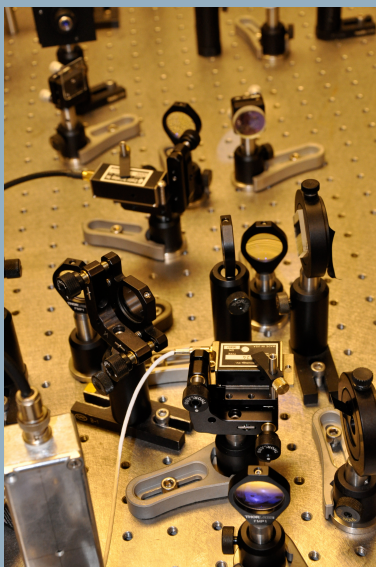


# PHY 116 Principles of Physics II



## Welcome to PHY 116!

Physics 116 is a second semester of non-calculus based course designed for students majoring in the life sciences, pre-medical or non-science students interested in physics. The course **objectives** are to introduce students to the basic concepts in electricity, magnetism, waves and optics and to their applications in everyday life. Students will be able to recognize validity and limitations of the theories behind the studied topics. Additionally, they will be able to understand experimental methods used to test scientific theories, and analyze and interpret the data from such tests. In the course we will use high-school algebra, geometry and trigonometry in formulating mathematical models in order to solve problems.



### STAFF INFO

#### DR. MARIN PICHLER

Instructor

Office Hours: MWF 10:30-11:20 and any other time if you let me know in advance. You can find me in Office: HS-G10 D, Lab G16, or [marin.pichler@goucher.edu](mailto:marin.pichler@goucher.edu) and at (410) 337-6328

#### Semyon Ginzburg

Lab Manager

Office: HS B-29

Class/Lab : MWF 1:30-3:20

HS B-27

Text: *College Physics*, Serway & Vuille, College Publishing, 8th ed.



[Course Schedule](#)

[Grading Scale](#)

[Blackboard](#)

## Why study Physics?

Physics is a science that asks the really “BIG” questions. What is the nature of space, time, matter or energy? The laws of physics are surprisingly few and elegantly stated. Their scope encompasses all natural phenomena so all chemical, biological, and technological systems must conform to the laws of physics. Physics knowledge provides an insightful understanding of how the world around works. Studying physics develops quantitative and analytical thinking skills so that one may be more able to tackle new problems.

**Learning Outcomes.** Completing this course the student will be able to (i) explain main concepts in electricity, magnetism, waves and optics, (ii) solve physics problems using algebraic methods, (iii) develop intuitive understanding and visualization of real phenomena governed by physical laws, (iv) perform an experiment and analyze collected data using statistics and write a concise report about the experimental test.

## Grading policy

Physics 543 grade is based on exams, lab reports, homework assignments and class participation.

Homework	12 %
Three Exams (16, 14, 10)	40 %
Final Exam	25 %
Lab reports and activities	20 %
<u>Class participation</u>	<u>3 %</u>
<b>Total</b>	<b>100 %</b>

## Interactive Physics Classroom

Class meets three times a week on MWF from 1:30 to 3:20 for lectures, discussions, problem solving, demonstrations, hands-on lab experiments and examinations. Understanding of physics concepts will be aided with frequent demonstrations and through examples in lab experiments. Multimedia tools will be used to enhance classroom experience. Computers are integrated in the course through lab problems and interactive simulations. Good part of the class time will be devoted to developing problem solving skills. Homework assignments, answers to problems and other relevant material will be posted on Blackboard™.

## Homework

There will be homework assignment for each chapter. Each homework will consist of problems you can check yourself and problems for submission. Answers will be available for the first kind of problems, and are intended to help you gain familiarity with the concepts and equations. Submitted problems will be graded. You will typically have a week to complete each homework. Late assignments will not be accepted. I encourage you to discuss problems and work together.

## Lab Experiments

There will be ~10 lab projects. Main goals of the lab exercises are:

- ◆ to understand that physics is grounded in experiments
- ◆ to use the use of laboratory equipment and techniques
- ◆ to reinforce the concepts and theories taught in lecture.

For each lab there will be lab report assigned and graded. A lab report should reflect what you have done: analyzed the data you have taken and produced results with conclusions. Reports should be written in concise and clear form with the following parts:

- Title - name of the experiment
- Abstract - An executive summary of your report which should be written after all other sections of the report, but positioned as second part of the report.
- Statement of Purpose - What do you hope to accomplish in this laboratory?
- Background - Physical principles behind the experiment, usually studied in the lecture before the experiment.
- Procedure - Brief description of the experimental procedure - how have you done the experiment.
- Results - the most important part of your report. Contains experimental data presented in tabulated form with proper units and uncertainties in measurement. Also contains your calculations of the related parameters in the experiment and graphs.
- Conclusion -contains the discussion of obtained results and your statement about the experiment. Did the experiment produce the expected results, i.e. do your experimental results agree with the physical laws you learned in class? If not, what are the possible sources of discrepancy? The report should be generated using a word processing software of your choice. Reports may be individual or from a group, depending on the specific lab and instructions.

Upon completing a lab experiment, you need to have you data checked by the instructor prior to leaving.

