

PHYSICS 490 - ADVANCED LABORATORY I

This is a 2-unit general course in experimental physics for senior physics majors. We will cover measurement and data analysis techniques, computer methods for data acquisition and analysis, and the presentation of scientific results. Each week there will be one hour of lecture, three hours of laboratory and computer work, and assigned homework.

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Course Web Page : www.physics.sfsu.edu/~lockhart/courses/phys490.html

Office hours to be announced in class + other times by appointment. You are encouraged to make use of my office hours. Small gaps in understanding can be easily corrected if taken care of promptly, but can lead to much greater difficulties later if ignored.

Texts: Required: J.M. Lockhart, *Modern Data Acquisition and Analysis* (Abridged Edition, 2009)

– Sold by P/A Club

Laboratory Notebook. National # 43-591 or #53-108 or equivalent.

(Must be bound, with numbered pages.)

Recommended: Pratap, *Getting Started with MATLAB 7* (Oxford, 2005).

Readable and useful. You would not absolutely need this if you are already familiar with MATLAB or IDL.

MATLAB Student Version, Release R2009a for Windows. This is somewhat expensive (\$99), but it does include the Signal Processing and other Toolboxes. Older versions are usually available (e-bay, etc.) which may meet your needs.

Prerequisites: Phys 320, Modern Physics and Phys 321, Modern Physics Lab. CSC 309 or 210 (UNIX and C) recommended. (CSC 309 is the better course for science students).

Requirements: You are expected to attend all lab sessions. You must maintain a lab notebook in which you record all your lab work. There will be weekly homework assignments associated with the lecture material. You will need to complete two “individual” experiments with short (3-4 page) written reports, one experiment with a publication quality report (6 or more pages), and several lab exercises (one of which will require a short report). You will also make a short Powerpoint presentation on an experiment.

Grades: Grades will be assigned according to the following approximate percentages: Lab notebook and exercises, 30%; homework, 20%; written reports, 35%; oral presentation 15%.

Learning/Skill Objectives: Development of understanding and ability in (a) Data Reduction & Error Analysis; (b) Computerized Data Analysis & Plotting; (c) Laboratory Instrumentation & Measurement Techniques; (d) Computerized Data Acquisition; (e) Preparation of Scientific Reports; (f) Preparation of Oral Presentations

Cheating/Plagiarism: All work you submit must be your own, or must be credited to the original author. You may work in a group on an experiment, and thus share data, but your report must be your own work. Any material copied or paraphrased from books, journals, or on-line resources (including figures) must

credit the original source. See the Physics and Astronomy Dept. Plagiarism policy on <http://www.physics.sfsu.edu> under *Department Policies*

Withdrawals: See the Dept. withdrawal policy on <http://www.physics.sfsu.edu> under *Department Policies*

Disability Accommodation: Students with disabilities who need reasonable accommodations are encouraged to contact the instructor. The Disability Programs and Resource Center is available to facilitate the reasonable accommodations process. The DPRC, located in SSB 110, can be reached by telephone at 338-2472 (voice/TTY) or by e-mail at dprc@sfsu.edu.