



DEPARTMENT OF PHYSICS
University Physics: Mechanics (PHY 2410-001 & -002)
Fall 2012

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E-learning: *Blackboard* is enabled for this course.

Introduction

This course is intended as an introduction to the principles of physics. Newton's laws and the concepts of energy will be introduced and used to study statics and motion of point particles, rigid bodies, and fluids. The main focus will be upon learning the basic principles and how to apply them in modeling mechanical systems.

Office Hours

Monday & Wednesday 10:30 – 11:20
Tuesday 12:00 – 1:50
I am available at other times too. Call or email for an appointment. I encourage you to use office hours to ask questions about the homework or to review class discussions.

Text and Review Problems

Physics for Scientists and Engineers, 8th Ed., R. A. Serway and J. W. Jewett, Jr. (Brooks/Cole, 2010). Chapters 1 through 15 will be included in this course. Please, quickly read the sections ahead of the class and review them in detail after each class.

Tests and Final Examination

There will be three **fifty-minute tests** as scheduled on the following page. Each test will count as **20% of your final grade**. There will be three problems on each test.

The **final examination** counts as **30% of your final grade**. It includes material from the entire semester and will be made up of six problems.

Homework questions & quizzes

A set of homework problems is listed on the second page of this syllabus. These problems will be the focus

of discussion at the Friday recitation. Please prepare for recitation by attempting the problems corresponding to the material discussed in class. During the last fifteen minutes of the Friday recitation, a quiz will be given that may resemble one of the homework problems. The average of the quizzes, after dropping the two lowest scores, will constitute **5% of your final grade**. There are no make-ups for missed quizzes.

Response Devices

Response Devices (a.k.a. *clickers*) will be used in this course. Your response rate to in-class survey questions using your clicker will constitute **5% of your final grade**.

Attendance

Ideally you should actively participate in all classes. But occasional absences are understandable. Should you miss a class, you are responsible for the missed material and announcements. Make arrangements with another student to obtain any information you have missed. (Freshman students must abide by the university policy on class attendance.)

Honesty

Villanova University has an Academic Integrity policy that will be enforced in this course. Violation of this policy will result in failure of the course. You are encouraged to study together (it improves your learning) but you must be sure to do your own thinking.

Learning Support

It is the policy of Villanova to make reasonable academic accommodations for qualified individuals with disabilities. If you are a person with a disability please contact your instructor after class or during office hours and make arrangements to register with the Learning Support Office by contacting 610-519-5636 or at nancy.mott@villanova.edu as soon as possible. Registration is needed in order to receive accommodations.

Test & Exam Dates

<i>Date</i>	<i>Chapters</i>	
September 26	1 – 4	Test 1
October 31	5 – 8	Test 2
December 5	9 – 13	Test 3
Saturday, December 15 8:00 AM – 10:30 AM	1 – 15	Final Examination

Tests will consist of three problems of a type similar to those discussed in class and assigned for recitation (see below). The final examination will consist of six problems and will be cumulative.

Changes in test coverage, if necessary, will be announced in class.

Problems for Study

A selection of the problems below will be discussed at recitation on Fridays. This is a minimal set of problems that are similar to the type you may see on quizzes and tests. (Many of these are more difficult than the test questions will be.) You can obtain extra help and answers to even number problems by asking either during class (time allowing) or office hours.

<i>Chapter</i>	<i>Subject</i>	<i>Recitation Problems</i>
1	Physics	4, 5, 7, 8, 14, 15, 33, 40, 42, 45, 66
2	Motion in 1D	3, 4, 7, 12, 13, 15, 16, 20, 30, 43, 44, 49, 66
3	Vectors	1, 4, 8, 12, 15, 23, 32, 47
4	Motion in 2D	9, 10, 15, 19, 26, 29, 32, 66
5	The Laws of Motion	1, 3, 13, 20, 24, 25, 44, 47, 65, 66
6	Circular Motion and Other Applications	8, 13, 16, 51, 54, 64
7	Energy of a System	1, 2, 11, 13, 15, 18, 25, 33, 42, 43, 50, 51
8	Conservation of Energy	3, 6, 7, 12, 15, 22, 23, 25, 38, 63, 64
9	Linear Momentum and Collisions	1, 3, 6, 7, 11, 22, 26, 30, 37, 38, 40, 42, 55, 73
10	Rotation of a Rigid Object About a Fixed Axis	7, 11, 15, 19, 25, 31, 32, 35, 44, 49, 67, 77
11	Angular Momentum	1, 3, 4, 8, 13, 16, 19, 27, 34, 37
12	Static Equilibrium	1, 11, 15, 41, 49, 55
13	Universal Gravitation	6, 12, 15, 16, 27, 33, 39
14	Fluids	2, 8, 21, 25, 27
15	Oscillatory Motion	1, 5, 9, 15, 29, 33, 37, 61

Notes on solving problems:

- Before you attempt any numerical work:
 - Decide what type of problem you are working on.
 - Write a plan of action (in words, not formulas) appropriate to the type of problem.
 - Draw a sketch of the situation and identify variables and constants.
 - If possible, make a mental picture of the system. If motion is involved, mentally animate the system. Creating a graph or graphs may help at this point, too.
 - Make a ballpark estimate of the correct answer.
- Following your plan, write the appropriate mathematical expressions. Do not put all the numbers in immediately. (Numbers may simplify algebra; but they make checking your answer impossible.)
- Solve for the unknown or unknowns.
- Plug in the numerical values.
- Check for reasonableness. Is your answer close to your ballpark estimate? Does the answer change in the right way when you change values of the given input numbers.