Course Syllabus  
Fall 2014

Course Information  
Physics II  PHYS 1200  4 credits

Lecture  
Monday-Thursday  8:30am – 9:30+am  DCC 308
Sect 1-6,11
Tuesday-Friday  8:00am – 9:00+am  DCC 318
Sect 7-10 T/F

Labs  
Sect 1,2 MTh 10:00 - 11:50 JRowl 2C14/ 22
Sect 3,4 MTh Noon - 1:50 JRowl 2C14/ 22
Sect 5,6 MTh 2:00 - 3:50 JRowl 2C14/ 22
Sect 7,8 T/F 10:00 - 11:50 JRowl 2C14/ 22
Sect 9,10 T/F 10:00 - 11:50 JRowl 2C14/ 22
Sect 11 M/Th 4:00 - 6:00 JRowl 2C14

Course Website:  http://lms.rpi.edu

Prerequisites or Other Requirements:  PHYS 1100 or equivalent or permission of instructor. Co-requisite: MATH 1020.

Lecturers
Scott Dwyer  ---  Monday and Thursday  dwyers@rpi.edu
Peter Persans  –  Tuesday and Friday  persap@rpi.edu

Instructors
Scott Dwyer  –  sections 1,2, 11  dwyers@rpi.edu
Kim Lewis  –  sections 3,4,5,6  lewisk2@rpi.edu
Peter Persans  –  sections 7,8, 9,10  persap@rpi.edu

Classroom Facilitators (TA’s) Lists  as well as

Office Hours for Professors and TA’s  –  will be posted on LMS as they become available

Course Description
Physics 1200 is the second semester of a two-semester introductory sequence. Topics include electric and magnetic forces and fields, Gauss’s Law, DC and AC circuits, Ampere’s Law and Faraday’s Law, mechanical oscillations and waves leading into electromagnetic radiation, physical optics, and quantum physics.
**Course Text(s)**
Fundamentals of Physics 9th or 10th edition (extended) by Halliday, Resnick & Walker (Wiley) with MasteringPhysics (Pearson) for Homework. (Same as PHYS 1100 last semester.)

**Course Goals / Objectives**

**Subject Matter:** This course will complete the study of introductory physics that was begun in Physics I with classical mechanics. In general, Physics II will address electricity and magnetism, and conclude with an introduction to quantum physics.

**Course Format:** The course consists of four regular class meetings per week---two lectures and two laboratory sessions. The lectures will meet on M&Th or T&F, as scheduled. Labs will meet twice a week for 110 minutes on the same day as your lecture.

**Classwork:** You will be assigned homework to be done prior to attending lecture and lab. Some of the homework will be on material to be covered in lecture and lab, so you will not have heard of it in class. This exposure is planned and will allow you to understand the lecture and the labs more effectively. Therefore you will need to read the book where appropriate to understand those homework questions.

**Course Content**

At the end of this course, a student should understand basic concepts of electromagnetism and quantum physics and be able to solve problems at a level consistent with any introductory Physics text. Students should be able to set up and solve problems using calculus at the level of a first year course in calculus. Mastery will be developed through classroom lectures and laboratory activities as well as through required homework assignments. Mastery of the material will be tested through homework, classroom labs, quizzes, three unit exams, and a comprehensive final.

**Student Learning Outcomes**
The successful student will:

1. Demonstrate key factual knowledge of electromagnetism and circuits and basic quantum physics. Examples of such knowledge include the order of magnitude of the wavelength, speed, and frequency of sound, light, and radio waves; and typical power consumption in common electrical devices.

2. Demonstrate understanding of key concepts applying to electromagnetic and circuits and basic quantum physics.
   a. Demonstrate knowledge of the basic physical concepts of conservation of momentum, energy, mass, and charge.
b. Demonstrate knowledge of the relationships between electric charge, vector electric fields, electric forces, and electric potential.
c. Demonstrate knowledge of the relationships between moving charges, vector magnetic fields, and magnetic forces.
d. Demonstrate knowledge of the relationship between charge, current, and voltage in direct current and alternating current series and parallel circuits.
e. Demonstrate knowledge of the relationships between wavelength, wave speed, and frequency for sound and electromagnetic travelling waves.
f. Demonstrate knowledge of wave interference and diffraction phenomena.
g. Demonstrate knowledge of the DeBroglie hypothesis and the relationship between particle-like and wave-like behavior of matter.
h. Demonstrate knowledge of the consequences of wave-like behavior of matter, including energy quantization for confined particles.

