

Portland State University
Department of Physics

PH202: General Physics: Electromagnetism and Thermal Physics
Winter 2008: 10am-11:50am

Instructor: Ralf Widenhorn

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Office hours: Monday 2pm-3pm and Thursday from 12pm to 1pm in SB2 #450

Text: Giambattista, Richardson, Richardson, College Physics 2/e

Web: <http://www.physics.pdx.edu/~ralfw/physics/>

Username: physics, password: physics

Course outline:

The course covers the basic concepts of electrostatic, electric charges, electric current in DC and AC-circuits, magnetism, temperature, heat, and the laws of thermodynamics.

Grading:

The course grade will be determined from three exams. They will count 25%, 35%, and 40% respectively. The exam with your lowest score will be counted least; the one where you received the highest score will be counted most. So even if you didn't do well on the first exam, not everything is lost. You can still improve your grade significantly by doing better on the next two. The grade of each exam follows the traditional scale:

- 90% or better is an A/A
- 80% to 89% is a B/B⁺
- 70% to 79% is a C/C⁺
- 60% to 69% is a D

For a low scoring exam a curve might be applied.

Homework:

The homework problems are posted on my webpage. Here, you will learn how to apply the concepts from the lecture to solve actual problems. Doing the homework should also help you to review the material and prepare for the exams. **Keeping up with the homework is essential for doing well in this class.** Guided solutions to most homework problems are also available on ARIS (www.aris.mhhe.com) (physics, Giambattista, Richardson, Richardson, College Physics 2/e). To get to the material for this course enter the section code 43E-7A-ED9. For first time ARIS users: To use the guided solution you need to sign-up for ARIS at www.aris.mhhe.com. The registration costs \$20 and is valid for the whole school year. There is also a self study guide

component to ARIS which is free of charge. Go to (www.aris.mhhe.com) (physics, Giambattista, Richardson, Richardson, College Physics 2/e) and click on the “Self Study” tab.

Chapter	Conceptual questions	Problems
Chapter 16	1,3,6,10,11,18,20	1,3,4,9,11,18,21,22,25,28,33,34,37,42,43,47,52,54,59,60,67,70,72,74,75,77,85,87
Chapter 17	1,4,9,13,16,20	1,4,7,9,12,17,19,27,29,30,32,38,39,44,50,54,56,61,63,64,66,70,72,78,81,86,89,91,94,95,97,98
Chapter 18	1,2,3,6,15,16,19,21	2,5,7,8,11,12,14,15,22,27,28,31,36,37,38,40,41,59,61,81,85,86,98,105,107,109,113,118
Chapter 19	3,8,19	8,10,12,15,17,18,23,27,38,45,46,48,55,60,64,70,72,76,78,82,84,94,97,99
Chapter 20	1,3,5,8,13,17,19	5,8,10,11,14,16,23,24,29,31,34,36,41,44,47,50,53,60,69,76
Chapter 21	3,4,9,11,12,13,14,17	3,7,9,10,15,16,17,21,27,28,33,34,39,44,45,50,55,57,69,70,72,73,76,79,81,82,
Chapter 13	3,5,8,12,15,20	4,6,12,22,25,36,39,45,50,54,58,61,62,68,69,82,86,104
Chapter 14	2,3,7,12,17,18,22	8,11,16,19,20,25,26,27,30,32,39,45,48,53,58,68,74,75,81,85,88,92,97,98,106,108
Chapter 15	1,8,12,16	2,4,7,12,14,16,19,24,27,37,44,51,54,56,70,79,82,85,90

Review & Synthesis, chapters 16-18 problems: 1, 5, 10, 11, 13, 14, 17, 19, 21

Review & Synthesis, chapters 19-21 problems: 1, 10, 12, 17

Review & Synthesis, chapters 13-15 problems: 2, 4, 5, 7, 8, 9, 10, 11, 13, 15, 17

Exams:

There will be three exams. They will cover the following chapters:

01/31/07 10:00am - 11:50am Exam 1: Ch16 – Ch18

02/21/07 10:00am - 11:50am Exam 2: Ch19 – Ch21

03/18/08 10:15am - 12:05pm Exam 3: Ch13 – Ch15

The exams are non-comprehensive, but exam 2 may include general concepts already covered in the previous exam.

The exams will contain two parts. The first Part will be multiple-choice (no partial credit) and the second part will contain problems that have to be solved in detail (you can receive partial credit for those problems). You can bring one piece of paper (8.5” x 11”) with **handwritten notes** to the exams.

Make-up exams are on March 19th at 6 pm in #113 SB2.

Make-up exams will be only given in case of emergencies or illness (with proof).

Extra credit:

1. Multiple Choice: (maximum of 10 points extra credit)

There will be a short in-class Multiple Choice Quiz every Tuesday. I will ignore your two lowest scores (or missed MC) and calculate the average percentage of

the other quizzes. This percentage multiplied by 10 points gives you the Multiple Choice Quiz extra credit.

2. Workshop or Term paper (5 points extra credit)

a.) Workshop

Complete the class “Workshop for Ph202” successfully. The workshops meet weekly for 1h50min sessions. It is a one credit class and you need to sign-up for it (the schedule is on my webpage). To pass the workshop students must attend all workshops and participate actively. You will work under the guidance of a workshop leader in small groups on problems sets corresponding to the material of the general physics lecture.

b.) Term paper

Write a term paper on a topic which is relevant to this course. Some possible topics are listed below, but you are free to choose another subject that sparks your interest. You need to submit an outline of your paper, with a list of references **by Feb 14th**. The paper should be 6-8 pages long (double spaced, font size 12) plus pages with figures and references. The paper is due before the final exam. **I only accept papers of people that have submitted the outline. No late work will be accepted for the outline and the paper submission.**

- Perpetual motion machine
- Temperature scales
- Thermodynamics of a combustion engine
- Greenhouse effect and global warm
- Thermal convection and the weather
- Maxwell's equations
- The physics of semiconductors
- Transistors and diodes
- Electricity at home

Here is an example on how to calculate your final grade:

Exam 1: 75, Exam 2: 90, Exam 3: 65, 70% of the extra credit MC, attended workshop

Total score= $(0.4 \times 90) + (0.35 \times 75) + (0.25 \times 65) + 7 \text{ (MC)} + 5 \text{ (Workshop)} = 90.5 \rightarrow A^-$
best exam 2nd best exam 3rd best exam extra credit

(Without the extra credit the same exam grades would have resulted in a C⁺)