

PH202: General Physics: Electromagnetism and Thermal Physics
Tue and Th 10am-11:50am, ASRC 001

Instructor: Ralf Widenhorn

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Office hours: Monday 12pm-1pm and Thursday from 12pm to 1pm in Science Building 2, B1-79 A

Blackboard: <https://bb.pdx.edu/webct/entryPageIns.dowebct>

Course outline:

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

Textbook:

J. S. Walker "Physics" (4nd Edition)

The PSU bookstore offers different bundles:

- Bundle #1 Full textbook with Mastering Physics (ISBN: 0558417086)
- Bundle #2 Full text but customized into three Volumes (Volume 1 PH 201/ Volume 2 for PH202, Volume 3 for PH203) with Mastering Physics. ISBN 9780558418359
- PH 201 (Fall term) bundle ISBN 9780558396114 includes Mastering Physics
- PH 202 (Winter term) bundle ISBN 9780558396060 includes Mastering Physics
- PH 203 (Spring term) bundle ISBN 9780558396091 includes Mastering Physics

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.

Exams:

The three exams will cover the following chapters:

01/25, 10:00 am - 11:50 am, Exam 1: Ch19 – Ch21

02/17, 10:00 am - 11:50 am, Exam 2: Ch22 – Ch24

03/15, 10:15 am - 12:05 pm, Exam 3: Ch16 – Ch18 + Parts of Ch15

The exams are non-comprehensive, but exam 2 and exam 3 may include general concepts already covered in the previous exams.

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 16th at 6 pm in #113 SB2.

Make-up exams will be only given in case of emergencies or illness.

Homework:

The homework problems are listed below and solutions are posted on blackboard. 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 and additional problems are also available through MasteringPhysics: www.masteringphysics.com. To get to the material for this course, enter the course ID MPWIDENHORNPH202. You can submit the homework online through MasteringPhysics:

- The assignments labeled "Homework" on MasteringPhysics will be graded: I will score each homework set with 80% and more correct answers as 100. Lower scores will be scaled: e.g. 65% would correspond to a score of 85. For your final homework score, I will ignore your lowest score and calculate the average of the remaining scores.

The homework will be 20% of your final grade (see below).

- The assignments labeled "Exercises" are just as important but are not graded.
- The "PracticeMaterial" contains all problems that are available on MasteringPhysics and is for those of you who want additional material to work on.

You can opt for not submitting your homework through MasteringPhysics. In this case your grad will be based on your exams only. This is only for very strong and disciplined students!

Chapter	Conceptual questions	Problems and Conceptual Exercises
19	2,5,11,14	8,10,15,18,27,35,43,47,51,61,63,67,69,101,103,104
20	3,4,7,11,12	1,6,2,11,14,18,21,31,32,37,39,48,49,51,55,59,62,66,71,75
21	8,12,13	5,7,13,20,32,35,41,46,49,54,61,65,68,73,81,87,88,91,92,95,96
22	1,4	8,13,15,24,28,35,38,42,45,50,52,55,58,61,64,68
23	4,5,7,9	5,10,15,22,26,27,32,33,38,39,43,49,55,59,63,66,69
24	5,7,11	6,8,14,20,23,31,39,49,53,66,72,74,75
15	14, 30	8, 11, 16, 24, 32, 47
16	1,4,7,11,14,16,20	3,9,17,18,24,37,41,49,51,54,59,63,64
17	4,7,11	7,13,17,28,31,38,42,46,51,52,59,62,72,74,76
18		1,6,9,11,12,16,21,30,33,36,39,48,51,55,59,64,65,71,74,97

Extra credit:

1. Multiple Choice: (maximum of 5 points extra credit)

There will be short in-class Multiple Choice Quizzes throughout the term (seven in total, this is to encourage class attendance, so sorry I won't announce the dates beforehand, no make-up will be offered for those quizzes). I will ignore your two lowest scores (or missed quizzes) and calculate the average percentage of the other quizzes. This percentage multiplied by 5 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.

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

- 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 3rd**. 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. Both outline and paper have to be typed and submitted as a hard copy in class.**

- 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
- The physics of superconductors
- Particle accelerators
- Transistors and diodes
- Electricity at home

Example on how to calculate your final grade:

Option 1 (with homework):

Exam 1: 60, Exam 2: 70, Exam 3: 80, 60% of the extra credit MC (3 points extra credit), attended workshop (5 points extra credit), at least 80% homework

$$\text{Total score} = 0.8 * [\underset{\text{best exam 2}^{\text{nd}}}{(0.4 \times 80)} + \underset{\text{best exam 3}^{\text{rd}}}{(0.35 \times 70)} + \underset{\text{best exam}}{(0.25 \times 60)}] + \underset{\text{homework}}{100 * 0.2} + \underset{\text{extra credit}}{3 + 5} = 85.2 \rightarrow B$$

Option 2 (without homework):

Exam 1: 60, Exam 2: 70, Exam 3: 80, 60% of the extra credit MC (3 points extra credit), attended workshop (5 points extra credit), no homework submitted

$$\text{Total score} = \underset{\text{best exam 2}^{\text{nd}}}{(0.4 \times 80)} + \underset{\text{best exam 3}^{\text{rd}}}{(0.35 \times 70)} + \underset{\text{best exam}}{(0.25 \times 60)} + \underset{\text{extra credit}}{3 + 5} = 79.5 \rightarrow C+$$

I will always calculate your grade with both options and choose the better of the two grades!

More:

The skills enhancement and Tutoring Center offers physics tutoring sessions:

439 SMSU, (503) 725-4448

web: www.setc.pdx.edu

MyMathTest to brush-up on rusty math skill is an interactive website where you can:

- Receive step-by-step help to successfully solve math problems.
- Study more efficiently with a personalized study plan and exercises

The access costs \$10 and can be purchased at www.mymathtest.com.

The program ID is [XL0E-S1EN-301Y-2EW2](#)

General Physics lab: <http://www.pdx.edu/physics/general-physics-laboratory>