3. Be able to follow written and oral instructions to complete physical measurements of electric, magnetic, and optical quantities.

4. Relate academic material related to the topics in section 2 to the world outside of the classroom.
   a. Recognize real-world situations in which quantitative or mathematical analysis produces predictive ability.
   b. Recognize real-world applications in which electric and magnetic effects must be considered in making a quantitative analysis of a situation.
   c. Recognize real-world applications in which quantum effects must be considered.

5. Translate a word, diagrammatic, or graphical description of a physical situation into a solvable mathematical description.
   a. Demonstrate the ability to use mathematical tools including algebra, trigonometry, and differential and integral calculus to solve problems in electromagnetism, vibrations and waves, and basic quantum physics of particles.
   b. Demonstrate the ability to select appropriate physical principles and relevant parameters that apply to quantitative analysis of a situation and then to represent the solution in logical mathematical form.
   c. Convert a word problem into a diagrammatic or graphical description and vice versa.

6. Solve straightforward quantitative physical problems that involve one or two physical concepts in this course.
7. Recognize when sufficient information is given to allow the student to solve for required quantities.

8. Start with the statement of a physical situation, derive useful relationships from basic formulas, and symbolically and quantitatively solve for required quantities.

9. Solve unfamiliar problems and assess unfamiliar physical situations based on the physical concepts of this course.

**Grading Criteria and Assessment Measures**

The course numerical grade range for each letter grade is given below.

- **A=** 92 to 100; **A-=** 89 to 91.999
- **B+=** 86 to 88.999; **B=** 82 to 85.999; **B-=** 79 to 81.999
- **C+=** 76 to 78.999; **C=** 72 to 75.999; **C-=** 67 to 71.999
- **D=** 55 to 66.999.

Your course grade will be determined as follows:

- **Unit Exams and Final Exam:** 70%
- **Laboratory Activities:** 20%
- **Lecture quizzes and worksheets:** 4%
- **Online Homework:** 3%
- **Comprehensive Written Homework (6 problems)** 3%

**EXAM GRADES:**

The final exam counts as 125% of a regular in-term exam. The exam portion of your grade will be determined as follows:

1. If the final exam score is greater than any of your first three exams, you will be allowed to drop the lowest score of one of your three exams scores to earn a maximum of 325 points for all exams, which will be normalized to 70% of your overall grade. For example, if one of the three in-term exams (E1, E2, E3) is the lowest of your four, that score is dropped and the examination contribution to your grade is --- (E1*100 + E2*100 + Final*125)/325*0.70.

2. But if your final exam is the lowest, then the final exam score only counts 25% and the examination contribution to your grade is --- (E1*100 + E2*100 + E3*100 + Final*25)/325*0.70.

3. Please note:
   a. Missing a regular hour exam will not automatically lower your grade – it will be the one that is dropped.
   b. Missing the final exam --- if you choose to leave early at the end of the semester --- could lead to a loss of up to (25/325)*70 = 5.4 points from your overall course numerical grade.
Course Policies on GRADES

All of your grades are kept or administered by your laboratory professor --- not necessarily the professor you have for lectures.

Important: Graded material will be assigned and collected, and will all count toward your final grade.

--- Written laboratory reports and worksheets are due at the end of your lab section. If you do not finish, hand in what you have but work hard to do your lab within the two-hour time frame. Working under a deadline is good practice for the real world.

--- Written homework is due at the beginning of your lab section.
--- On-line homework is due by 7:30 am on the day of your lecture
--- Quizzes are given at the start of each lecture class

There is no make-up of missed quizzes or work that is due in classes.
Rather, the policy is this:

We will drop the three lowest of each of your 1) Lab grades and 2) Quiz grades. These are grades which require you to be in class. If you miss a class due to sports, due to illness, due to family or personal matters, even if you have a Dean’s excuse, you will not be allowed to make up the missed work. Rather, that zero will be one of the grades we drop.

