SUNY Geneseo
Department of Physics and Astronomy
Class: M 2:30pm - 5:20pm; ISC 215
Web: www.geneseo.edu/~pogo

Dr. Pogo
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Office Hours: MW 9:30am-11:00am; TW 12:30pm-2:00pm
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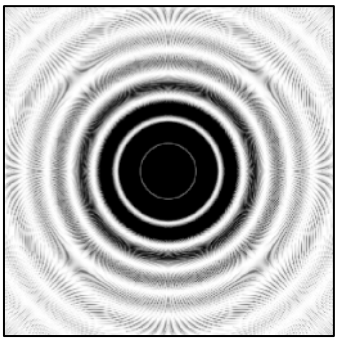
Optics and Modern Physics Lab

(Phys 226)

Fall 2015



What am I doing here? The main objective of this course is to give you some first-hand experience with some of the ideas you are wrestling with in Analytical Physics III. At the end of this course, you will have directly examined some of the fundamental behaviors of light and matter, including wave propagation speeds, interference & diffraction, polarization, the photoelectric effect, black-body radiation, quantization of energy levels in the Hydrogen atom, radioactive decay, and chaos. Some of the labs will be simulations. In addition, you will gain proficiency in the use of various symbolic and computational methods for performing analysis and uncertainty analysis. You will also gain proficiency in good laboratory practice, in data organization, and in presenting your work in a neat and coherent manner.

Where is the lab manual? The lab manual for this course will be distributed incrementally throughout the semester. You will be given the necessary pages of the manual one week prior to each lab experiment, and you will be required to maintain the manual in a 3-ring binder as the course progresses. Also, you will maintain a hard cover experimental journal in which you will record your lab progress. Various rules for the maintenance of these journals can be found at the beginning of the lab manual.

How will I be graded? Your grade will be determined by:

Weekly Quizzes	25%
Journal	20%
Worksheets and Abstracts	40%
Oral Presentation	15%
Lab journals	100%

A pre-lab assignment will be distributed (with the relevant lab manual pages) one week in advance of each experiment. Pre-lab must be completed before coming to lab. Each week, there will be a quiz based on the pre-lab assignment and/or the previous week's experiment. Your Lab Journals may be graded at any time without prior warning.

You will often be required to write a one-page (double spaced) abstract of the experiment, written independently from your lab partner (or anyone else). As a reminder, abstracts must define the purpose of the experiment, the methodology of the experiment and the analysis, a discussion of possible sources of error, and numerical results. Be sure to also include a final interpretation of the results (i.e., a conclusion). A copy of the abstract should also be typed and stapled or taped into your lab notebook.

Finally, at the end of the semester, you will be required to make an oral presentation based on one of your experiments. This presentation will be graded on physics (doing the experiment correctly and understanding it), content (correctly identifying the most important elements of the experiment), visual support (showing graphics that are helpful, clear, and not distracting), oral quality (speaking loudly enough without mumbling, making eye contact), and your ability to ask relevant questions of the other speakers.

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What is the lab schedule? Labs will meet on the following days:

Lab 0:	**Introduction**	**Aug 31**
	Labor Day – no labs this week!	***Sep 7***
Lab 1	**Index of Refraction of Glass/Lenses**	**Sep 14**
Lab 2	**Polarization of Light**	**Sep 21**
Lab 3	**Ultrasonic Interference and Diffraction**	**Sep 28** **Oct 5**
	Fall Break	***Oct 12 – Oct 13***
Lab 4	**The Speed of Light**	**Oct 19** **Oct 26**
Lab 5	**Permittivity of Free Space**	**Nov 2**
Lab 6	**The Bohr Atom**	**Nov 9**
Lab 7	**The Michelson Interferometer**	**Nov 16**
Lab 8	**Blackbody Radiation**	**Nov 23**
	Thanksgiving Break	***Nov 25 – Nov 27***
Lab 9	**Photoelectric Effect**	**Nov 30**
Lab 10	**Chaos – Computer Simulation**	**Dec 7**
Lab XI	**Review**	**Dec 14**
	Oral Presentations	**Thu, Dec 17, 3:30pm**

Also, your assigned lab partners are listed on the course web site. Note that you'll have a different partner each week. To determine your lab partner(s) for any experiment, find the row corresponding to your name, and then scan across until you find the number of the lab you are performing (as listed above). The name above this number is your partner. If an experiment number is colored pink, then you will make an oral presentation on your work for that experiment on December 17.

Learning Outcomes

At the end of this course, students will:

- Gain proficiency in the use of symbolic analysis and uncertainty analysis
- Gain proficiency in the use of numeric/computational analysis and uncertainty analysis
- Gain proficiency in careful laboratory practice, including the ability to use several kinds of scientific instruments
- Gain proficiency in data organization
- Gain proficiency in oral and written communication of lab work