SUNY at Geneseo, Dept. of Physics & Astronomy

Physics 226: Optics and Modern Physics Laboratory

section 2, spring 2003

Syllabus

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Course Website: http://www.geneseo.edu/~mclean/SophLab/

Learning Outcomes

As a result of taking this course, the student should be able to …

1. … list and explain characteristics of a useful lab notebook.
2. … skillfully use specific lab equipment introduced throughout the semester.
3. … demonstrate understanding of wave phenomena (propagation, interference, and diffraction), geometric optics, light polarization, spectroscopy, and radioactive decay.
4. … explain why the photoelectric effect, atomic spectra, and electron diffraction are evidence for the quantum nature of matter.
5. … describe the defining properties of chaotic behavior.

Times and places:

Labs: in Greene 236, Tues. 1:00–4:00pm.

Office hours: Mon. 1:30–2:30pm, Wed. 9:30-11:30am, and Thurs. 2:00–3:30pm.

I am also available at other times. See the schedule on my web site. Just stop by my office, or, if you want to ensure that I'll be there, contact me by phone or email.

Required materials:

Two quad-ruled lab notebooks, with supplied labels attached to the front.

A 3-ring loose leaf binder. The lab manual will be distributed part-by-part as we progress through the semester, to be collected into the binder.

Pen: all writing in the lab notebooks should be in pen.

Supplementary resources:

Your texts from Analytical Physics I, II, and III will be useful sources of background theory.

Required coursework and grading:

Each of the 12 labs will carry equal weight, graded based on the following components:

20% Quizzes: Every lab, based on the Pre-Lab Assignment in the lab manual, and possibly on work from the previous week's lab.

20% Lab Work and Effort: Completion of tasks with appropriate care and attention to detail.

60% Work done in lab notebooks, broken down as:

- 25% Analysis and Calculations: Appropriate and accurate analysis of raw data in order to extract the desired physical measurements.
- 25% Lab Summary: One-page brief report on the lab, as per lab manual.
- 10% Presentation: Overall organization and clarity of work in notebook.

A concluding Oral Presentation will have the same weight as a lab, graded for accuracy, organization, clarity, and NOT slickness.

- ***Completed lab books (with data, analysis, and lab summary) are due by 5pm on Friday of the same week as the lab was performed. Late work will be penalized 20% per business day (2.5% per hour, eight hours per day).***

- ***All experiments are performed as teams. Each student must submit his or her own work. Data, calculations, and results will presumably match your partner's, notebooks will be separately evaluated, and Lab Summaries must be written independently.***

Schedule

Date	Lab
Jan 28	Introduction
Feb 4	Speed of Waves
Feb 11	Ultrasonic Interference and Diffraction
Feb 18	Speed of Light in Glass: Geometric Optics
Feb 25	Speed of Light in Vacuum: Permittivity of Free Space
Mar 4	The Michelson Interferometer
Mar 11	Polarization of Light
Mar 18	Photoelectric Effect
Mar 25	SPRING BREAK
Apr 1	Black Body Radiation
Apr 8	Bohr Atom
Apr 15	Electron Diffraction
Apr 22	Radioactive Decay
Apr 29	Chaos: A Computer Experiment
May 6	Oral presentations