Physics 9B Laboratory Syllabus

I. General Information

Welcome to Physics 9B lab! Here are a few basic things you need to know about these labs:

- Lots of information about labs in general, as well as some specifics on writing lab reports is available in the Read Me page of the online lab manual. Some of the more important points will be repeated here, but it's not an overstatement to say that one cannot have a successful experience in lab without going to that page of the online lab manual early and often.
- Labs are an integral part of the course, so you are required to attend, and your lab grade will impact your overall course grade. See below for details on exactly how the lab grade contributes to your course grade.
- The lab activities are designed so that they are not "cookbook." That is, you will not be given a list of specific instructions to follow so that every experiment works out exactly as you would expect. Instead, you are given background information (most of which you will already be somewhat familiar with from lecture) and some basic criteria for what you are to explore. Then you are expected to design your own experiment, using equipment that has been set out for you. There are no "rules" with regard to how you perform your experiment, except those that protect the safety of students and equipment, and of course you have to maintain impeccable scientific integrity – no fudging data! A good example of this “no rules” approach involves the use of smartphones. Some students think that they are restricted to work only with the equipment they are given in the lab, but smartphones have capabilities (such as video recording) that can be very useful in collecting accurate data, and you are free to make the most of these devices.
- Each week of lab consists of preparatory work at home before coming into lab, punctual and consistent attendance, and active participation within your group.
- If you are new to the 9-series after taking the equivalent of Physics 9A elsewhere, it would be useful to look at the early labs for Physics 9A, where topics important to labs in general are covered. You can find these in the Physics 9A Lab Manual.

II. Online Laboratory Materials

There are three important links for the labs:

- Physics 9B Lab Web Page – This is the page where you likely downloaded this syllabus. It includes the schedule of labs for the quarter, and a list of all section meeting times and lab TAs to assist you when you may need to do a make-up lab.
- Physics 9B Lab Manual – Here you will find the 9 labs you will be doing this quarter written in the LibreTexts platform. Every lab includes a portion on background material you will need to perform the lab, and a portion that details the activities related to the lab.
- Physics 9B LibreText – This is the online textbook for the course, portions of which are required reading for lab preparation. Links to the appropriate sections for each lab are provided in the "Background Material" portion of the lab manual.

III. Weekly Routine

Every lab follows the same routine each week. First, there is preparatory work you need to do before coming to lab:

- Read the Background Material section in the lab manual for that week's lab. This material is usually a brief extension or review of material from lecture, but sometimes (and especially in the first couple weeks of 9A, where the focus is on lab-specific skills) it is completely independent of the lecture.
- Complete the pre-lab assignment for that week's lab on Canvas (it is listed as a "quiz").
- Read through the Activities section in the lab manual to get some idea of what you will be doing when you come in.

When you come into lab, it basically goes like this:

- Meet with your group. Make a note of any preliminary comments from your TA before you get started.
- Discuss how you want to proceed with your group members.
- If appropriate, do a "dry run" of a basic procedure to become familiar with nuances of the equipment before you start making "real runs."
- Perform the experiment(s), recording data and noting important details.
- Confer with group as you craft a lab report. It's okay to delegate tasks like data tables, graphs, and explanatory prose, but everyone in the group should understand every element of the lab report.
- Everyone within the group scans/photos their own copy of the lab report and submits it to Canvas. This must be done prior to leaving the lab room.
IV. Lab Report Grades

There are many grades that you can receive for your lab reports. They lie on the usual ABCD spectrum, but they are not the usual letter grades. Here is what they mean:

A. Acceptable – This is what you are striving for when you turn in your lab report.

B. Belatedly acceptable – This is also a good grade. It occurs when your first effort was unacceptable, but you made corrections and resubmitted a worthy document.

C. Conditions required for acceptability – This applies to an unacceptable report. This can be for several reasons:
   • You didn't do the pre-lab assignment satisfactorily.
   • Your group took decent data, but missed one or more important points in the analysis.
   • Something is amiss with the data collected by your group.

Your TA will indicate how your effort has fallen short, and you will be allowed to fix the problem(s). If the problem happens to be bad data, then your TA will provide a set of data for you to use, as the lab equipment will not likely be available to re-run the experiment. You are allowed to confer with your group members on this fix, or you can choose to work alone, but every individual student is responsible for clearing this grade for themselves. When the conditions are cleared, the TA will change this grade to a B.

D. Deficient, wholly unacceptable – You can receive this grade if you fail to turn in a lab report at all, or (in rare cases) when the group’s effort was abysmal. Like the C grade, this can (and must – see below) be made up. When it is made up, if there are still conditions needed for acceptability, then it can be changed to a C. If/when the make up is acceptable, then the grade is changed to a B.

Important note: The time available for fixing C and D grades is not unlimited. The TA cannot be expected to grade resubmissions of lab #2 in the last week of classes. You can discuss with your TA what deadline they have for you to resubmit, but a good rule of thumb is to do it before the following week's lab is due.

V. Overall Lab Grades

At the end of the quarter, you will receive one of four grades for the lab portion of the course, and these grades come with different consequences for your course grade.

HP. High Pass – A very small percentage of students will receive this grade. It is reserved for the few students that the TA feels have done an exceptional job. These students show genuine curiosity that drives the group conversation, keep other group members engaged, and generally help everyone avoid the "let's just get this over with" attitude that can sometimes plague lab classes. No one with an outstanding lab report grade of C at the end of the quarter is eligible for a HP. The overall course grade consequence of receiving a lab grade of HP is an increase of one-half letter grade (such as B– to B).

P. Pass – Almost everyone in the class receives this grade. To receive it, at the end of the quarter, one must have no more than a single lab report grade of C (all the rest being either A or B, and no D's at all). Given the opportunities to fix grades of C or D, this should not be a problem, but one must keep close tabs on lab grades so that these don't catch you by surprise. This lab grade has no effect on the overall course grade.

LP. Low Pass – These are pretty rare, and there is no reason why everyone shouldn't be able to avoid them altogether. You will receive this grade if, at the end of the quarter you have two uncleared C grades for lab reports (and no D's). The only thing stopping you from receiving a pass for a lab grade for the quarter is the effort necessary to clear these unacceptable grades! The overall grade consequence of receiving a lab grade of LP is a decrease of one-half letter grade (such as B+ to B).

NP. No Pass – These grades generally go to students that just decide to give up. You receive this grade if you have one or more uncleared D lab report grades, or three or more uncleared C lab report grades. The overall grade consequence of receiving a lab grade of NP is that you receive an F for the full course, regardless of your performance outside of lab.

VI. Makeup Labs

Given the importance of doing every lab, it is useful to know the policies related to making up missed labs. If you miss or expect to miss a lab meeting, you are able to make it up by attending another section during the same week (while the equipment is still in the lab room). It is better if the other section you attend is taught by the same TA as your section, but this is not required. The schedule of all lab section meeting times & locations this quarter can be found on the Physics 9B Lab Web Page. If you are unable to make-up a lab in the classroom in the same week, your TA will provide you with data with which to write a lab report.

No matter which way you make up a missed lab, your TA will not tolerate repeated occurrences of this. You are expected to show up each week to work in a group, and makeups are intended for emergencies only. If your TA feels you are abusing this privilege, then they will disallow any more makeups, with possibly devastating consequences for your course grade.