

0.1

Physics Workshop/Lab Syllabus

FACULTY COORDINATOR: MAXIM BYCHKOV

EMAIL: MAB3ED@VIRGINIA.EDU

WEBSITES:

PHYS2419_Spring2020 on UVa Collab

PHYS1429_Spring2020 on UVa Collab

WORKSHOP GOALS AND PHILOSOPHY

The concepts in physics are often not easy to grasp. We must each construct our own models of understanding and verify them against reality. 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 ability to work within a group of peers and communicate ideas, both orally and in writing, is an important skill to have.

PURPOSE OF THE COURSE

The purpose of this workshop is to

- Teach you a systematic way of solving problems.
- Give you practice to work and solve problems in groups.
- Help you develop better oral and written communication skills.
- Give you confidence in your ability to take measurements and adequately analyze and interpret data.
- Introduce you to some important physical phenomena and concepts.
- Introduce you to proper laboratory procedures, the use of computers and data sensors, and teach you some basic laboratory techniques.

REGISTRATION

Physics 1429 and 2419 are dependent courses for Physics 1425 and 2415 respectively, but are not part of the Physics lecture course. It is a one-credit course with an independent grade.

Registration in Physics Lab will be blocked on Friday, January 10, 2020 8 AM. The labs start on Monday during the semesters first full week of classes (January 13, 2020).

The course instructor, Dr. Maxim Bychkov can be reached at room 214 Physics building, 924-6843, mab3ed@virginia.edu. The labs meet once every week and detailed experiment schedule for this semester can be found on Collab.

You must attend the section of your choice on time during the first full week of classes. If you are registered and attend your 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 sections enrollment and you may lose your spot.

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 showed 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. Preference will be given to waitlisted students in the same order the names appear on the waitlist. Only 26 students may be in any given section. The remaining students must find other sections to attend.

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 Dr. Bychkov as soon as possible, but absolutely before your scheduled section.

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

This course is part of the Inclusive Access program with The UVA Bookstore. This service enables The UVA Bookstore to offer students instant access to the course materials on the first day of class. It means you will immediately have access to your digital course materials through WebAssign after attending the first lab. Your instructors will help you login to your course and access the digital materials during the first lab.

Please note that after January 29th if you are still enrolled in the course, then your student account will be charged. No refunds will be processed.

Your work in Physics Lab will consist of four parts:

1. A pre-lab homework that you must complete no later than 10 minutes before coming to the lab.
2. The lab itself, answering all the warm-ups and predictions, and attaching data, results, graphs, and analysis. These results are due at the end of the lab period.
3. A group lab report due after your lab meeting. There are two different types of lab reports: the 1 page out-of-class reports (six total) that are due in one week after the end of your class and the fill-in in-class reports (six total) that are due the next day after the end of your class meeting. Please pay attention to in-class announcement for any schedule changes.
4. A post-lab that you must finish within 48 hours following your lab meeting. Only the labs that have in-class reports will have an associated post-lab (six total).

All types of assignments (including your electronic copies of the reports) will be submitted using the WebAssign Internet site. We will arrange the WebAssign access for you at the first meeting of the class. You won't have to purchase an additional access.

The labs are overseen by two (or more) graduate teaching assistants (commonly called a TA). The TAs' responsibilities are to ensure a proper learning environment in the class. TAs are also responsible for protection of the equipment, providing additional instructions and information

concerning the lab. Your TAs will not be grading your work or assigning your grades. We have dedicated graders to grade your lab reports.

GRADING POLICY

The workshop/lab will be graded as follows:

- The pre-lab homework is worth 20%.
- The weekly lab report is worth 40%.
- The post-lab is worth 40%.

The grades and the answer key for the assignments performed on WebAssign will be available to you at the end of the corresponding week via WebAssign gradebook. Your lab reports grades will be, ordinarily, finalized in one week following the report's due date. Please contact your class instructor if you haven't received your grade for the lab report after 1 week following the original due date.

Once your lab report has been graded, you have 2 weeks to inquire your grader about any deductions and to settle any grade ambiguities. **No lab grade will be changed past 2 weeks after your report grade was assigned.** Graders' names will be part of your scoring on WebAssign, and graders' office hours can be found on Collab.

Your final grades are determined based on learning thresholds. The values of thresholds vary from semester to semester and will be announced after the first few labs have been finished and graded. Note that the grade thresholds may differ from those of other courses at UVa. Numerical values of your scores will not be rounded and are kept to 4 significant figures.