If you miss a lab or quiz, you are still responsible to learn the material and are encouraged to work through homework and labs on your own, if possible, and especially study posted answers. This material will be on the exam.

We do not drop your three lowest Homework grades.

MAJOR EXAMINATIONS: There will be three major in-term exams in this course. They will be held from 6:00 p.m. to 7:00 p.m. on the dates below:

EXAM 1 - Wednesday Oct 01, 2014
EXAM 2 - Wednesday Oct 29, 2014
EXAM 3 - Wednesday Dec 03, 2014

Exam Rooms will be announced in lecture prior to each exam.

You will be allowed to bring to each exam:
--writing instruments,
--a basic scientific calculator (without a full keyboard), and
--one 8.5" x 11" sheet of paper containing constants, formulas, and any other information that you might find useful. Both sides of the page may be used as well as any size font.

The use of any electronic communication or data storage devices is forbidden and will result in a grade of F for the course.
A grade of zero will be recorded for any major exam that is missed for any reason. This grade may be your dropped exam grade.

If you have a conflict with an examination time for a legitimate and documented reason, you may take that exam during a conflict time. Contact your section professor in the week prior to the exam to find out if your reason is valid and to make arrangements to attend the conflict exam. The conflict test hour will usually be provided at 5 pm the day before the regular test. Students must request permission from their section instructor by 5 pm Friday of the week before the test to take the conflict test.

Students with approved special needs (large print, extra time, quiet room, computer...) should contact their section instructor in the week before the exam.

FINAL EXAMINATION: The Final Exam is mandatory for everyone. The final examination will be given on the date scheduled by the registrar during the period provided. Do not plan to leave campus before you know when our final is as we are allowed no flexibility to offer the exam on other dates. No special arrangements will be made for students who cannot take the final at the scheduled time unless there is a conflict with another scheduled exam. There are Institute rules for how that works. As with the other exams, you will be allowed to bring to the final examination only one 8.5” x 11” sheet of paper containing constants, formulas, and any other information that you might find useful. Both sides of the sheet may be used.

HOMEWORK:
The philosophy of this course is that you learn best through your own study and practice, not by passively listening to lecture. We will try to focus and clarify your learning through assignments, labs, lectures, and exams but it is your job to learn. On-line homework uses the MasteringPhysics system as you did last semester. We strongly encourage you to do homework yourself and make sure you understand it. Copying may increase your homework grade (6% of total grade) but statistically it has been proven to lower your exam grade by at least one standard deviation, i.e., at least one letter grade.

Online homework counts for 3% of your total grade. Each graded homework question or problem counts for 1 point in your homework total. There will be about 150 total points. (Some problems and tutorials may be long or difficult – they count the same as short or easy questions.) Detailed policy is given on the “Mastering Physics” site for this course. The following is a summary. You will have 6 attempts at each question, but a small amount (3%) of the points for a numerical question and a substantial fraction (>20%) for a multiple choice question is deducted for each incorrect answer. Many problems have hints that you can access. Accessing a hint on a problem reduces the possible points for that problem by 1%. Late homework will be assessed a penalty so that a homework that is more than about 12 hours late will receive a maximum of 25% of the credit. We
encourage you to complete the homework not only for the points but for the learning experience. Some problems in the homework are listed as “Practice”. “Practice” problems do not count toward your homework total.

Your online homework grade will be 3% times MAX(1, (1.1*(Your pts/Possible pts)). The adjustment by *1.1 accommodates issues you may encounter with automated grading and allows you access hints and to have a few incorrect numerical answers without penalty. We expect this will be the only adjustment we will make for any issues with the homework system. We still want to know about problems with the system, so report problems to “Mastering Physics” within the site and a copy comes to us, but individual grade adjustments will not be made.

In addition to online homework, there will be six written homework problems due about every two weeks. These problems will address topics related to the design or use of important devices, such as electron and optical microscopes and spectrometers. Each problem will bridge across course topics. These problems will be worth a total of 3% of your grade.

