Physics 9C Laboratory Syllabus

I. General Information

Welcome to Physics 9C 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.
- The early labs for 9A are a little sparse in their physics content (you've only just started!), and are used as training for elements of data analysis, such as uncertainties and graphical methods.

II. Online Laboratory Materials

There are three important links for the labs:

- Physics 9C 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 9C 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 9C LibreText – This is an online textbook often used 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."

III. Weekly Routine

Every lab follows the same routine each week.

lab preparation

- 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"). You are expected to work through these questions, not just guess blindly or get an answer from a classmate.
- Read through the Activities section in the lab manual to get some idea of what you will be doing when you come in.

If you arrive in lab without a clue of what you are supposed to do, then your lab TA will know you have not done the necessary preparatory work. Don't expect your lab partners or TA to explain what you need to do at every step.

in the classroom

- 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" 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.

submitting the report
• Everyone within the group must submit their own copy of the lab report to Canvas. For record-keeping purposes, everyone must have their own copy of the lab report on file in Canvas. If just one copy of the lab report is submitted by a single group member "for the group", then that member will be the only one that gets credit.
• The names of all the group members that attended the lab and worked on the report must appear on the report. The names of absent students cannot be included in the report. Doing so constitutes academic dishonesty, and will be reported to OSSJA.
• All lab reports must be submitted to Canvas before leaving the lab classroom. "Finishing the report at home" is not allowed.

re-submitting a report
• If you submit a report that is graded as "unacceptable" by the TA (an ✗ appears in Canvas, and the TA will write a short note in the grading indicating what part(s) of your report are inadequate), then you are required to repair and resubmit that report.
• Group members can confer about how to fix the problems, but everyone is individually responsible for making the fixes. That is, a group member submitting a fix for themself does not count toward a fix for every other group member.
• Re-submissions are made in the same place in Canvas as the original lab report.

make-up labs
There are two conditions that can require doing a make-up lab, each with their own consequences. What both have in common is this: A lab report that is not made-up appears as a blank in the Canvas Gradebook (not an ✗, as is given for unacceptable). If this blank in the Gradebook is still present at the end of the quarter, then you will receive a NP for a lab grade, and will fail the entire course. That is, all labs must be completed to receive a passing grade.

• not attending the scheduled lab session
  - Contact your TA (not the lecture instructor!) to let them know why you have missed or will miss a lab meeting.
  - You must make your best effort to come to another lab meeting, to work with a group in-class. The schedule of lab meeting times is posted on the Physics 9C Lab Web Page. If you have a choice of make-up lab meetings to attend, you should try to attend one that has your usual TA, but that is not necessary. Whoever the TA is that you attend a make-up lab with, you need to check-in with them and tell them who you are, so that they can give you credit for being there.
  - If you cannot attend a make-up lab session, then you need to ask your TA for "make-up data" for that lab. This is data that has been collected for you to use for analysis, and you right a lab report as though this was what your group measured. You may not use the data acquired by your usual group, nor can you use their lab report. This report is all yours to write. All of the lab TAs hold weekly office hours, and are available to help you understand what you need to do to write this report. Note that it is possible to receive an "unacceptable" grade for a lab report written with make-up data, and in that case, you will need to make revisions, as usual.

• a truly abysmal (worse than unacceptable) effort
  - This is pretty rare, and usually results from taking all the wrong data (or insufficient amounts of data), so that no reasonable analysis is possible. The TA will judge if the effort warrants a make-up, and if so, will give a blank grade in Canvas (not an ✗, as is given for unacceptable).
  - While this can be made-up in a second lab session, this option is very unlikely, as it would require the TA to grade the lab report in time for you to attend another lab in the same week. So virtually all of these kinds of make-ups require using the make-up data. All of the same rules as described above apply in this kind of make-up lab.

IV. Lab Grading
As indicated above, there are four grades that you will see in Canvas for your lab reports:

Blank This usually means you have not attended lab yet. If you have attended lab and you see a blank, then it means that your lab report was either not submitted, or was such a poor effort that the TA is requiring you to do a make-up lab. Even just a single blank for a lab report at the end of the quarter is sufficient to give you a failing grade for the lab and by extension, the entire course, so it is very important to contact your TA about any blanks that appear in your lab grades!

Excused You will see this "grade" after you have attended a lab session, but before it has been graded. It is a placeholder that the TA uses to mark students that attended the lab session. After the lab report is graded, this will be changed to a blank, a ✓, or an ✗.
✓ This indicates that your lab report has been accepted. Your goal is to receive one of these for every lab report you submit. You can receive one from the first submission, or after you have corrected an unacceptable submission.

✗ This indicates 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 (correctable) is amiss with the data collected by your group.

**Important note: The time available for fixing blank and unacceptable grades is not unlimited.** The TA cannot be expected to grade resubmissions multiple labs or labs from early in the quarter during the last week of classes. You can discuss with your TA what deadline they have for you to resubmit, but they are not required to give you more than a week past your scheduled lab meeting (and for the last lab of the quarter, you won’t even get that long).

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 ✗ 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). The only exceptions to this are changes from F→D– and A→A+.

**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 ✗. Given the opportunities to fix a lab grade, 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 exactly two lab grades of ✗. 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 Blank lab report grades, or three or more lab report grades of ✗. 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.