Physics 142W Workshop

Introduction

Workshop Goals and Philosophy

Physics is an experimental science. Experiments are performed to test the predictions of theories or to present data the theories cannot explain in order to spur better theories.

If you find physics difficult, you are not alone. The concepts are often not easy to grasp. We must each construct our own models of understanding. Passive listening to lectures and rote memorization are not good ways to learn. We must be able to assimilate the concepts and apply them to predict further phenomena. Studies have shown that learning improves when a student thinks about a concept or problem by him/herself first and then discusses it with a small group of peers. That is the philosophy we will follow in this workshop. The abilities to work within a group of peers and to communicate ideas, both orally and in writing, are important skills to have. These are fundamental goals of this workshop.

Most of the experiments in this workshop will utilize data sensors interfaced to a computer. We utilize PASCO’s Data Studio software, because of its powerful ability to take, present, and analyze data. You will find most of the analysis tools you need in Data Studio. You can find the area, highlight a particular region, find averages, or a host of things with Data Studio. You will find that you will normally be able to fit or model data with an analytic function. We will also make frequent use of Excel. In addition, Mathcad is available on the lab computers. Remember to print out and include any computer results.

Purpose of the Course

The purpose of this workshop is to

1. teach you some important physical phenomena and concepts,
2. introduce you to proper laboratory procedures, to use computers and data sensors, and teach you some basic laboratory techniques,
3. give you confidence in your ability to take measurements and adequately analyze and interpret data,
4. teach you better oral and written communication skills,
5. teach you to think for yourself and to work in groups of peers.

Registration

Physics 142W is a dependent course for Physics 142E, but it is not part of Physics 142E. It is a one-credit course with an independent grade. You must, however, be registered in a 142E (lecture) section before ISIS will allow you to register for a 142W (workshop) section.
If you already have credit for 142E, you must still register for 142E before ISIS will allow you to sign up for a 142W section. After you have registered for the lab, you can drop the lecture.

**Registration in Physics 142W will be blocked on Friday, January 25, 2008.** The labs start on Monday during the semester’s first full week of classes (January 28, 2008).

Once registration is blocked, Mr. Larry Suddarth (room 214 – Physics building, 924-6843, lts7x@Virginia.EDU) will be the **only** person who can add you into a section of 142W.

In that first week, you **must** attend the section of your choice on time. If you are registered for that section, your place in that section is secure. If you do not attend or are late to your registered section, your name will be dropped from that section’s enrollment.

**Let us re-emphasize this point:** If you are registered for a section and wish to secure your place in that section, you must attend that section on time during the first full week of classes.

After students registered for a section (who show up on time!) have been added to the roster, those who wish to add to that section will then be added if space is available. Since only 24 students may be in any given section, if more students want to add than there is space available, names will be drawn at random and added to the roster until the 24 spaces are filled. The remaining students must find other sections to attend. Note, however, that there are normally two sections being held simultaneously so that most time slots have space available for 48 students in the two sections.

In the **extraordinary** event that you cannot attend any sections during that first full week of classes (say due to major illness or a family emergency), please contact Mr. Suddarth as soon as possible, but absolutely before your scheduled section. Contact Mr. Suddarth regarding any problems with registration.

It is your responsibility to be registered for a workshop. If you are unable to find a workshop open that meets your schedule, go to a suitable section the first week to see if space becomes available or to see if someone will switch with you. You may need to go to several workshops before this is successful.

**COURSE ORGANIZATION**

**Every student must purchase the manual for Physics 142W at the UVa bookstore.** This manual contains the workshop activities which you will use each week. You’ll be assessed a 10% penalty if you fail to bring your manual to lab.

Your work in Physics 142W will consist of three parts:

1. A pre-lab homework that you must complete before coming to the lab.
2. The lab itself, answering all the questions and predictions, and attaching data, results, graphs, and analysis as requested with your group members that will be turned in at the end of the lab.
3. A post-lab quiz that you must finish in the specified time period.
The labs meet during each full week of classes and are overseen by a graduate teaching assistant (commonly called a TA). The TA’s responsibilities are to ensure the safety of the students, protect the equipment, provide good teaching pedagogy to help you learn as much as possible, provide additional instructions and information concerning the lab, grade your work and, together with the faculty, assign your grade.

GRADING POLICY

The workshop will be graded as follows:

- The pre-lab homework is worth 20%.
- The weekly lab is worth 50%. Your grade is based on your performance in the laboratory as evidenced by what you turn in each week.
- The post-lab quiz is worth 30%.

No scores will be dropped. Lab scores will be curved based on your TA’s students only (to take account of the different grading scales of the TA’s). Final grades are determined by relative class “rank”, not by a predefined numerical scale. Historically, the average grade in 142W has been between B and B+.

