

Spring 2013.v1.0

COURSE POLICY AND GUIDE

PHYSICS I (95.141)

Physics I for Scientists and Engineers

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Welcome to the first semester of the two-semester sequence in freshman physics for science and engineering majors. Please read this guide carefully since it outlines the materials that will be covered this semester and explains what the Freshman Physics Team expects of you. Guide sections include:

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The Freshman Physics Team, including the Professors and the Tutoring Staff, wants you to be successful in this course! Expect to put in a lot of time - it's a challenging course. Talk to us if you start to get lost or are confused about a concept. It's your responsibility to come to us for help - it's our responsibility and pleasure to help!

1. Course Text, Prerequisites, and Co-requisites

Text: The course textbook is **Physics for Scientists and Engineers, 4th Ed.** by Douglas C. Giancoli; Pearson/Prentice Hall publisher. The text comes either as a complete book set if you are taking two semesters of physics or a volume 1

set if you are taking only one semester of physics. In Physics I we will focus on the first half (or Vol. I) of Giancoli. More information on the textbook is available on the course website.

The **course web site**, which contains almost ALL material related to this course, can be directly accessed at: <http://faculty.uml.edu/pchowdhury/95.141/> or by navigating from the faculty website <http://faculty.uml.edu/pchowdhury/> via the TEACHING tab. Here you will find textbook information, this course policy, the homework assignments for the semester, and other information about the course and the Physics I team. **Lecture notes will also be posted on this website.**

All homework will be submitted and graded primarily electronically via the Mastering Physics website www.masteringphysics.com. The course name at this website is **UML95141SPRING2013**. So while the masteringphysics.com access kit is REQUIRED for the course, you are NOT required to necessarily buy the latest edition or the exact version of the textbook offered at the bookstore. You could purchase an electronic edition, a used earlier edition, or even a different textbook entirely (although this is not recommended). Bundled packages containing the textbook (highly recommended), masteringphysics.com access kit (required), and math supplement (recommended) is available from the North Campus Bookstore. **More information on textbook bundles offered by the bookstore are available on the course website.**

This course also **requires** the use of **CLICKERS in every lecture**, which will be **loaned to you for the semester at no cost to you** (you pay only if you lose it).

Pre-requisites and Co-requisites: All students should have had the equivalent of high school plane geometry, and algebra I and II, including trigonometry. High school physics is helpful but not necessary. Some of the calculus concepts needed during the semester will be taught as they are encountered in the course, but these short lessons are no substitute for the deeper understanding you will need as a scientist or engineer. **Although there is no Calc pre- or co-requisite for this course, be prepared to sharpen you algebra and trig skills and learn the calculus needed along the way.** You will need Calc I and II for Physics II and III (see catalog). In addition, all regular students should be taking or have taken the **physics laboratory course 96.141, which is a co-requisite to 95.141.**

2. Course Description and Rationale, Goals and Objectives

Course Description and Rationale: **95.141 Physics I** is the first semester of a two-semester sequence primarily intended for science and engineering majors. Mechanics including vectors, kinematics in one and two dimensions, Newton's Laws of dynamics, Newton's Law of Universal Gravitation, work, energy, momentum, conservation of energy and momentum, collisions, rotational

kinematics and dynamics, oscillatory motion and a rudimentary introduction to mechanical waves. **Corequisites: Physics Lab 96.141**

As a scientist or engineer, you will be expected to 1) develop mathematical models that predict the behavior of physical phenomena, and 2) use those models to understand the phenomena, design products and/or improve technology to better mankind. This introductory course in physics marks the beginning of your journey into not just understanding, but mastering through application, the physical concepts that are crucial for your specific major.

Course Goals: Three goals have been set for these freshman level courses. Goal 1 is to develop in course participants a strong fundamental understanding of physical phenomena. Goal 2 is to have students learn how to use mathematical tools to model physical phenomena in ways which allow engineered outcomes. Goal 3 is to have the students develop learning strategies for successfully completing demanding engineering and science courses.

