The laboratory is an essential component of this physics course. Hands-on experience in the laboratory, not possible in the lecture, lets you actually observe physical phenomena, make measurements, record and analyze data, and finally draw conclusions. This experience reinforces what you hear about in the lecture and vice versa. Remember that the main goal of the lab is not to get the experimental numbers but to understand the physics. So when you are doing the lab exercise not only should you concentrate on what to do but also think of what your are trying to study.

**Departmental Lab Policy**

In order to pass the course you must do all lab exercises including handing in the lab reports. This is the physics departmental policy and no exceptions are made. If you have to miss a lab please follow the make up policy below. If you are repeating the course and you passed the lab before please consult with your course instructor. Whether or not you need to retake the lab is up to your current lecture instructor.

Labs account for 15% of your grade.

**Pre-lab Problem/Lab Quiz**

You and your lab partners should each read and think about the lab exercises before the lab period. Otherwise you will waste a lot of time getting started. There may be a short quiz at the beginning of the lab.

**Content of Lab Reports**

Doing lab exercises is not only just following the procedures and taking data. Instead of following the procedure without thinking why you take certain procedures, you must understand why experiment is designed in a certain way. Before you make measurements you should have some ideas what you would expect. You must carefully observe what's going on and try to interpret in the light of laws of physics. Hence your lab reports should reflect your thinking process. It should not be just a collection of description of the objective, experimental procedures and data (all those should be in the part of the report) but also you must describe in sentences your observations in concise but clear manner and try to explain in terms of what you expected. Under no circumstances are you allowed to copy the data from someone else and turn in a laboratory report as if you had actually attended the laboratory session.

Your lab grades will be based on the items below. Each lab report including the pre-lab problems (or quizzes) will be graded in 20 points max/lab. Each report must include the following.

1. Your name and lab partner’s name, TA’s signature, Date. Without TA’s signature your report will not be graded.

2. The purpose of the experiment, what you perceive the points to be.


4. Experimental procedures. Your lab manual may explain these in detail. However, do not be discouraged from writing it by yourself as if you were explaining to someone. Expressing the experimental design in your own words makes you really understanding the process. Copying the lab manual or just referring should not be acceptable.

5. Measurements. Record all measurements as you make them. If you collect more than a few data, you should construct a table with enough labeling information so that you can find and interpret the data easily at another time. Do not forget to record the appropriate units for the data. You have to submit your own data sheet.

6. Graphs. When drawing a graph, be sure to make it large enough to show the details. Most graphs should be between a half and a full page in size. Label the axes with the names of variables being plotted and units used. The title of the graph should not be a repeat of axis labels. It should be more
specific and indicate under what conditions the measurement were taken. If data are expected to be on a straight line draw a best fitted line and find the slope of the graph.

7. **Computation** The details of numerical calculations need not be shown, but you should give enough steps or explanations so that the method you are employing is obvious to the reader. Sometimes a good way to do this is to include detailed arithmetic for one particular case, but you should also include a few words of explanation in any event.

8. **Conclusions** You should draw your own conclusions, where appropriate based on your experimental data. Try to see if you can see the point of the exercise. How does it relate to lecture for example. You are encouraged to discuss your findings with your laboratory partner and members of other groups. However, you should write your conclusions in your own words. Your reports will be graded on the amount of thought and care that went into them and on the logical development that you used to arrive at these conclusions. You should, of course, comment on whether your results do agree with what one would expect based on physical principles you have learned in the class. When they do, you should explain how, when they don't you should try to understand why not.

9. **Your participation** during the lab period. Were you engaged actively in the lab work? Did you contribute positively during the lab discussion? Most often your lab period will involve collaborative group learning (CGL). In CGL environment there should be no boss. Do not let your partner handle everything. Each group member plays a specific role (data taker, recorder, checker) and you should discuss the problems together for the success of the group's goal. If there is more than one part in the lab exercise the group members should exchange the roles. This method works well because we learn a lot by discussing the problems with other people. Your lab partner may see a very important aspect of the experiment that you have overlooked or you may find something your partner has missed. Try to contribute to the group. By doing so you will find you can achieve more.

**When You Miss a lab**
You may attend another section only after approval from your Lab TA and by the TA of the section you want to attend. In another words, you are not allowed to walk into other sections without TAs’ approval. Making up the lab is subject to the Lab instructor’s approval. If you have to miss the lab, please check with your lab instructor as soon as possible.

Under normal circumstances **make up labs are not allowed after two weeks from the time when the lab was initially scheduled.**

**Deadlines of Lab Reports**
The lab reports due are about three days after the lab. A cart with slots to receive lab reports is located on the second floor of Witmer Hall outside of Room 206. **Penalty for late reports is 2 point (10%) of a full grade per week late.** Lab reports will be graded and returned to you within a week. Keep all graded lab reports. At the end of the semester in case problems arise we will correct our record only if you present us the graded reports. If you do not get reports back within a week it is your responsibility to check with your lab instructor. No reports will be accepted after 5pm Monday, May 02 2005.