LECTURE ATTENDANCE:
Lecture attendance is not required, but 4% of your grade is associated with work that is completed in lecture in form of a quiz to be given each lecture at a time to be announced by your lecture instructor. Lecture quizzes cannot be made up due to absences of any kind. To accommodate individual schedules and obligations, the lowest three quiz or worksheet grades will be dropped. If you are absent, a grade of zero is recorded for that quiz or worksheet.

LABORATORY ATTENDANCE:
Laboratory is where most of your learning will take place. This is your opportunity to discuss with colleagues and ask questions of instructors. Laboratory experiments and related activities form 20% of your grade.

There is no make-up of missed labs being offered. To compensate for individual schedules and obligations, the lowest three lab grades will be dropped. Labs that you miss receive a grade of zero. However you are still responsible to learn the material for that lab. If you miss a lab, you are strongly encouraged to work through that material on your own and understand the questions being asked.

To receive credit for the lab classes you must attend the class you are registered for and you must actively participate in the laboratory activity. You will not be allowed to arrive later than other members of your group and copy their work. That is plagiarism and will be dealt with accordingly. You must also hand in an individual completed laboratory report every class which will be graded on a scale of 0 to 10. Written reports are due at the end of the lab session in which the activity is performed. They cannot be taken home, finished later and then turned in for credit.
**Academic Integrity**

Student-teacher relationships are built on trust. For example, students must trust that teachers have made appropriate decisions about the structure and content of the courses they teach, and teachers must trust that the assignments that students turn in are their own. Acts, which violate this trust, undermine the educational process. The Rensselaer Handbook of Student Rights and Responsibilities define various forms of Academic Dishonesty and you should make yourself familiar with these. In this class, all assignments that are turned in for a grade must represent the student’s own work. In cases where help was received, or teamwork was allowed, a notation on the assignment should indicate your collaboration. Students taking courses at Rensselaer have a right to expect that their work will be evaluated fairly with respect to other students. They have a right to expect that other students will not attempt to enhance their own grades or the grades of their friends by cheating. Professors have a right to expect that their students are honest and submit work reflecting their own efforts. In an atmosphere of academic integrity, students and professors are on the same team trying to achieve the same learning objectives. If you attempt to cheat, you are placing yourself in a position where you are at odds with your professors and the vast majority of your fellow students. Academic dishonesty is a serious offense and we will treat it accordingly.

Students are expected to actively participate in a collaborative group when working on the in-class activity. However, each student must turn in her/his own activity write-up. No student will be allowed to submit an activity in the name of any other student. The same policy applies to homework and quizzes. If you are caught copying or handing in work that is not your own, you will receive a non-droppable zero for that assignment and will be warned that this is not acceptable behavior. If this occurs a second time, you will receive an F for the course and a letter will be sent to the Dean of Students.

Discussing homework problems and getting help with them before class is permitted and strongly encouraged. Most learning is done through discussion with your peers and instructors.

Collaboration (giving or taking information) or copying of any sort or using any aid that is not allowed during an exam or quiz is cheating. Altering a returned exam and asking for a re-grade is cheating. If you are found cheating on any exam, you will receive an “F” for the course. The violator will also receive a written warning, copied to the Dean of Students.

If you get creative and think of a new way to cheat that is not specifically mentioned above, it is still cheating and will be punished. If you are that creative, please put your talents to better use.

If you have any question concerning this policy before submitting an assignment, please ask for clarification.
Other Course-Specific Information

Course Information: Course information and a PowerPoint version of the lecture notes are available at the LMS (WebCT - Blackboard) site for this course. We have posted videos of Prof Persans’ (Spring 2013 and Fall 2014) lectures to allow you to review lectures. Class-wide announcements are also posted at that location, so check in daily. Information that must be disseminated rapidly, such as class or exam cancellations, will also be sent out on the Physics 1200 Twitter feed: http://twitter.com/persap.

Extra Help: All instructors and graduate teaching assistants are available during laboratory class and in office hours for students who need help outside the classroom. Supplemental (ALAC) tutors and mentors will also be available to help you with this course. A list of the office hours for all the instructors and tutors in the course will be published and updated on the Physics II homepage (RPI LMS) as soon as the information is available. Office and office hours information can also be found in the Physics Office (JROWL 1C25) and posted outside the classrooms. Students may go to any instructor listed, not just their section professor or section TA.