Student Learning Objectives: During the course Students will:

- Demonstrate a conceptual understanding of the various topics listed in the course description
- Learn how to apply physical laws to various observed phenomena.
- Learn how to approach scientific and engineering problems in a professional manner
- Demonstrate the ability to apply mathematical tools such as vectors, geometry, algebra, trigonometry, and calculus techniques to physical problems.
- Develop problem-solving skills and apply those skills to correctly solving and/or modeling a variety of physical problems
- Develop a learning strategy for successfully completing demanding college courses

3. Course Outline*

Lecture	Sections in Book	Material Description
L1	Chapter 1:1-7 (overview)	Class Intro and Course Policies Units, Dimensions, Estimates
L2	Chapter 2: 1-4	Displacement, Speed, Velocity, Acceleration.
L3	Chapter 2: 5-7	Constant acceleration and freely falling objects.
L4	Chapter 3: 1-5	Scalars, Vectors, Vector Kinematics

* May be modified as Semester unfolds

** The Schedule may change as a result of changes in the University Schedule.

L5	Chapter 3: 6-9	Projectile Motion, Relative Motion
L6	Chapter 4: 1-6	Forces and Newton's Laws
L7	Chapter 4: 7-8	Free Body Diagrams, Problem Solving
L8	Chapter 5: 1-4	Friction, Circular Motion
L9	Chapter 6: 1-5	Planetary Motion, Newton's Inverse Square Law
L10	Review	Review
L11	Chapter 7: 1-2	Work done by Forces, Scalar Product of Vectors
L12	Chapter 7: 3-4	Varying forces, Kinetic Energy, Work Energy Principle
L13	Chapter 8: 1-4	Conservative and Non-Conservative Forces, Potential Energy, Mechanical Energy
L14	Chapter 8: 5-8	Conservation of Energy, Dissipative Forces, Escape Velocity, Power
L15	Chapter 9: 1-6	Momentum, Conservation of momentum, Collision and Impulse
L16	Chapter 9: 7-9	Elastic, Inelastic Collisions, in 1 and 2 Dimensions, Center of Mass
L17	Chapter 10: 1-4	Simple Rotations of a Rigid Body, Torque
L18	Chapter 10: 5-8	Rotational Dynamics, Inertia and Torque
L19	Chapter 11: 1-6	Angular Momentum, Vector Cross Product, Conservation of Angular Momentum
L20	Chapter 12: 1-2	Static Equilibrium for Rigid Bodies, Force and Torque Balance
L21	Chapter 14: 1-5	Simple Harmonic Motion, Circular Motion and Pendulums
L22	Chapter 15: 1,2, 4	Introduction to Wave Motion
L23	Review	Review

4. Course Format - Lecture, Recitation, and Tutoring

The course meets four times per week, with **2** large group **lectures in Olney 150** and **two recitation meetings in various classrooms**. The lectures will cover new material and the small recitation classes will be used to discuss the lecture material, work out sample problems, and administer weekly quizzes. Keep all course material in a folder or binder in an organized fashion. Organization is a major key to success in this course.

The Lectures will be interactive. Each of you will have a **unique assigned clicker** that **will be provided to you in the first week of class. Bring the clickers to EVERY lecture**, as you will be asked to participate in the lecture through the clicker. See the grade section for the number of points you earn by participating! You must have your OWN clicker, and you may not, under any circumstance, bring more than one clicker to class (you cannot bring a friend's clicker and enter answers for him/her!!).

There will be three exams during the semester and a Final. The three exams will be given during lecture times. See the next section on exams for the schedule. Quizzes and Homework are discussed below. Your recitation instructor is happy to go over a particular homework problem or concept during his/her office hours. **Free tutoring is available** at the Physics Department tutoring center or in the Learning Center. There will be **evening review sessions before each exam**. See sections below for more details.

5. Examinations and Examination Schedule

The common exams for all sections will be given during lecture times on the dates given below. In addition, there will be a 3 hr final examination during finals week. The place and time for the final will be posted later in the semester with the finals schedule. You are required to attend each exam at the officially announced time.

A Diagnostic Math Quiz (10 points for just taking it) without calculators will be given in your first recitation section meeting. This quiz is to ensure you have the basic math/problem-solving skills required for this very challenging course. It allows you to make a decision as to whether you will be successful in this course *before* the add/drop deadline. It is for *your* benefit! For each **exam** session, you must bring pencils, erasers and a **calculator**. Only ordinary calculators are allowed. Alphanumeric calculators (those that include written formulas in their display modes) are NOT permitted. All formulae needed for an exam are provided on sheets attached to the exam.