PREPARATION BEFORE THE LAB

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

1. Read over the lab manual in its entirety.
2. Work through all predictions and warm-up questions. It is not important that you get all predictions correctly, but it is important that you gave it an honest try.
3. For each lab, you must do the pre-lab homework (which will closely resemble the warm-up questions from your manual) that can be found on the **WebAssign** Internet site:

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

Log in using your university computing ID and password. Complete the pre-lab homework no later than 10 minutes before your lab meets. The pre-labs are 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 out 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 or four students. You may be assigned to a different group once every 3 labs. The coherence and the team work displayed by your team play an important part whether you will remain with the same partners or will be assigned new ones. A free exchange of ideas between group members (and anyone in the laboratory) is **absolutely**

essential to your success in the lab. We expect you to share both in taking data, in operating the computer system, and writing of the report.

Set clear expectations and firm deadlines amongst your group members from the very first meeting. We will discuss some possibilities of dealing with non-participants and/or overachievers throughout the semester. More information on forming, keeping, and dissolving the groups can be found on your Collab site under Lessons.

After every few labs, you will have the opportunity to evaluate your group members on their contributions to the lab activities and report-writing process. These evaluations are anonymous and contribute to decisions regarding group changes. If your participation is rated poorly by your peers, you may incur point deductions from your lab grade.

Each lab is **1 hour and 50 minutes** long. You are expected to have vacated the room within 1 hour and 55 minutes to allow the next section to begin on time.

AFTER THE LAB

You are expected to clean up your work place after you finished the lab. **Please leave the tables in similar or better conditions than you found them.** Repeated offenders of this policy will receive a penalty on their reports.

There will be a single report turned in per group for grading. **All members of the group must contribute to the writing of the report every week.**

For six labs during the semester you will write an out-of-class report and for the other six labs you will fill in the in-class lab report on WebAssign. The purpose of the in-class lab report is to model a good structure of your lab reports. You can then use the feedback from the grading of these reports to write better out-of-class reports. The exact schedule of out-of-class and in-class reports can be found under Recourses on your Collab.

It is recommended to set up a Google Doc or Overleaf (ShareLaTeX) collaboration. As an alternative, a group of students getting together to write a group report in a physical space instead of on-line has proven to be a very successful strategy for report writing. Make sure that the responsibilities and deadlines for each contribution are explicitly communicated to all group members.

All lab reports are due as specified in the “Course Organization” section, no exceptions. The submission of the report will be done via WebAssign in an In-lab assignment every week.

ALL members of the group will get the same lab report grade based on that single report. There will be periodic peer evaluations performed on WebAssign to assess the level of participation of each member. If your participation is low you will incur penalties on your lab report scores.

The labs that have in-class reports will have post-lab assignments (six total per semester). You must do the post-lab that can, again, be found on the **WebAssign** Internet site:

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

Log in using your university computing ID and password. The post-lab is a timed assignment. Therefore you may need to review corresponding materials before you begin taking the assignment. The post-lab is due within 48 hours following your lab meeting. You are allowed to use your notes, books and lab manuals. You can either work on post-labs individually or in groups. However, it can only be a group of students enrolled in the class. Class TAs will also be available to help you with the post-labs during their office hours. No external help (on-line tutors, TAs that do not teach the labs, solution depositories such as chegg) is allowed. Your pledge at the end

of every assignment specifies the extent to which group members can contribute. Automatic extensions are available (see WebAssign Policy section below).

There may be an additional 13th post-lab at the end of the semester. It consists of the questions based on the material through out the semester. However, it is not a final exam and won't be carrying a separate weight towards your final grade.

TARDINESS

Late arrival for any lab session is very disruptive and will be penalized. After an initial five minute grace period, the TAs will deduct 10% from your grade for the first ten minutes of tardiness and 20% for each successive 10-minute period (or part thereof). If you are more than 30 minutes late you will receive a 50% penalty on your lab report grade.

ABSENCES AND LAB MAKE-UPS SCHEDULING

Penalty free absences will be excused only for legitimate reasons such as **incapacitating** illness, a death in your family, a University sponsored trip, etc.

An exam (or study session) for another course is NOT an approved reason to miss lab. If one of your other professors schedules an exam for the time that you have lab, you should inform them that you already have a class scheduled for that time and ask them to make appropriate arrangements. [You should, of course, do this as soon as the exam schedule is communicated to you.]

If you must miss a laboratory session, submit a petition explaining your situation and requesting permission to make up the lab. The request must be submitted via the following URL:

<https://feynman.phys.virginia.edu/request/>

Excused absences will, ordinarily, be granted a penalty free make-up.

In case of unexcused absences it is ultimately a decision of your instructor to grant you a make up. Should you be granted one, a penalty of 50% will be imposed on your lab report.

- **The request should be before the lab, not after.** Even in case you have a legitimate excuse you will not be granted a penalty free make-up if your petition was received after the beginning of your class.
- Make-up labs are held on Thursday afternoon. PHYS2419 make-ups are held in Physics building room 212 beginning at 3 PM. PHYS1429 make-ups are held in room 215 beginning at 4pm. Special arrangements for different dates can be made only in case of extraordinary circumstances, but are not guaranteed. It is your responsibility to communicate such circumstances to your instructor.
- 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 longer than the following week. The last lab of the semester can only be made up the week that it is offered.
- If you were granted a permission to attend a make-up lab, you will be given an extension for the pre and the post-labs. The make-up section TA will extend your pre-lab and post-labs. However you will have to check your WebAssign account periodically to see if the extension has been granted.