## Exams

There will be three exams spread through the semester and a cumulative final at the end of the semester. Exam times are listed in the schedule. You will be given a formula sheet for the exam and you can bring a calculator. No books or class notes are allowed during the exams. A review session will precede each of the three exams.

## Quick Quizzes

Periodically quick quizzes (10-15 min.) will be given to check your understanding of the material. The evaluation may include individual and group efforts.

## Policies

**Special Needs/Disability** - please contact ACE: Assistance to Students with Disabilities office to arrange accommodation.

**Lateness** - try not to be late for class. However if you are late, please come in with as little disruption to the class as possible.

**Absence** - I strongly urge you to attend all classes. Let me know if you are going to miss a class. You are responsible for the material that was covered. Excused absences may be due to serious illness, family reasons, court appearance, religious observance and varsity athletic events.

**Reminder** - I encourage you to work together on problem sets, but blatantly copying someone else's ensures that you haven't taken the opportunity to learn, and you'll likely suffer the consequences on the exams. All students are bound by the standards of the Goucher's Academic Honor Code (see <http://www.goucher.edu/documents/General/AcademicHonorCode.pdf>).

**Cell Phones** - the use of cell phones in class/lab is not permitted. If your phone goes off during lectures you'll be asked to make a donation to the college.

## Safety

We may use various equipment for the demonstrations including electronic, magnetic and optical devices. You have to follow safety instructions and precautions. Failure to do so may endanger yourself and others and can result in dismissal from class.

## Grading Scale

A	93 – 100 %	Exact numerical cutoffs will be determined at the end of the semester.
A <sup>-</sup>	90 – 92 %	
B <sup>+</sup>	85 – 89 %	
B	80 – 84 %	An unexcused absence from an exam results in a grade of zero.
B <sup>-</sup>	75 – 79 %	
C <sup>+</sup>	70 – 74 %	
C	65 – 69 %	
C <sup>-</sup>	60 – 64 %	
D <sup>+</sup>	55 – 59 %	
D	50 – 54 %	
F	49 and below	

**Schedule** Note: Class schedule is tentative and subject to a change.

DATE	Chapter & Topic	Note
Jan 26, 2011	Intro. Ch 15. Electric Forces and Fields	
Jan 28, 2011	Ch 15. Electric Forces and Fields	
Jan 31, 2011	Ch 15. Electric Forces and Fields	Lab: Electric field lines
Feb 2, 2011	Ch 16. Electrical Energy and Capacitance	
Feb 4, 2011	Ch 16. Electrical Energy and Capacitance	
Feb 7, 2011	Ch 16. Electrical Energy and Capacitance	Lab: Capacitance
Feb 9, 2011	Ch 17. Current and Resistance	
Feb 11, 2011	Ch 17. Current and Resistance	
Feb 14, 2011	Ch 17. Current and Resistance	
Feb 16, 2011	Ch 18. Direct Current (DC) Circuits	Lab: Ohm's law
Feb 18, 2011	Ch 18. DC Circuits	
Feb 21, 2011	Ch 18. DC Circuits	
Feb 23, 2011	Review	
Feb 25, 2011	Exam	2/25 Exam
Feb 28, 2011	Ch 19. Magnetism	
Mar 2, 2011	Ch 19. Magnetism	Lab: Kirchhoff's rules
Mar 4, 2011	Ch 20. Induced Voltages and Inductance	
Mar 7, 2011	Ch 20. Induced Voltages and Inductance	
Mar 9, 2011	Ch 20. Induced Voltages and Inductance	Lab; Magnetic Force
Mar 11, 2011	Ch 21. Alternating Current (AC) Circuits	Mid semester break March 12-21
Mar 21, 2011	Ch 21. Alternating Current (AC) Circuits	
Mar 23, 2011	Ch 21. AC Circuits /Electromagnetic Waves	03/25 Lab: RLC Circuits
Mar 25, 2011	Ch 21. Electromagnetic Waves	
Mar 28, 2011	Review	
Mar 30, 2011	Exam	Exam
Apr 1, 2011	Ch 22. Reflection and Refraction of Light	
Apr 4, 2011	Ch 22. Reflection and Refraction of Light	

DATE	Chapter & Topic	Note
Apr 6, 2011	Ch 23. Mirrors and Lenses	Lab: Reflection and Refraction
Apr 8, 2011	Ch 23. Mirrors and Lenses	
Apr 11, 2011	Ch 24. Wave Optics	
Apr 13, 2011	Ch 24. Wave Optics	Lab: Lenses
Apr 15, 2011	Ch 24. Wave Optics	
Apr 18, 2011	Ch 25. Optical Instruments	
Apr 20, 2011	Ch 25. Optical Instruments	Lab: Diffraction/Spectroscopy
Apr 22, 2011	Ch 25. Optical Instruments	
Apr 25, 2011	Review	
Apr 27, 2011	Exam	Exam III
Apr 29, 2011	Ch 26. Relativity/Modern	
May 2, 2011	Review	
May 4, 2011	Review	05/03-05 Make up lab
May 10, 2011	Final Exam	exact time TBA, May 9-12

**LIGHT SCATTERING AT SUNSET**