PREPARATION

Before attending your lab section during the first full week of classes, look over the lab manual and become familiar with the appendices to which you should refer as needed throughout the semester. Particularly important is Appendix D: The Accuracy of Measurements and Significant Figures. Refer to Appendix D and apply it appropriately throughout the semester.

For each lab, you must do the pre-lab homework that can be found on the WebAssign Internet site:

https://www.webassign.net/uva/login.html

We are not having you submit a formal written lab report, but instead, we are requiring you to spend time preparing for the lab each week. We expect that since you are better prepared, the lab will be a better learning experience.

In order to prepare for the lab each week, you should do the following:

1. Read over the lab write-up in this manual (including the relevant appendices) to get an overview of the material.
2. Read the instructions again, but this time more carefully; highlighting the important features of the lab. Try to work through any derivations you do not understand (refer to your textbook as needed). In other words, be an active reader and study the manual.
3. Complete the pre-lab homework. The homework is not pledged and you are encouraged to work together to understand and solve the problems. HOWEVER, you are responsible for really knowing how to work the problems. Simply “plugging numbers” into a formula or spreadsheet given to you will teach you nothing.
PROCEDURE IN THE LAB

normally you will work in groups of three. You will be assigned to a different group each week. We encourage a free exchange of ideas between group members (and also generally in the laboratory), and we expect you to share both in taking data and in operating the computer system. You will turn in your lab materials as a group at the end of the period. Everyone must fill out the material asked for in the manual, but you only should turn in one set of graphs and data when you are asked to print them out. Be sure that all such printouts are well noted with the activity number and your lab partners’ names. You and your group members will not necessarily receive a common grade for the lab each week, because we will grade both your results and your answers. Each lab is two hours (technically one hour and fifty minutes) long. You are expected to have vacated the room within one hour and fifty-five minutes to allow the next section to begin on time.

ABSENCES AND TARDINESS

Absences will be excused only for legitimate reasons (illness, a death in your family, a University sponsored trip, etc.). If you must miss a laboratory session, submit a written petition (email will suffice) to your TA explaining your situation and requesting permission to make up the lab. This request should be made as soon as is possible, but absolutely no later than your next scheduled lab period.

Unexcused absences earn a grade of zero for that lab. You may petition for permission to attend a make-up session for up to half-credit, but there is no guarantee that you will be granted permission. Even if you are granted permission, you will only be allowed to attend the make-up session if there is available space. Those with valid excuses have absolute priority.

Late arrival for any lab session is very disruptive and will be penalized. After an initial five minute grace period, the TA will deduct 10% from your grade for the first ten minutes of tardiness and 15% for each successive 10-minute period (or part thereof).

LAB MAKE-UPS

You must receive written permission from your TA to make up a missed lab. All make-ups must be arranged by your TA in advance. Without prior arrangements, there will be a 50% penalty (assuming, of course, that there is even space available in the make-up session). Make-up labs are normally Thursday afternoon beginning at 4 PM. You may only make up a lab during the week that you missed it or the following week. The labs are not left set up more than the following week. It is the student’s responsibility to make sure the TA has given permission and to attend the make up.

If you miss a lab for an approved reason, and do not make up the lab until the following week, your TA should contact Mr. Suddarth for an extension for the homework and the quiz. If you take the make-up on Thursday of the regular lab week, you do not receive a time extension.
WEBASSIGN POLICY

Please pay close attention to the due dates of the WebAssign pre- and post-lab assignments.

The pre-lab homework will typically be posted on the Tuesday of the week before the regularly scheduled lab. The homework is due thirty minutes before the lab (and no extension other than that described in the make-up policy will be granted).

You will be given several submissions to obtain the correct answer. Do not waste your submissions. Seek assistance if you are having difficulty. Remember, the homework is NOT pledged. Indeed, you are encouraged to work together. As noted earlier, though, you are expected to learn how to do the problem, not just “work the calculator”.

The post-lab quiz IS pledged. You are allowed to use your book, notes, and manual (available in PDF form via the class web site), but you are NOT allowed to consult anyone.

The quiz will be posted right after the lab (at the next hour mark). It is DUE within a few hours of completing the lab. We do, however, give you a penalty-free extension until the following “calendar” Monday at 5 AM. **This is an absolute deadline:** If, for whatever reason, you do not complete the post-lab quiz on time, you will receive a zero.

The quizzes have a time limit of forty-five minutes. To allow for “transit delays” and the like, we will accept submissions up to five minutes late (again, without penalty). Like the 5 AM Monday deadline, this is an absolute deadline and if you do not submit the quiz on time, you will receive a zero. Do NOT “aim” for either deadline.

You will be given several submissions to allow you to “save” your work and to reduce the temptation to wait until the last second to hit “Submit”.