

Physics 112: General Physics II

Spring 2008

Instructor: Keith “Kilo” Watt, M.A., M.S.

Email: kilo@KeplerEducation.com

Room: Lecture (section 5475) – PS175

Lab (section 5477) – PS169

Date/Time: Lecture – Tuesday & Thursday, 5:45 PM – 7:00 PM

Lab – Tuesday, 7:10 PM – 9:40 PM

Office Hours: In *Second Life*: Tuesday & Thursday, 8:00 AM – 9:00 AM

In Person: Before and after class or by appointment

Email: Most any time, though there will be several hours delay

Textbook: Lecture – Required: *MasteringPhysics* Online Tutorial System

(<http://www.MasteringPhysics.com>)

Optional: Serway and Faughn, *College Physics*

Lab – C. Dellai, *et al.*, *College Physics Only* lab manual

Course Description

From the 2007-2008 Catalog:

Includes electricity, electromagnetism, and modern physics.

Oooooo-kay.

So what is this class really about? Basically, you are going to learn the mystical secrets of electricity and magnetism. Electrodynamics, the focus of this semester, is the science of describing and predicting the actions of electromagnetic fields and forces. Essentially our entire modern world, from the cell phone in your pocket to the iPod in your ears, is governed by these forces. By the end of this class you will have a firm understanding of all of these!

I am a former NASA engineer; I worked in the Orbital Mechanics Branch of Marshall Space Flight Center in Huntsville, AL, and at the Mars Space Flight Facility at Arizona State University in Tempe. I’ve helped navigate the shuttle and the Hubble Space Telescope in orbit around the Earth as well as sent four spacecraft to Mars. Spaceflight is one of the purest examples of physics in action, so I’ll be pulling in some real-life problems for you to work on. It should be fun!

Expectations

I’m not going to kid you: This is a tough class, and I’m a tough teacher. If you aren’t here to learn physics, if you have little or no interest in physics, drop this course! We have a lot to do and a very limited amount of time in which to do it, so you can expect that we are going to work pretty hard. That said, I think you will find this course to be

one of the more enjoyable ones you've taken so far. I have an off-the-wall sense of humor, so we will have a lot of fun during the course of the semester. At least you'll be having a good time while you're hating life...

This class meets only twice per week for lecture and once per week for lab. For that reason, attendance is mandatory at all class sessions unless I tell you otherwise. If you decide to skip my class, I assure you my feelings will not be hurt – it's your dollar, after all – but you almost definitely won't pass the class either. As my students from PHY111 can tell you, missing even one class can put you so far behind that it's very difficult to catch up. Caveat emptor...

Each week you should have the following with you:

Pencil (NOT a pen!)

Paper or notebook for taking notes

Calculator with scientific notation and trig functions (computer and cell phone calculators will NOT work!)

One last thing: Please keep your cell phones off during class. If you have a special circumstance (babysitters at home, elderly parents, etc.), please talk to me and we'll make arrangements.

Office Hours

I am generally not on campus unless students have made arrangements to meet with me. Traditionally, students often set up a study session immediately before class where I offer tutoring on specific problems. The main way to get in touch with me has been through email – you should contact me *before* you get frustrated with the homework, not after!

Email always entails a delay of several hours and it can be difficult to have a discussion over email. GCC has therefore established a “virtual student center” in the online world of *Second Life*. *Second Life* is a virtual world that is accessed through your computer (much like a massively multiplayer online game such as *Everquest* or *World of Warcraft*). *Second Life* is free to everyone, and the client used to access the world can be copied from any GCC computer or downloaded directly from <http://secondlife.com/community/downloads.php> (it runs on PC, Mac, and Linux). Once you download the client, you'll be prompted to register and choose a name for your “avatar” (yourself in *Second Life*). My name in *Second Life* is “Kilo Raymaker”. Simply send me a message (by email or in *Second Life*) and I'll add you to the group for our course, as well as send you a landmark that will allow you to teleport directly to the GCC campus in *Second Life*.

