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This document may be revised.

# PHY 111
# Introduction to Engineering Physics I

**Dillard University - Fall 2005**

Meeting Times:

**STERN 123 001** **M 8:00a- 9:50a**
**STERN 123 901** **W 8:00a- 9:50a**

**I have a schedule conflict with another course I am teaching. We have to find a new set of meeting times.**


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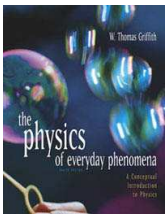
| Instructor: **Rob Salgado**<br>**Assistant Professor of Physics**<br>Office: **Stern 307A**<br>Voice: **(504)-816-4510** | E-mail: **rsalgado@dillard.edu**<br><br>Instant-Messengers: AOL, MSN, Yahoo:<br>**dillardphysics** (do *not* email here) | Office hours:<br>**-to be announced** |


Catalog Description:

**PHY 111 Introduction to Engineering Physics I. (3 credits)**
An introduction to engineering and physics to freshman students covering elementary physics (Mechanics and principles of problem solving physics), an introduction to engineering disciplines and their roles in society, and training in library and literature search. Class meets two hours per week for lectures and two hours per week for laboratory.




Required Textbook:

**"The Physics of Everyday Phenomena: A Conceptual Introduction to Physics" (4th edition) by W. Thomas Griffith**
(published by McGraw-Hill: ISBN: 0-07-250977-5)

Electronic Materials:

The main website is on ***Blackboard***: **`http://dillard.blackboard.com/`** *(Physics/ Introduction to Engineering Physics I (PHY111F001) ).*
Use of our ***Blackboard*** course website is **REQUIRED**, as described below.
Some helpful information concerning Blackboard will be made available to you.

I will maintain a website (for now: **`http://physics.syr.edu/~salgado/111/`** ) that lists the assigned problems and solutions. I will also try to make available the whiteboard/PowerPoint notes and any computer source code (e.g., Python, Maple) that I use for simulations or computations.

Your textbook has a useful online resource at
**`http://highered.mcgraw-hill.com/sites/0072509775/student_view0/index.html`** Use it!

Course Goals:

A. To introduce basic concepts in physics, drawing examples from everyday phenomena.
B. To develop physical intuition, mathematical reasoning, and problem solving skills.
C. To prepare students for the necessarily rigorous sequence in physics and engineering.
D. To introduce students to research techniques [including laboratory experience, computer-based data acquisition and analysis, and the preparation and delivery of scientific presentations.]

Course Requirements:

Come to class **ON TIME and AWAKE**. Attendance is **REQUIRED.**
*"The University recognizes that a student may miss a class for legitimate reasons. In such cases these absences are excusable; however, the student must complete the Student Absence Form."* An absence may be excused within 2 weeks of the absence using a form issued only by the Division of the Natural Sciences.
*"A professor may drop a student with 3 or more unexcused absences from a course."* (2003-2005 University Catalog, page 15)
Note that your attendance is recorded on the official midterm and final grade sheets.
***"Academic dishonesty will not be tolerated."*** (2003-2005 University Catalog, page 15)
Come to class PREPARED and EQUIPPED, having read or written any assignments.
Treat each other with RESPECT. Limit all discussions to the PHYSICS topic under discussion.
**Turn OFF** all phones, pagers, radios, and other disruptive devices. Put away newspapers, magazines, and materials from other courses.

Course Procedure:

Two 110-minute meetings per week. Although the course is allocated with "lecture" on Mondays and "lab" on Wednesdays, we will not conform to that schedule. Lab-activities will be interspersed throughout the course.

Exams and Quizzes:

To encourage you to keep up with the work that YOU must do in order to learn the subject matter,
**QUIZZES** may be announced **and may also be given at any time, without warning.**
EXAMS will be announced. There is also a cumulative one-hour MIDTERM and a cumulative two-hour FINAL.
Be on-time. Quizzes and exams end when "time is called". There are **no** makeup exams or quizzes. There are **no** exceptions.

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Absences:

DON'T BE. But, if you are absent for an exam or quiz, you have one (1) week to obtain a Division excuse form.
***Only if*** that excuse is valid, **your final exam will carry the weight of your missed exam or quiz**.
Otherwise, you will get no credit for the missed exam or quiz.
When you are absent, you are, of course, still responsible for any work and any course material that you missed.