Exam Schedule- Spring 2013**

Date	Exam	Material Covered
Feb 27	Exam 1	Chapters 1 – 4
Mar 27	Exam 2	Chapters 5 - 8
Apr 24	Exam 3	Chapters 9 - 12
Not Set	Final	Chapters 1-12,14-15 (exclusions will be announced)

** The Schedule may change as a result of changes in the University Schedule.

6. Homework:

a) Lecture Preparation Assignments (ONLINE)

These short assignments, typically two problems of a tutorial nature, will be due ONLINE **before** each lecture, and can be found and worked on at www.masteringphysics.com, course **UML95141SPRING2013**. For these, you will be allowed 6 attempts to get the right answer, and will also be allowed to view hints from masteringphysics.com. No late submissions are allowed. These homework problems will count for 20% of your final homework grade. These problems will help you prepare for the day's lecture and are an important component of keeping up to speed in class.

b) Regular Homework Assignments (ONLINE)

Regular homework assignments, typically ten problems a week, will also be done ONLINE at www.masteringphysics.com, course **UML95141SPRING2013**. These will be due at the end of each week (usually every Saturday at noon), and will focus on the material covered in that week. These will constitute 60% of your final homework grade. For these, you will be allowed 3 attempts to input the correct answer (a final incorrect answer will cost you 20% of the grade for that problem). Your total HW grade will be reduced 25% for each day past the due date that the HW is submitted.

c) Regular Homework Assignments (WRITTEN)

You also need to work the **regular homework problems** out neatly on notebook paper. These will be reviewed and graded (for process and logic, not the final answers) by your recitation instructor regularly on a scale of 0-5. The written homework will constitute 20% of the regular homework assignment grade. These will also help you when you need help from the tutoring centers, since they can go through the problem with you to find any mistakes you may have made.

You should be able to see your ONLINE HW scores as soon as you finish the HW set. **The two lowest online regular homework grades will be dropped** from grading considerations.

You have to do many more than just the assigned homework problems to learn the material in the course. Problem solving skills is one of the most important learning goals of this course. One of the best ways to do homework is to form small groups and work the problems together. Remember, the **Mastering Physics** software randomizes the variables for each problem, so everyone will have different answers for each problem. However, the way you solve the problems will be similar, and this can be worked out in groups. Assigning one or two problems to each member in the group is NOT an effective way of doing

homework! In order to do well in this course you must have a good understanding of the homework, so if you work in a group, make sure you understand how to do each problem! Working on Physics as a team will improve your grade.

The Physics department runs its own tutoring center, in a dedicated room in the Physics Department. Teaching Assistants for Physics I will be available all day in the tutoring center, and you can drop in any time that they are there for help on the homeworks. They should be able to walk you through your problems.

We will also have exam review sessions with a physics instructor in the evenings prior to the scheduled exams. Dates and times will be announced.

7. Quiz Policy

Recitation instructors will typically give at least **one quiz per week**. These can be **announced or unannounced**. They will typically cover recent material and be similar to the homework problems. Students must come to class with calculators. **The lowest quiz grade will be dropped**. Unexcused absences for a quiz will result in a grade of "0" for that particular quiz.

8. Cancellation Due to Closing of University

If the University closes due to a snow emergency we will pick up where we left off. At the next lecture a revised schedule will be posted to work around the lost day. If the closing causes a cancellation of an exam, the exam will be rescheduled and the revised date announced during the first lecture scheduled after the cancelled day.

9. Attendance/Absence and Disabilities Policies

Attendance/Absence. Attendance is required in all recitations and lectures, and your clicker will help us to keep track of attendance. **Using more than one clicker in class is considered to be academic fraud, and not taken lightly.** Homework and quizzes will serve as proof of attendance in the recitation sections. Poor attendance will lead to a drop in your grade.

There are no make-up examinations. Illness on the day of a major examination must be verified by submission of a letter from a physician or nurse showing that you were seen prior to or on the day of the examination and attest that your illness made you unable to take the examination. Any other unusual situation needs your recitation instructor's approval in writing. All other absences, i.e. varsity sports, family weddings etc., must be made one week in advance by written request and approved by your instructor. **Only one approved major**

examination absence is allowed. In that case your grade will require increased emphasis on the other in-class exams or the final examination (see below).

