, week of October 4th

Exam 3: Conservation Laws – In-class Exam during lab, week of October 25th

Exam 4: Applications of Newton's Laws – Take-home Exam due November 28 at 11:59 pm

Exam 5: Waves – In-class Exam during lab, week of December 6th

If you are going to miss an exam for a scheduled event, you must reschedule the exam with your instructor before the end of week 2. The Math Review Exam will be pass/fail and you must pass to continue on with the course.

Participation:

During each lecture you will be given some multiple choice problems to answer with your clicker. You will receive participation points based on your answers to these clicker questions. If you cannot attend a class for any reason you will not be able to make up these points.

Lab Section:

The labs are an integral and important part of the course. For each lab you will be required to do some preparatory homework and complete all of the sections of the lab in your lab notebook. You should anticipate spending the full 3 hours (1:00 – 4:00 pm) completing the lab. At the end of the lab class you will be evaluated by an informal "exit interview" for that lab. There will also be 3 formal lab reports throughout the semester. **You must complete all of the labs to pass the course.** That means that you cannot get a zero on any laboratory notebook assignment or formal report. You also cannot skip any labs for any reason.

Materials:

You will be provided with a laboratory notebook at the first lab meeting. It should be used only for this class since notebooks may be collected for grading at the end of some lab meetings.

Homework:

Online lab homework will be due at 11:59 pm on Wednesdays. This homework will make sure that you have thought about the lab and that you come prepared to the lab section. You will not be allowed to turn in the homework late.

Lab Calendar:

Please check the lab calendar below to make sure that you will be available for all of the labs for your section. If you are going to miss a lab for a scheduled event, you must reschedule the lab with your instructor before the end of week 2. **Remember that you *must* complete all the labs to pass the course.**

Lab Schedule - Fall 2010

No	Week of Monday	P17 Monday 2-5pm	P17 Tuesday 2-5pm	P23 Wednesday 2-5pm	P16 Thursday 1-4pm	P16 Friday 1-4pm
1	Sept 6	No Lab	Semester Begins- No Lab	No Lab	No Lab	No Lab
2	Sept 13	Measurement	Measurement	Measurement	Measurement	Measurement
3	Sept 20	Ohm's Law	Ohm's Law	Bouncing Ball	Bouncing Ball	Bouncing Ball
4	Sept 27	Oscilloscope	Oscilloscope	Force Table	Inclined Plane	Inclined Plane
5	Oct 4	Capacitors	Capacitors	P23 Midterm	P16 Midterm	P16/P17 Midterm
6	Oct 11	Fall Break			Conservation	Conservation
7	Oct 18	Faraday's Law	Faraday's Law	Inclined Plane	Ballistic Pend.	Ballistic Pend.
8	Oct 25	Induction	Induction	Outward Force	P16 Midterm	P16/P17 Midterm
9	Nov 1	RLC Circuit	RLC Circuit	Conservation	Outward Force	Outward Force
10	Nov 8			Ballistic Pend.	Force Table	Force Table
11	Nov 15	Light	Light	P23 Midterm	Fluids	Fluids
12	Nov 22	Thanksgiving Break				
13	Nov 29	Optics	Optics	SHM	SHM-Waves	SHM-Waves
14	Dec 6	Interference	Interference	Waves	Midterm	Midterm
15	Dec 13	P17 Exam		Semester Ends		

INTELLECTUAL RESPONSIBILITY:

Homework – You are encouraged to work with other students on your homework, but what you turn in must represent your own understanding of the problem. Copying a solution from another student or from a published source will be considered a violation of intellectual responsibility. This rule applies to solutions posted on the internet (such as, but not limited to, cramster.com).

PRS – You must submit your own answers to the PRS questions. Do not look at what other students are submitting with their clickers. Never press the buttons on another person's clicker or ask someone to submit answers for you.

Lab work – Discussion and cooperation between lab partners is encouraged during the lab session. Both partners should share equally in the collection of data. However, each student must keep a **separate** record of the data and do all calculations **independently**. It is important to preserve the integrity of data. Use of any data or calculations other than one's own and "fudging" of data (adjusting a number to something other than what you observed) are considered violations of the principles of Intellectual Responsibility. Lab reports must be written entirely by you and must represent your own understanding of the work you have done. You cannot simply copy what others have told you.

Exams – The exams will be closed book unless otherwise noted. You will not be allowed to collaborate with anyone during an exam. What you submit must be entirely your own work.