Homework (assigned periodically):

Some homework will be REQUIRED pre-class ***Blackboard***-based assignments, which are graded for conscientious effort and contribute to your PARTICIPATION grade. This will be used as a mechanism to
prepare you for class [You'll be thinking about the physics before class and will get some computer-based feedback] and
prepare me for class [I'll be getting feedback on your understanding from reading some of your answers and can act accordingly].
Some textbook problems will be assigned but will not be collected. You should discuss homework with your friends. We will discuss some [but not all] of the homework in class. After you have made a genuine effort on the assignment, you are encouraged to consult the posted homework solutions and visit office hours to discuss the rest of the homework.
***If you delay making a genuine effort on the assignment to wait for the solutions, you've missed a valuable learning opportunity.***
Exam and quiz problems are generally based on assigned homework problems, unassigned textbook problems, and worked-examples from your textbook. I'll tell you now: I sometimes ask worked-examples straight out of your textbook to see if you are using the textbook well.

Most of the learning you do in this course is done by your doing homework problems outside of class! (I am merely a guide for you.)
(*"Trying to learn physics without doing problems is like trying to learn how to ride a bicycle by reading a book."* –MIT 8.01 syllabus)
You are strongly encouraged to work on the homework with other students.
However, be sure that you can do the homework problems *by yourself* since you'll be working on quizzes and exams *by yourself*.

If you need help with your homework, please visit the Learning Center in Stern 301 [where you can also earn EFFORT-points] or visit me (with your textbook, your notebook, and with proof that you have tried the problems) during Office Hours… the sooner the better.

Grades are roughly weighted as follows:

15% QUIZZES (FORMAT: multiple-choice questions, a short problem, and vocabulary definitions; some may be ***Blackboard***-based)
15% LAB ACTIVITIES
15% MIDTERM EXAM (FORMAT: like many quizzes but cumulative)
20% FINAL EXAM (FORMAT: like many quizzes but cumulative) [REQUIRED. Not taking the final exam may result in a final grade of F.]
20% PRESENTATION (FORMAT: short PowerPoint talk on an approved physics topic of your choosing.)
15% PARTICIPATION (INCLUDES: ***Blackboard***-based pre-class quizzes and assignments and EFFORT)
Needless to say, but I'll say it: ***Your course grade is determined solely on the quality of the work you have done for this course.***
Approximately: A≥88%, B≥76%, C≥64%, D≥50%, F<50%.
Borderline cases (between two letter grades): If your exams show an upward trend, your grade may be nudged upwards.

Some advice:

Physics is a **challenging** subject that requires your dedicated attention, but rewards you with skills that you can apply in ***any*** discipline!
In addition to understanding the physical world, Physics teaches you ***how to think and reason*** and ***how to be a problem solver***.
Since Physics is challenging, your doing well in it distinguishes you (especially for summer research programs and Graduate School!).
Physics is **cumulative**: For example, understanding Ch 5 requires you understand all of the chapters before it.
*You must not fall behind! If you find yourself falling behind, you must get some help. Visit the LEARNING CENTER in Stern 301!*
Physics is written and spoken in a **Mathematical** language.
At this stage, Algebra, Trig, Geometry and Pre-Calculus are more important than Calculus. *Review your basic mathematics NOW!*
Physics is about "understanding **relationships** between physical quantities", which we uncover by experiment and by mathematical reasoning.
Physics is **NOT about formulas** and merely plugging-in numbers.
Formulas are often only "special cases of expressions of those relationships".
*"Knowing a formula without knowing when it applies" is generally useless.*
The act of "plugging-in numbers" measures your ability to do Arithmetic or use a calculator.
The resulting number is only useful when you interpret it physically. *"The right number with wrong physics" is just plain wrong.*
**YOU CAN** understand and succeed in Physics only if YOU put in the required work.
Just attending lectures and labs… Just taking good notes… Just doing the homework…
Just memorizing formulas and definitions… Just reading the textbook… Just reading the solutions… …is not enough.
There are no shortcuts. ***YOU HAVE TO DO IT ALL.. and YOU CAN, only if YOU put in the required work.***
At a minimum, (as the rule of thumb goes)
for every credit hour, you should be spending three (3) out-of-class hours on the course per week.
Note, however, that merely logging-in the 9 hours per week does not guarantee a good grade. That time must well-spent.

