

Intermediate Laboratory – Phys 3870 Schedule, Fall 2007

Week	Day	Lecture	Assignment Deadlines
1	M W	Aug 27* Aug 29*	Introduction, Experiment Design Error Analysis, Uncertainty, Error Propagation Class
2	Sep 03 Sep 05*	Labor Day / No Class Statistical Analysis Class	HW #1 Due
3	Sep 10 Sep 12	Error Experiments A & B (Lab Book Needed) Error Experiments A & B	
4	Sep 17 Sep 19	Error Experiments A & B (conclude) Introduction to Lab and Lab Book Notes	Exp A and B Reports due
5	Sep 24 Sep 26*	Experiment 1 (start) Rejection of Data and Linear Regression Class	
6	Oct 01 Oct 03	Experiment 1 Experiment 1	HW #2 Due
7	Oct 08* Oct 10	Nonlinear Regression and Chi-squared Test Class Experiment 1	
8	Oct 15 Oct 17	Experiment 1 (Conclude) Experiment 1 (Catch up day)	HW #3 Due/Lab Book Check
9	Oct 22 Oct 24	Experiment 2 (Start) How to write a report Experiment 2	Lab book returned
10	Oct 29 Oct 31	Experiment 2 Experiment 2	
11	Nov 05 Nov 07 Nov 09	Experiment 2 (Conclude) Experiment 2 (Catch up day)	First Report Due (Exp 1 or 2)
12	Nov 12 Nov 14	Experiment 3 (Start) Experiment 3	
13	Nov 19 Nov 21	Experiment 3 Thanksgiving Break / No Class	
14	Nov 26 Nov 28	Experiment 3 Experiment 3	
15	M W F	Dec 03 Dec 05 Dec 07	Experiment 3 (Conclude) Experiment 3 (Catch up day) No Exceptions!! – This means you!!
			Second Report Due (Exp 3)

* Classes to be held in Physics Conference Room 244, 08:30 to 10:30 am

Homework: Reading, problems and schedule:

HW #1: Taylor: 2.2, 2.3, 2.8, 2.9, 2.17, 2.19, 2.24, 2.26, 2.28, 3.3, 3.7, 3.11, 3.18, 3.40, 3.46 (*due 5 Sept.*)

Reading: Taylor: Preface and Chs. 1, 2, and 3

HW #2: Taylor 4.5, 4.9, 4.13, 4.17, 4.23, 4.28, 5.12, 5.14, 5.35

Reading: Taylor: Chs. 4 and 5. (*due 3 Oct.*)

HW #3: Taylor 6.2, 8.2, 8.7, 8.20, 8.24 (use 1/rad/sec for ω), 8.25, 9.9, 9.15, 12.2, 12.7

Reading: Taylor: Chs. 6, 8, 9, and 12. (*due 17 Oct.*)

Note: Hand in all **even numbered** problems for marking.

PHYS 3870 - Intermediate Laboratory I
Fall Semester 2007
Other Important Information

Instructor: Mike Taylor

e-mail: mtaylor@cc.usu.edu

Phone: 797-3919

Office: SER 220C

Office hours: During laboratory time or by appointment

Lab TA: Addison Everett

Laboratory Times: 08:30 – 11:20 am, M,W

Location: SER 109

Web Information: www.physics.usu.edu (syllabi/homework/3870)

Error analysis classes: Physics Conference Room 244.

8:30 to 10:30 am

See attached Schedule for dates.

Laboratory classes:

- Access to the Lab will be via a card reader. Please bring your Student Card to class (on Wed 29 Aug.) to be scanned in (card will be returned to you by end of class).
- You may access the lab outside of class hours **any time you wish**. Please do not use computers for personal usage. Remember we know who is logged into the lab!

Safety:

Lab environments can be dangerous if you do not take simple precautions and obey common sense rules of good practice when using electrical equipment. Electric shocks can be very serious. Please be very careful as you build your experiment and make your experimental measurements.

Always work with your partner and never perform work alone.

Course Prerequisites:

- General Physics (PHYS 2210 and 2220)
- Introduction to Modern Physics (PHYS 2710)
- Introduction to Computer Methods in Physics (PHYS 2500) or the MathCAD component of PHYS 2710.

