

**Modern Physics Laboratory (Phys 1426)
Spring 2008**

Instructor: X.L. Wu

Office: G-10 Allen Hall
office hours: 10 AM – 6 PM M-F
email: xlwu@pitt.edu
office phone: 412-624-0873

TA: Jeff Wuerschell

Office: Allen 514
office hours: MW 1:30-3 PM
email: jkw14@pitt.edu
office phone: 4-1537

Lab Manager : Jay McDonald

office: 329 OEH
office hours: 9 AM – 4 PM M-F
email: jpmcd@pitt.edu
office phone: 49030

TA: Liming Liu

office: Allen G10
office hours: TH 4-6 PM
email: lil40@pitt.edu
office phone: 4-7860

Objectives:

This course is aimed at training students in the area of experimental physics. Even for those students who are more inclined towards theoretical physics, this part of training is indispensable. The course is organized in such a way that it offers students a great deal of flexibilities in determining the progress of their projects; a typical student will decide what experiments to perform, what approach to use, and the amount of time he/she would like to devote to the project. Although the standard lab hours are from 1-4 every Thursday afternoon, students are welcome to conduct measurements in other times during a week. Students are required to do independent reading, to think deeply about the physics behind the measurements, to analyze the data, to reach their own conclusions, and to write up the report. Some of the experiments are relative short but may have deep implications for physics. If one just simply goes through the motion, it can be done very quickly. However, this defeats the purpose of the experiment. For each experiment, therefore, we invite the students to go beyond what is described in the instruction manual and to be creative in the measurements and in the discussion of experimental results.

Policies:

Students are expected to do three lab projects during the semester, plus the introductory project on data analysis. Because of limited resource and unusually large class this term, students are encouraged to work in pairs. It is possible for more than two students to work in a group, but you have to get the permission from the instructor. For each project, each student is expected to submit a lab report that is not a duplication of others, though the data can be shared within the group. Failing to hand in a report for a lab on time will drop your final grade by one letter grade.

The following are strict deadlines (no late lab reports accepted!):

Jan 10, 17: data analysis project. The writeup is due on Jan 31.

Jan 24, 31, Feb 7, 14: Project 1. The writeup is due on Feb 21.

Feb 21, 28, Mar 6, 20: Project 2. The writeup is due on Mar 27 (Mar 9-16 break).

Mar 27, Apr 3, 10, 17: Project 3. The writeup is due on Apr 24 (School ends on Apr 26).

Schedule for W-option: The first draft of first W-option paper is due on Feb 21.

The final draft of the first W-option paper is due on Mar 6.

The first draft of second W-option paper is due on Mar 27.

The final draft of the second W-option paper is due on Apr 10.

There will be a final exam on the lecture material during the final week (Apr 21-26).

Grades: The data-analysis project counts 15%, the three lab reports count 75% (25% per lab), and the final exam counts as 10% of the total grade.

Regular lab reports will be graded on the basis of clarity (explain what the experiment is, what you did, and what you found), and correctness of analysis. New ideas, extra analysis, etc. can earn bonus points.

W-option: Two lab reports should be written in the format of the American Journal of Physics, available online from the Pitt library site and handed in according to the schedule above. Papers will be graded on style and correct journal format (references, etc.). The two weeks interval between the first draft and the final draft allow editorial suggestions.

Available Experiments:

I. Resonance;

RF cavity,	318 OEH
Acoustical rectangular cavity,	318 OEH
Acoustic cylindrical thermometer,	318 OEH
Electron Spin resonance	302 OEH
Pulsed NMR	318 OEH

II. Nuclear;

Muon decay,	315 OEH
Mossbauer,	318 OEH
Gamma Ray Spectroscopy	318 OEH

III. Electronics;

Electrical noise,	318 OEH
Phase Lock Loops,	318 OEH
Chaos,	318 OEH

IV. Optics;

New Optical Fabry Perot Interferometer,	302 OEH
New Stellar Interferometer,	314 & 306 OEH
FTIR	314 OEH
Single Photon Interference	315 OEH

V. Miscellaneous;

Quadrapole mass spectroscopy,	318 OEH
Black Body radiation,	315 OEH
Fluorescence decay with a laser diode	306 OEH
Acoustic Optics Modulator,	306 OEH
Pulses RF Ultrasonics.	306 OEH