***How should you spend your time?*** Some ideas…

- Homework, homework, *homework,* homework, and, finally, more homework. *(The riding-a-bicycle analogy above is quite true.)*
- Read and re-read your textbook and your class notes. Keep your notes neat and organized.
- Rewriting notes (interjecting your thoughts and comments) is one way to "re-live" the lecture and re-process the concepts and ideas.
- Mark up (with specific questions) anything that you don't understand.
  Merely saying "I'm confused" isn't very helpful. (Can you narrow down the problem? Is it really a Physics issue? Or a Math one?)
- When you've identified a specific problem, try to resolve the problem yourself. If you can do that, that's great!
  If not, get help from others! Don't be discouraged, ashamed, or shy. There are lots of people to help you. Find them!
- Talk to your friends. Some of them may have had the same problem. (I learned a lot from my friends.)

- Learn more from teaching your classmates! (That why I like to teach… each time I learn a little more. Questions from students often bring up fine points that I never considered. Fielding those questions helps me fill in the gaps of my knowledge.)
- Get help in the Learning Center (Stern 301). You can earn some EFFORT-points by spending well-spent time here.

Throughout the semester, I will try out **new teaching techniques and activities** (being developed by various Physics Education Research groups) that have been successfully integrated into Physics courses throughout the country. Your participation in these techniques and activities and your patience with our attempts at implementation will be appreciated.

**Sequence of PHY 111 topics and the learning objectives:** (Homework will be assigned during each chapter.)

**Ch 1 Physics, the Fundamental Science (1 wk)**

*Distinguish "physics" from other disciplines. Discuss the importance of mathematics and units of measurement.*

**Ch 2 Describing Motion (1 wk)**

**Ch 3 Falling Objects and Projectile Motion (2 wk)**

*Distinguish velocity, acceleration, speed, and average velocity. Setup, algebraically- and geometrically-analyze, and physically-interpret simple constant-acceleration kinematics problems.*

**Ch 4 Newton's Laws: Explaining Motion (2 wk)**

*Define and explain Newton's Laws of Motion. Distinguish mass from weight. Setup (with Free-Body Diagrams), algebraically- and geometrically-analyze, and physically-interpret simple statics and dynamics problems.*

**Ch 5 Circular Motion, the Planets, and Gravity (1 wk)**

*Setup, analyze, and interpret simple circular-motion problems. Define and explain planetary motion using Kepler's Laws of Planetary Motion and Newton's Law of Universal Gravitation.*

**Ch 6 Energy and Oscillations (1 wk)**

**Ch 7 Momentum and Impulse (1 wk)**

*Distinguish force, energy, work, power, momentum, impulse. Setup, analyze, and interpret simple problems involving energy-conservation and momentum-conservation. Setup, analyze, and interpret simple-harmonic-motion problems.*

**Assorted topics: (* time permitting )**

**Ch 13 Electric Circuits**

*Describe parts of a simple electric circuit. Setup, analyze, and interpret simple electric-circuit problems. Distinguish voltage, current, charge, power, resistance. Distinguish series arrangements from parallel ones. Distinguish DC circuits from AC ones.*

**Ch 15 Making Waves**

*Distinguish amplitude, frequency, wavelength, period, wave-speed, and phase-difference. Distinguish longitudinal waves from transverse ones. Describe wave-interference.*

**Ch 17 Light and Image Formation**

*Define and explain the Laws of Geometric Optics (reflection and refraction).*
**Describe and analyze the formation of images (with mirrors and lenses).*

***Ch 18 The Structure of the Atom**

***Ch 19 The Nucleus and Nuclear Energy**

Some other highly-recommended texts you may wish to consult:

**"Conceptual Physics" by Paul Hewitt**

**"Physics for Scientists and Engineers" by Raymond A. Serway**

**2005**

**August**

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**December**

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Midterm Week

The Final Exam is offered once during Finals Week at a specific date and time (to be assigned by the University). Do not plan to travel until after Dec 8.