SYLLABUS FOR PHY-122: University Physics I Laboratory
FIRST SUMMER SESSION, 2005
INSTRUCTOR: Dr. Gary B. Adams
OFFICE: PSF-430 PHONE: 727-6511
E-MAIL: gary.adams@asu.edu

OFFICE HOURS:
Daily (except for examination days) 11:40-1:20 PM (in the Help-Study Room)

I. INTRODUCTION

PHY-122 is the 1-credit laboratory course accompanying PHY-121, University Physics I, which covers the subject of Introductory Mechanics. PHY-121 must be taken at the same time as (or either before) PHY-122.

For logistical and economical reasons the material covered in the two courses is not coordinated in time. The expectation is that, over the course of the term, material learned in one course will enhance the understanding of the material received in the other.

The manual for this laboratory is online at
http://www.public.asu.edu/~gbadams/sum05/122syll.html
You are responsible for downloading these pages, reading them beforehand, and bringing them with you to the appropriate lab. DO NOT PRINT OUT YOUR LABS ON THE PRINTERS IN THE LAB ROOMS. These files are in pdf format.

II. COURSE FORMAT AND POLICIES

A. Schedule

The course during this Summer Session commences on Tuesday, May 31 and concludes on Thursday, June 30. There are no Monday sessions and each section will have an additional six days on which it does not formally meet. Four of these days are reserved for "make-up and final interviews" as described below. A schedule of experiments and meeting dates is distributed with this Syllabus. Laboratory Sessions are scheduled on Tuesday - Friday from 10:40 AM until 12:30 PM or from 12:40 PM until 2:30 PM. IMPORTANT NOTE: NO FOOD OR DRINK IS ALLOWED IN THE PHYSICS LAB ROOMS.

Help-Study sessions are for the students’ benefit in gaining assistance with the conceptual and procedural basis of an experiment. The Help-Study Hall (PSH-462) will be staffed by the Instructor and Teaching Assistants from 11:00 until 3:00 PM each day except on PHY-121 examination days (June 7, 15, 23, and
July 1). Teaching Assistants will not otherwise keep office hours except by appointment, but will alert their respective sections to the hours which they will be present in the Help-Study hall. However, assistance may be solicited from any member of the course staff on duty. The Summer Session lab TA’s are:

Liang Gao       Liang.Gao@asu.edu
Razieh Behkam   Razieh.Behkam@asu.edu
Rui Cao         Rui.Cao.1@asu.edu

B. Laboratory and Grading Policy

There are six experiments scheduled for the term. In order to obtain a passing grade (D or better), a student must have completed five of these. An A grade requires completion of all six.

The laboratory format is based on cooperative learning. Students will work together in teams of three or four. Teams will be organized by the section TA at the beginning of each set of two experiments; thus, during the term each student will have three sets of teammates.

Your personal grade for each lab will consist of three parts: (1) the team write-up of the lab, 65 points, (2) the team performance on the lab interview, 30 points, and (3) your personal performance at the lab interview, 5 points. Part 1, the team write-up of the lab, will consist of the data, the analysis, and the conclusions, which must be prepared prior to the interview in an acceptable format (see below under Presentation of Results). This team write-up must be presented at the beginning of the team interview; if your conclusions are not reasonable, your team may be sent back to your lab table to reconsider the lab analysis.

During the team interview, Part 2 of your personal grade, each team member will be asked one or two questions. Questions are asked to the individual team member, not to the team as a whole, and each individual must answer ALONE without prompting from other members of the team; so, no matter how you decide to divide up the tasks of the lab among your team members, it is the responsibility of the team to make sure that every team member knows all the relevant points of the lab before the interview begins. Part 3 of your personal grade (5 %), depends on your individual performance on your question (or two questions) during the interview.

Roughly, in the interview and on the team write-up, major issues or questions are worth 10 points and secondary or smaller issues are worth 5
points. For example, though it is not the purpose of the lab, in the course of the first lab everyone should learn to use a vernier caliper. Failure of a team member to demonstrate this skill properly during the interview would cost the team about 5 points (plus the individual would lose the 5 points of his or her personal grade). Another question that might be asked for the first lab is, given a data set, find the standard deviation and the absolute error or uncertainty in the mean value. Learning this skill is a primary goal of the first lab and failure to demonstrate this skill in the interview would cost the team about 10 points (plus the individual would lose the 5 points of his or her personal grade). Similarly, in the team write-up for the first lab you are required to propagate errors in measurements of length into errors in volume. Failure to clearly demonstrate correct error propagation in your written analysis (or in the course of the interview) would cost the team about 10 points. On the other hand, smaller mistakes, like failing to properly label axes on graphs or giving a final answer with relative error instead of absolute error, might cost only 5 points or less.

Your final lab grade will be the average of your six personal lab grades with:

\[ A \geq 90 \quad B = 80 - 89.9 \quad C = 70 - 79.9 \quad D = 60 - 69.9 \quad E < 60 \]

The plus-minus grade scale will be used; but the plus-minus cutoffs will depend on the final distribution of grades (for example 87.6–89.9 would be a typical range for B+). Completion of less than five labs is an automatic E.

C. Data Recording

Data are to be recorded in **ink** on \(8\frac{1}{2}\times 11\) quadrille sheets (5 × 5). Team members should share the cost of a pad of quadrille paper (AKA engineering paper). These are to be no erasures or "white-outs". Errors are to be lined out. At the end of each laboratory period or the conclusion of the experiment, each data sheet is to be dated and initialed by all team members and section TA. Data should be recorded in tabular form with well-labeled columns, or otherwise distinctly entered onto the data sheet. The data may be transferred to computer spreadsheets for analysis if the team so desires. For your own protection, you may wish to make at least one photocopy of all signed data sheets (it is certainly a bad idea to have only one copy of your data).
D. Presentation of Results

Under the interview structure and in light of the summer’s compact schedule, no individual formal written lab reports are required. However, the data are to be analyzed, with full attention to experimental and statistical uncertainties (except when explicitly excused) and the results are to be presented in tabular and/or graphical format as appropriate. There must be a clearly written description of the analysis process complete with pertinent equations. If your calculations are done with a spreadsheet, or with graphical analysis, you must show one example of each calculation in your written analysis. BE SURE TO STATE YOUR CONCLUSIONS PROMINENTLY AND CLEARLY. It is expected that most reports will be handwritten on engineering paper, but word-processed reports are acceptable. All these documents, as well as the original raw data sheets (initialied and dated), are to be presented at the interview.

E. Scheduling of Interviews

Most interviews will occur during the last hour or so of the second day on which the particular experiment is scheduled (see the calendar schedule sheet) on a first-come first-served basis. Teams that need to revisit the experiment and/or repeat their interview can do so in the "MAKE-UP AND FINAL INTERVIEW" period during the third day of the experiment cycle. Interviews normally will last no more than ten or fifteen minutes. NOTE that summer labs 3 and 4 must be completed, including interview, in two lab periods.

F. Relation to Lecture

The Department of Physics cannot afford to stock sufficient equipment to allow all students to conduct the same experiment at one time. Therefore, it is impossible to coordinate closely the laboratory work with material covered in the PHY-121 lecture. Consequently, some students may encounter a physical principle in the lab before learning about it in lecture. This is not necessarily a bad ordering of the learning process; many prefer it. On the other hand, some students may wait for a week after learning the physics theory before doing the relevant experiments. In either case, it is expected that material encountered in each course will eventually be reinforced by material from the other course in such a way as to enhance understanding.

Beginning May 31, this information, plus course info updates, will be available on the internet at http://www.public.asu.edu/~gbadams