As an experiment, I will be in the *Second Life* “grid” at the GCC student center (search for GCCaz in-world or type in <http://slurl.com/secondlife/GCCAz/37/221/30> in your web browser) Tuesday and Thursday mornings from 8 AM to 9 AM. Now you can attend my office hours in your PJ's and no one will ever know. You are in no way required to use *Second Life*! I'm simply trying this as a service to you, my students. *Second Life* has the advantage that I can display diagrams and equations that can be seen by everyone present

in the virtual world, something that is often hard to do over email. There are a lot of things that we can do in *Second Life*, some of which might be difficult or impossible to do in the real world. It could be fun!

Withdrawal Policy

You may withdraw from the course by submitting a withdrawal form to the Admissions Office. Furthermore, I reserve the right to drop you if you've missed more than three consecutive classes. All withdrawals must be accomplished before the last week of class, or you will be stuck with the grade you've earned! Note that under no circumstances will I allow you to do "extra credit" at the end of the semester to improve your grade. Your only way to improve your grade is to start studying at the very beginning of the class!

Grading

Grades will be assigned based upon the following items:

<i>MasteringPhysics</i> Homework (daily)	= 25%
In-Class Quizzes (daily)	= 10%
Lab Reports (weekly)	= 15%
Tests x 4	= 40%
Final Exam	= 10%

Note that the actual number of homework assignments and quizzes may change due to holidays and other external factors. Yes, I do curve, but I will guarantee that an uncurved 90%+ will be an A, 80-89% at least a B, 70-79% at least a C, etc.

As indicated above, we will be having a quiz every day. Yep, get up off the floor, it's not that bad. If you have been paying attention in class, you'll have no problem whatsoever.

Make-ups

As a general rule, assume it can't be done. Other than GCC-approved activities, there are no excused absences. We will have one day for a make-up test, but you **really** don't want to take one of my make-up tests... As I said before, while I don't count attendance against you, you aren't likely to pass the class if you aren't here *every day*. All work is due either in my hand, in my email box, or online (as appropriate) by the due date. Late work isn't accepted for any reason, so plan ahead!

Academic Dishonesty

I take the academic integrity VERY seriously. If you are caught, you're history. End of story. In this course, academic dishonesty includes: copying information from the Internet, copying another person's homework or lab report, looking at another person's quiz or test, fabricating data, and utilizing material from previous years. Additionally, GCC may impose disciplinary actions on you for misconduct or violations of law or GCC rules and policies. You could be subject to temporary exclusion, disciplinary probation, suspension, or expulsion from class. Sound like fun? I didn't think so. All of these policies are outlined in the official GCC Student Handbook, so you are responsible for knowing them – read and heed!

Special Circumstances

Students with a documented disability should see me ASAP to discuss accommodations. The Disability Services and Resource Office at GCC Main is in room SPS 31 (623-845-3080). It's no big deal, obviously I have one too....

Course Objectives

Here are the objectives for this course, as laid out in GCC's official course description:

I. Electrical and Magnetic Properties of Matter

II. Fields and Forces

III. DC and AC Circuits

IV. Electromagnetism

V. Light and Optics

VI. Elements of Modern Physics

Subject to Change – Your Mileage May Vary

Good education means adapting my instructional techniques to the particular needs of my students. The purpose of the quizzes and the homework is to let me make those adaptations. As a result, any or all of this information is subject to change as necessary!