Disabilities. If you have either a learning disability or severe physical handicap you may be eligible for extra time during exams and the final. Discuss your situation with the UMass-Lowell Counseling Center (978) 934-4331. A properly filled out Learning Disability Accommodation Notification form must be filled out and a copy given to your recitation AND lecture instructor in order for us to accommodate your needs. All information will be kept confidential.

10. How Your Grade is Determined

Your letter grade is based on the total points you earn, as follows:

10 pts	Diagnostic Math Quiz (full credit for just taking it)
40 pts	Attendance/Participation
100 pts	Homework
	20 Online lecture prep
	60 Online regular homework
	20 Written homework
100 pts	Quizzes
100 pts	Exam 1
100 pts	Exam 2
100 pts	Exam 3
<u>200 pts</u>	Final
Total	<u>750 pts</u>

If one of the in-class exams is missed (due to an instructor approved absence), the points for the missed exam will be assigned to either the final exam or the two remaining exams, whichever method works in favor of the student's performance. Students who have six or more unexcused recorded absences in either recitation or lectures will have a one-half letter grade reduction. The Physics I instruction team will determine the exact points required for the various letter grades after the final is graded. Obviously, the more points you accumulate, the better your grade will be - make sure you get all the homework and quiz points you can!

At the end of the semester, after all grades including the FINAL EXAM are added together, your lecture instructor in consultation with all the recitation instructors will determine the point cutoffs for the various letter grades. The following table provides the cutoffs that were used in the previous few semesters, and is most likely to be continued this semester. You can use the table to estimate your letter grade as you progress through the course by comparing your point total (or percentage) with the expected cut-offs.

Grade Conversion Table*

	%	Approx. Points
A	80% - 100%	≥ 600
A-	75% - 79%	562 - 600
B+	70% - 74%	525 - 562
B	65% - 69%	488 - 525
B-	60% - 64%	450 - 488
C+	55% - 59%	413 - 450
C	50% - 54%	375 - 413
C-	45% - 49%	338 - 375
D+	40% - 44%	300 - 338
D	35% - 39%	263 - 300
F	0% - 34%	<263

*(The cut-offs for this semester determined at the end of the course may differ slightly from that listed above)

Note: An **unexcused** absence from an Exam will result in a "0" for the exam and a 1/2 letter grade lowering of your mark after letter grade conversions. An unexcused absence on the final will result in a course grade of "F".

11. Help if You Have a Problem

If you have a problem, your recitation instructor is the first person you should contact. For help on the course work, arrange a meeting with your recitation instructor or one of the tutoring centers. The instructors will provide you with their specific office hours. They will also see you by appointment at mutually convenient times if you can't make office hours. For major unresolved problems contact Prof. Chowdhury (contact info at the top of this document).

12. Academic Conduct and Integrity

You are responsible for proper academic conduct - please refer to the university's academic integrity policy at the following URL:

http://www.uml.edu/catalog/undergraduate/policies/academic_dishonesty.htm

The basic rule of thumb is simple: you should not try to receive credit for work you have not performed. This means, e.g., that you must do your own homework assignments and take your own exams and quizzes. If you are struggling in the course, meet with your recitation instructor to figure out how we can best help you. There are no easy (ethical or otherwise) ways to pass this course, but we are dedicated to ensure you have the best support possible to succeed.

13. Physics Tutoring at UMass-Lowell

The Physics Department has its own tutoring center for introductory physics courses Mon - Fri 9 am - 5 pm next to the Physics Department office in Olney 136. Graduate teaching assistants in the physics department conduct these. In addition, the Center for Learning and Academic Support Services, Southwick 308 also provides peer drop-in tutoring conducted by senior undergraduates who have been recommended by faculty. It is your responsibility to figure out which of the many aids offered (recitation instructor office hours, Physics department tutoring center and UML tutoring center) work best for you.

<http://www.uml.edu/CLASS/Tutoring/Drop-In-Tutoring.aspx>

See Suzanne Gamache at the Tutoring Center (3rd floor Southwick) for more information and an up-to-date schedule on physics tutoring.

Contact: Suzanne_Gamache@uml.edu; (978) 934-2947