Course Objectives:

This course is intended to develop good experimental practices in the laboratory (as identified in the “AAPT Goals of the Introductory Physics Laboratory”). During this semester particular emphasis will be placed on:

- Gaining experimental and analytical skills
- Learning how to perform quantitative error analysis
- Developing experience with well founded experimental procedures
- Data analysis
- Developing collaborative learning skills through work with your lab partner
- Developing the basics for good report writing and communication skills.

Course Texts:

J.R. Taylor, An introduction to Error Analysis, 2nd ed. (University 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).

AIP Style manual, 4th ed. (Am. Institute of Physics, NY, 1990). (Lab copy).

Recommended Computer Analysis Programs:

MathCAD Version 11, (2003) *or* MathCAD Version 6.0 (1998), Available in SER rooms 109 and 231 (see Shelley in SER 250 for key).

Laboratory Notebook:

A bound Laboratory Notebook is **REQUIRED** for this course. All data, notes, calculations and scratch work must be kept in your notebook.

Laboratory Attendance:

This is mandatory for each experiment until it is finished. You may also attend the lab (with your partner) at other additional times if necessary.

Note: There is a lab fee that supports the maintenance of the equipment that you will be using.

Course Grading:

This class is divided into several parts:

Error analysis: (20%)

This will be determined by your three homework scores.

Error Analysis Experiments: (20%)

This will be determined from two basic lab experiments (10% each).

Laboratory experiments: (60%)

This will be determined from your two laboratory report scores.

Note: Your Laboratory Notebook will also be inspected for content.

Homework:

- Turn in all **EVEN NUMBERED** problems on error analysis listed in the attached “Assignment Sheet” on (or before) the dates specified.
- You are encouraged to use MathCAD to solve these problems.
- Solutions to the odd numbered problems will be made available.
- A penalty will be imposed for late assignment.

Experiment Reports:

- You will perform three experiments, but will write reports on two of them. Each report will count for 30% of your total grade.
- Following completion of your first experiment your lab book will be marked (hand in Wed 17 Oct, returned back Mon 22 Oct).
- You will first write a brief report (3-4 pages) on Experiment 1 or 2 (your choose which). (Report due Mon. 9 Nov. at start of class).
- Based on the instructor’s comments you may revise this report and receive the average grade of the two marks for your score.
- Your third experiment will be also written as a brief report (due Friday 7 Dec.). (Hand in to MJT in SER 220C by 5:00pm)
- A penalty will be imposed for late reports! Your grades may also be reduced if your lab equipment is not kept clean and tidy.

Competency Test:

You must also complete and submit the self-paced competency tests of MathCAD Data Analysis and Science Workshop Computer Interfacing I, II, and III unless you have already completed these in PHYS 2500 and receive a written waiver from the instructor.

Course structure and assignments:

Error Analysis: (20%)

- There will be a series of 5 lectures distributed during the first 6 weeks of the semester.
- Reading assignments and three sets of homework problems are given in Course Schedule together with their due dates.

Error Analysis Experiments: (20%)

- You will perform two basic error analysis experiments to aid your understanding of how to quantify errors in physical measurements. You will summarize your results and error calculations in two short (up to 2 page) reports that will be marked.

Laboratory Experiments: (60%)

- You will complete **three experiments** on the topics of your choice.
- Eight experiments are available to choose from. Each is designed to take about 8 hours for data collection. You have 5 lab periods (~15 hours) to complete each experiment (with an additional catch up day).
- Refer to “Description of Experiments” for details on experiments and please consult with TA or Lab Instructor to help with your selection.
- You are also required to choose a **lab partner** for each of the experiments.
- Please complete your “**Lab Selection Sheet**” with a prioritized list of experiments and indicate a preferred partner. Be sure to include at least two alternate experiment selections.
- Lab partners and your experiment selection will be made during the first week. (Hand in your Lab Selection Sheet during 2nd class).
- A “**Schedule of Experiments**” will be posted in the Lab during the 2nd week of classes.

Good experimenting and enjoy the class!

<p>Disability: If you have a disability which requires accommodation in order for you to take this class, please contact me. This disability must be documented by the Disability Resource Center.</p>