Tentative Course Schedule

This schedule is subject to change from day to day as I may talk more about things that are interesting to the class and less about things that we find aren't so fascinating. This will give you a rough guide, though:

Lecture

- **Part I: Electricity and Magnetism**
 - A (Very) Quick Review of PHY111
 - Electric Forces and Electric Fields
 - Electrical Energy and Capacitance
 - Current and Resistance
 - Direct-Current (DC) Circuits
 - Magnetism
 - Induced Voltages and Inductance
 - Alternating Current (AC) Circuits and Electromagnetic Waves
- **Part II: Light and Optics**
 - Reflection and Refraction of Light
 - Mirrors and Lenses
 - Wave Optics
 - Optical Instruments
- **Part III: Modern Physics**
 - Relativity
 - Quantum Physics
 - Atomic Physics
 - Nuclear Physics

Lab

- **15 Jan:** E-Field Mapping
- **22 Jan:** Capacitance
- **29 Jan:** Ohm's Law
- **5 Feb:** Test #1
- **12 Feb:** Charge/Mass Ratio
- **19 Feb:** Earth Inductor
- **26 Feb:** Test #2
- **4 Mar:** Refraction
- **11 Mar:** SPRING BREAK – NO LAB TODAY!
- **18 Mar:** Lenses
- **25 Mar:** Test #3
- **1 Apr:** Light Interference
- **8 Apr:** Spectra of Light
- **15 Apr:** Test #4
- **22 Apr:** Radioactivity
- **29 Apr:** Make-Up Test Day (you *really* don't want to take my make-up test...)
- **6 May:** Final Exam (in lecture – NO LAB TODAY!)

Using *Mastering Physics*

KEEP THESE INSTRUCTIONS WITH YOU!

Registration Procedure

1. Point your web browser to <http://www.KeplerEducation.com/MPtutorial> for a complete walk-through of registering and getting started with *Mastering Physics*.
2. You will need to purchase an access code from the site (instructions are on the web page listed above).
3. Be sure to use your first name and last initial for both your Login Name and your Student ID.
4. The Course ID is PHY112S08GCC.

Working Problems and Tutorials (Summary)

1. Read (and/or print) the Learning Goal and background material (*very important!*)
2. *Carefully* read the text of the problem – these problems can be tricky!
3. Read each part of the problem, and choose your answer. Press “submit” to see if you are correct.
 - a. You can keep trying to answer a question as many times as you like, but you will lose points for each wrong attempt – be sure of your answer before pressing “submit”!
 - b. If you are unsure of the answer, you can press the “hints” button to get hints. These hints do not count against you, but you will get bonus points for every hint you do *not* open – it’s possible to get greater than 100% on each assignment!
4. Once you have answered all parts of the problem, press “Submit Problem” to send your results to me.
5. You will be presented with a survey, which is completely optional. You do not have to fill it out, though *Mastering Physics* will use your input to rank the difficulty and usefulness of the problem for future physics students taking this class (I choose problems based on the calculated difficulty, so I can use *Mastering Physics*’ reports to refine which problems to use for coming semesters – and later on in this semester – based on your feedback.)
6. Press “Submit Survey” to go on to the next problem (even if you left the survey blank).
7. Sometimes you will be expected to rank certain quantities from greatest to least or vice versa. Remember that some quantities may be *equal* to each other – place them on *top* of each other in the ranking task window or you will not be able to solve the problem!
8. Keep in mind that you will learn *nothing* by random guessing – you’ll be completely wasting your time. You don’t get the problem right on the third try, email me for help before going on! You should *never* use the “Give Up” button!

PHY 112: GENERAL PHYSICS II SYLLABUS ACKNOWLEDGEMENT

Spring 2008	PHY112 SEC. 5475 (Lecture)	
T/R	5:45 – 7:00 PM	ROOM PS175
Spring 2008	PHY112 SEC. 5477 (Lab)	
T	7:00 – 9:40 PM	ROOM PS169

I acknowledge that I have received a course syllabus for the course described above. I have read it and understand the attendance, withdrawal, grading and other policies. I recognize that to successfully complete this course, it may require 2 to 3 hours out of class for each hour spent in class.

Printed Name: _____
E-mail address or some way to contact you:

Signature: _____
Date: _____

How much Physics, Physical Science, Chemistry, and Math have you had?

What do you hope to get out of this course?

What (if any) part of physics do you think will be most interesting to you?

How did you select this and other courses for which you are registered this semester (on-line schedule, paper schedule, a campus advisor, etc.)? If an advisor, what assistance did you receive from this person?