The make-ups are not guaranteed and it is ultimately the students responsibility to make sure that all guidelines to attend the make-up were followed.

If, for any reason, you are unable to keep up with assigned work, you are expected to withdraw from the course, no incompletes will be given. Excessive absences will require notes from a doctor or medical professional.

WEBASSIGN POLICY

All parts of your work in this class will be performed using the WebAssign interface. Therefore it is important to dedicate a separate section to explaining WebAssign policies.

Please pay close attention to the due dates of the WebAssign assignments.

Work all your calculations out to several significant figures, at least 6. Submit your answer to WebAssign with at least 3 significant figures unless specifically indicated otherwise in the problem. Never round off any of your given numerical values or any intermediate values. Ignore the fact that you may be given a number accurate to only 2 significant figures. Assume it is 6 figures. WebAssign allows only a 1% error, therefore in chain calculations, an acceptable answer on an earlier part may not result in an acceptable answer in later calculations.

Pre-labs

The pre-lab homework will always be posted week before the regularly scheduled lab. **The homework is due 10 minutes before the lab** and no extension other than the one associated with a make-up will be granted. For pre-labs, you will be given 6 total submissions per question or part thereof to obtain the correct answer. First 3 submissions are penalty free and the WebAssign will indicate if you answered a question correctly after each submission. Every submission after the 3rd attempt will cost you 5% off the value of the question. After the 5th attempt the correct answer will be displayed to you and you can type it in for an additional 5% penalty. Before the dead line, no time limit is imposed on the pre-lab assignment. Seek assistance if you are having difficulty. Indeed, you are encouraged to work together. As noted earlier, though, you are expected to learn how to do the problem, not just “work a calculator”.

Post-labs

The post-lab will be posted right after the lab (at the next hour mark). **The post-lab is due within 48 hours after you finished the lab.** The post-labs have a time limit of 75 minutes.

The post-lab IS timed. You are allowed to use your book, notes, and manual (available in PDF form via the class website), but you are NOT allowed to consult anyone who is not enrolled in this class or use results from any previous years/semesters.

You will be given 2 free submissions per question or part thereof on the post-lab. After each submission, WebAssign will tell you if your answer is correct. After the first 2 free submissions you will have 3 more, but each additional submission will cost 25% of the points assigned for that question (or part thereof).

WebAssign always grades your last submission, so you must leave your answers in WebAssign after each submission. Do not wait until the last second to submit your answers or you may receive a zero. **Despite our warnings this will happen to several students during the semester, and they will receive a zero.**

Make sure that you not only *Save* but *Submit* your answers. The saved answers are not graded and are not stored by the WebAssign past the time limit of the assignment. You will receive a grade of zero for the questions you did not submit. **Despite our warnings this will happen to several students during the semester, and they will receive a zero.**

Once the post-lab is started the time limit can not be changed, stopped or extended. Therefore, **never** begin your post-lab if you think there is the chance that you will lose electrical power, or your Internet connection e.g. from a thunderstorm. **Do not attempt** to "sneak a peak" at the post-lab that you missed, after the deadline. Once you clicked on the post-lab the clock will start running. As a rule of thumb, it is best not to click on the post-lab assignments in case there is any doubt. **Despite our warnings this will happen to several students during the semester, and they will receive a zero.**

Lab reports

As indicated earlier, you will have six fill-in reports and six out-of-class reports during the semester. You are expected to finish the majority (if not all) of the fill-in reports during the class. You are still given 24 hour to complete/modify them. The structure and the hints for the in-class reports will be displayed to you on WebAssign, but you are expected to write in complete sentences and explain your reasoning clearly as if writing a stand alone paper.

The six out-of-class reports are 1 page documents submitted on WebAssign. Check the Lessons on Collab for the basic rubric, expectations, formating guidelines, and sample reports.

IMPORTANT:

You may request an **automatic extension** for your post-lab on WebAssign if you missed the due date. Every post-lab will have an associated link, following which the extension can be requested. You must request the automatic extension within 22 hours of the due date. If you accept the extension, 30% will be deducted from your assignment score, and you must complete the assignment within a window of 2 hours that begins after you accepted the extension. (The time limit is still imposed so you must start the assignment within 1 hour, 10 minutes.)

CLASS POLICY CHANGES

Although we strive to discuss most situations encountered in the class in this Introduction, the class policy might change throughout the semester in some ways. In such cases the change of rules will be emailed to all students. A class website (also mirrored on the UVa Collab site) will also include the policy changes.