

Physics Department, California State Polytechnic University, Pomona



Physics 121L

Section 14

Fall 2003

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Course Description: Physics 121L is the laboratory that accompanies Physics 121, the first of a three-quarter, algebra-based introductory sequence in physics. This quarter the primary content is classical (or “Newtonian”) mechanics. The laboratory exercises in this course are intended to provide 1) hands-on experience with the natural phenomena of concern in Physics 121, 2) practical experience with measurement and the analysis of uncertainties in experimental work, and 3) opportunities to develop your skill in communicating the results of experimental work in the form of laboratory reports.

Course Homepage: The course homepage is at <http://www.csupomona.edu/~ajm/classes/phy121l/>. Please go to this web page as soon as possible (*definitely* before the second class meeting) and download and print out the following four documents:

- 1) “Format Details and Scoring Guide for Laboratory Reports”
- 2) “Sample Lab Writeup”
- 3) “Lab Report Self Evaluation”
- 4) “Quiz 0”

Please bring the completed “Quiz 0” with you to the second class meeting. (See course schedule.)

Conditions of enrollment: This course is to be taken with Physics 121.

Laboratory Manual: The Physics 121L/131L Laboratory Manual is available at the Bronco Bookstore.

How to get help: My office hours are Mondays 11:40-12:10 & 2-3, Tuesdays 1:30-2:30, Thursdays 3:45-4:45, and Fridays 11:40-12:10. I will also be in the Physics Department Tutoring Center (3-213) on Thursdays 1:30-2:30. You can also come to see me during my other lab class, Physics 131L on Tuesdays from 8-10:30 as long as you recognize that I will need to attend to my lab students’ needs first. If you can’t come during any of these hours, I will be happy to make an appointment with you for another time. For me, *the* most enjoyable aspect of teaching is working with students one-on-one. *Please, please* come see me often.

Note: The Physics Department welcomes students to take advantage of *any* faculty member’s posted office hours whenever they are not being used by the faculty member’s own students.

Lab Procedures: Each week you will work on a new laboratory exercise with one or two lab partners. Although it is sometimes difficult to fully understand the lab procedures until you are in the lab with the equipment, it is important that you spend about a half hour looking over the introductory material and the experimental procedures in the lab manual in order to understand the purpose of the laboratory exercise and something about the procedures *before* the lab period. Otherwise you will waste very precious time trying to figure out what to do *during* the lab period.

After a quiz at the beginning of most lab periods I will spend some time calling your attention to certain features of the equipment and procedures and, occasionally, modifying some of the specific instructions given in the manual. Then you and your lab partners will spend the rest of the period gathering data and analyzing it. In many if not most cases you should be able to finish your analysis before leaving the lab.

Keep all of your lab notes, data, results, written summaries and/or reports, and quizzes in a notebook. It is to your advantage to keep your notebook as well organized as possible because it may be used during quizzes and the lab final.

For three of the labs you will write brief, semiformal reports to be submitted the following week.

Attendance and In-Lab Evaluations: Physics department policy is that all students must complete the requirements for at least 7 of the 8 laboratory exercises in order to pass this course. Beyond that, a portion of your lab grade will result from my evaluation of your work in the lab. I am interested in things like (1) whether you are an active partner in the lab work, (2) how well you monitor the condition of your experimental apparatus while taking data, (3) whether you think about the reasonableness and/or perform approximate analyses of your data as you go to avoid wasting time on subsequent measurements that are clearly wrong, and, (4) *most importantly*, what you do with the extra time when you finish taking your data. This time should *always* be used to complete the analysis of your data; it is the rare case in which data analysis does not reveal errors of some sort and there is no way to fix them at home.

Quizzes: Most weeks, at the beginning of the lab period, I will give a brief quiz. The quizzes are primarily intended to probe your understanding of the previous week’s work. They will have questions about the purpose, procedure, and results of the laboratory exercise and may ask you to do partial analyses of typical data with uncertainties. They may also have very

basic, “have you come prepared” type questions about the laboratory exercise to be performed that day. In order to allow for extraordinary circumstances (*including* absence for *any* reason), I will throw out your two lowest quiz scores.

Reports: You will produce brief, semiformal reports for three of the eight laboratory exercises. Spend some time reading the handout, “Format Details and Scoring Guide for Laboratory Reports,” where you will find detailed information about my expectations for report format, the criteria I will use when scoring reports, and the meaning of cryptic marks that I make on your reports. Also, spend some time looking over the “Sample Lab Writeup” for a concrete example of the style I am requesting that you use.

Please attach a “Self Evaluation” to the front of each lab report that you submit.

Reports are due at the beginning of the following lab period. Late reports will be accepted but will be penalized approximately 20% for each week or fraction thereof. I will not accept incomplete reports; they will be returned to you and counted as late when they are resubmitted. In any event, all reports must be submitted before noon on Wednesday of final’s week. In determining the “report” portion of your lab grade I will consider only your *two best* and/or *most timely* reports.

Lab Final: A lab final given during the makeup period during the final week of classes will probe the following things: (1) How well you have understood the purpose, procedure, and results of the laboratory exercises, (2) how clearly you have documented those items in your notebook, (3) your ability to propagate uncertainties through calculations, (4) your ability to construct graphs from data and to determine and interpret slopes and intercepts of linear fits to the data. Remember that you will be allowed to use your lab reports during the quizzes and the lab final so it is distinctly to your advantage to keep it as well organized and complete as possible.

Makeup Labs: If you miss a lab you may make it up either by attending any other lab section that will be performing the same laboratory exercise (with that instructor’s approval *and* his or her signature on your data pages) or during makeup week (one laboratory exercise at most in your *regularly scheduled* lab period *only*.)

Grading: Beyond the requirement that you attend and complete the requirements for at least six of the of the seven laboratory exercises, your course grade will be based on the following items:

Quality of work in the lab	20%
Quizzes	30%
Reports	30%
Lab Final	20%

In general, if you are moderately conscientious in lab, if your two best reports average about 7 out of 10, and if you score 60 to 80% on your best quizzes and on the lab final, you should expect to earn about a B in the course. As long as you complete the requirements for seven laboratory exercises, about the only way to earn less than a C is to average less than 5 out of 10 on your best two reports and to score below 40% on your best quizzes and on the lab final.

Academic Integrity: Please make sure that you have read and fully understood the statement on academic integrity that appears in the University catalog. My sincere desire is to act as facilitator—not an enforcer—for your studies in physics. Accordingly, I operate on the assumption that all of our interactions are based on openness, honesty, and good faith. I expect all of us to be honest and to treat each other fairly and with respect. Because our trust in each other is absolutely *crucial* to the effectiveness of our relationship, I take an uncompromising stance, as should you, on the necessity for sanctions when it is violated.

Course Schedule:

<i>Date</i>	<i>Turn in</i>	<i>Quizzes/Exams</i>	<i>Laboratory Exercise</i>
9/29	Introduction to lab procedures and error analysis		
10/6	“Quiz 0”		#1 Measurements and Uncertainty
10/13		Quiz	#3 Vectors
10/20		Quiz	#2 Constant Acceleration
10/27	Report (Exp #2)		#5 Dynamics of Circular Motion
11/3	Report (Exp #4)	Quiz	#4 Atwood Machine
11/10			#6 Ballistic Pendulum
11/17		Quiz	#7 Rotational Dynamics
11/24		Quiz	#8 Static Equilibrium
12/1	Report (Exp #8)	Lab Final	Makeup