INTERMEDIATE LABORATORY I - PHYS 3870

SYLLABUS

Fall 2015

It is important that students bring a certain ragamuffin barefoot irreverence to their studies; they are not here to worship what is known, but to question it. *–Jacob Bronowski, The Ascent of Man*

Class: 11:30 - 2:20 MW SER 109/132/138 http://physics.usu.edu
Instructor: JR Dennison, Physics Department SER 222D (435) 797-2936 JR.Dennison@usu.edu
Office Hours: *During lab time, MW 11:30-2:30, or by appointment*
Assistants: Jonathan Price SER 209 jonathanprice1@live.com
Class Web Site: http://www.physics.usu.edu/dennison/3870-3880/IntermediateLab.htm

Prerequisites: *General Physics* (PHYS 2210 and 2220), *Introduction to Modern Physics* (PHYS 2710)
Introduction to Computer Methods in Physics (PHYS 2500).
Students will not be admitted without the prerequisites without explicit permission from the instructor.

Objectives: This course is intended to address all five goals for physics laboratory courses identified in the AAPT *Goals of the Introductory Physics Laboratory* handout. During this semester, particular emphasis is placed on: (1) experimental and analytic skills including experimental techniques, computer interfacing, data analysis, and error analysis; and (2) developing collaborative learning skills through work with a lab partner. In addition, written and oral communication skills are stressed.

Texts:
J. R.Taylor, An Introduction to Error Analysis, 2nd ed. (Univ. Science Books, Mill Valley, CA, 1997). **REQUIRED**
D.C. Baird, Experimentation: An Introduction to Measurement Theory and Experiment Design, 3rd ed. (Prentice-Hall, Englewood Cliff, NJ, 1995). **RECOMMENDED**
AIP Style Manual, 4th ed. (Am. Institute of Physics, New York, 1990). **Available via web site**
MathCAD Version 14, (Mathsoft, Cambridge, MA, 2007). **RECOMMENDED COMPUTER ANALYSIS PROGRAM** Available for purchase or in SER 109, 132, 138.
Additional references are listed in the attached *Annotated Bibliography*.

Notebook: A bound Lab Notebook is required. All data, notes, calculations and scratch work should be kept in the notebook.
NO EXPERIMENT WILL BE ACCEPTED UNLESS IT IS RECORDED IN A NOTEBOOK

Grading: Problem Sets (25%): Turn in all even numbered problems on error analysis listed on the attached *Assignment Sheet*. You are encouraged to use *Mathcad* to solve these problems. *Mathcad* solutions to the odd numbered problems will be posted. A penalty will be imposed for late assignments.
Experiment Reports (75%): Reports for each of three experiments will count 25% of the total grade. Reports must be turned in before beginning the next experiment. You may revise either of the first two reports, based on instructor comments, and receive the average grade of the two marks for the final grade for the experiment. *There will be a half letter grade penalty for each class period the report is late. Grades may also be reduced if the lab and equipment is not left clean and orderly.* A *Lab Report Grade Form* is available.

Assignments: There will be a series of eight lectures during the first six weeks of the semester. Reading assignments and problems are listed on the attached *Assignment Sheet*. Lab partners and experiment selection will be determined during the second week of classes. A *Schedule of Experiments* will be posted during the third week of classes. Partners will schedule meetings with the instructor outside class to preview experimental proceedures.

Complete three experiments on the topics of your choice from the attached *List of Experiments*. The experiments are designed to take about eight hours each for data collection. Experiments should be performed in pairs. One experiment will require a brief report (four page limit). One experiment will require full report (no page limit). The final report format is an oral presentation prepared jointly by lab partners. Refer to the handouts *Content of Lab Reports* and *Descriptions of Experiments* and *Poster Preparation* for further details.

Disability Resource Center: Students with ADA-Documented physical, sensory, emotional or medical impairments may be eligible for reasonable accommodations. Veterans may also be eligible for services. All accommodations are coordinated through the Disability Resource Center (DRC) in Room 101 of the University Inn. (435)797-2444 voice, (435)797-0740 TTY, (435)797-2444 VP, or toll free at 1-800-259-2966. Please contact the DRC as early in the semester as possible. Alternate format materials (Braille, large print or digital) are available with advance notice.

Honor Code: The honor code will be strictly enforced in this course. Any suspected violations of the honor code will be promptly reported to the honor system. For more information please visit: http://www.usu.edu/policies/PDF/Acad-Integrity.pdf

Class Fee: A $40 fee per semester is charged for this class to help cover the expenses for expendable supplies and computer usage. Please be aware that the equipment used in this lab was acquired over many years, at a cost well in excess of $250,000; please treat it with appropriate care and respect.