Physics 119 Laboratory Weekly Schedule and Reading:

1. **NO LABS DURING FIRST WEEK OF QUARTER.** April 1-4

2. **Lab 1 - Pendulum** April 8-11
   *Reading*: Walker, Chapter 13.6

3. **Lab 2 - Standing Waves and Resonance** April 15-18
   *Reading*: Walker, Chapter 14.1, 14.2, 14.8

4. **Lab 3 - Waves, Phase Difference, Speed of Sound** April 22-25
   *Reading*: Walker, Chapter 14.1, 14.3, 14.4

5. **Lab 4 - Reflection and Refraction of Light** April 29-May 2
   *Reading*: Walker, Chapter 26.1, 26.2, 26.5, 26.8

6. **Lab 5 - Curved Mirrors** May 6-9
   *Reading*: Walker, Chapter 26.3, 26.4

7. **Lab 6 - Thin Lenses** May 13-16
   *Reading*: Walker, Chapter 26.6, 26.7

8. **Lab 7 – Diffraction and Interference** May 20-23
   *Reading*: Walker, Chapter 28.1 \(\rightarrow 28.4\)
   
   **NOTE**: Students *should* begin signing up in the laboratory this week for desired make-up lab sessions in the 10th week.

9. **Lab 8 - Gratings and Spectra** May 27-30
   *Reading*: Walker, Chapter 28.6, 31.2, 31.3
   
   **NOTE**: Students *must* sign up in the laboratory this week for desired make-up lab sessions next week.

10. **Make-up Labs** June 3-6

*All readings are from text used currently in Physics 116.*
Welcome to Physics 119!

This third quarter of the Algebra-based Introductory Physics labs is all about OSCILLATIONS AND WAVES. Physics 119 is a separate C/NC 1-credit course, but most people take it in conjunction with the lecture 116. Most of the lab is similar to the lab part of 123. Now that you have learned a lot of physics in the previous two quarters, this lab uses your knowledge through a series of applications to oscillations and wave phenomena. The first three labs are on oscillations and mechanical waves and the next 5 labs on electromagnetic (light) waves. We will develop the subject of geometrical optics (reflection, refraction, mirrors, and lenses) more extensively than in your lectures and as one unified topic.

A very important aspect of experimental work is the idea of "uncertainty". We will focus on developing a familiarity with this basic concept so that it becomes second-nature to think about the uncertainty whenever you think about a measured quantity.

There are labs Tuesday through Friday. The last week of instruction will be used for make-up days. If you are current with labs you do not need to attend during that week. Note: there is no guarantee that equipment or space will be available. Avoid make-ups if you can!

Course Instructor

Instructor: Prof. Sam Fain  
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Phone: 206-543-8444  
Course website: http://courses.washington.edu/ph119123/

Office Hours: Your TA will arrange his or her own office hours. If you would like to see me, send me an e-mail and we can arrange a time in my office.

TAs and Lab Sections

If you want to change a lecture, tutorial, or lab section, check the online time schedule frequently to see if what you want has opened up. If you change after the first lab, you must inform both the former and new lab TA.

A list with Section names, Room numbers, TA assignments (along with his/her e-mail) should be available on the website. Both 119 and 123 labs will be listed in this table. If you want to change a lab section, check the online time schedule frequently to see if what you want has opened up. If you want to try to overload a section, you must consult with the Program Coordinator in PAB C136 (206-543-4982) to obtain an entry code.
**Lab Manual and Report**

A lab manual is used and the appropriate section must be brought to the lab starting with the first session. Lab manuals must be purchased before the start of labs.

All labs can be completed, including the lab report, within the three hours scheduled. Lab reports are written, while performing the lab, directly into the lab manual.

At the conclusion of the assigned lab, you are required to submit your lab report for grading. Your TA will initial the report at places while you do the lab and at the end to verify its completion. Reports without legible initials at the end will not be accepted. If you attend a lab section other than your assigned section, the TA in the lab section you attend must collect and sign your lab report and pass your report to the proper TA. You are responsible for telling the “substitute” TA the name of your regular TA.

The lab instruction sheets contain spaces in which the answers to questions preceding the spaces are to be written. These answers are to be written in complete sentences! “Yes” is not a complete sentence. A drawing or sketch is a very good idea to explain what you are doing. Your TA will be impressed if you make an effort to write clearly and neatly.

You must submit a separate lab write-up even though you will be working with one or two other students. Partners are expected to consult with one another and to try to agree upon the measurements and answers to any questions.

**Significant Figures, Units, and “Error”**

Measurements should be made carefully and recorded with attention to the appropriate number of significant figures. For example, if a length slightly over 12 cm is measured to the nearest millimeter; the result should be written in the form 12.1 cm, a number with three significant figures.

The labs require an understanding of how well your measurements are made and thus a quantitative estimate of the uncertainties in your measurements. You will encounter uncertainties that can be described as random uncertainties (or errors) and others that are systematic uncertainties (or errors). The first two labs will help you with ways to estimate both types of uncertainty. An appendix on uncertainties is provided similar to that used in 117 and 118.

You should also understand the difference between precision and accuracy. A precise result is one that has little random error, and, usually, many significant figures. An accurate result is one that is close to the truth. For example, by carefully repeating the measurement of the length of a string many times with a ruler, you can get a surprisingly precise result with little random error, but if your ruler is a cheap, low quality one, it will not be accurate! No amount of repetition will get rid of that systematic error (but there are ways to discover if the ruler is wrong; you could compare it with a different ruler.) You should make sure that the magnitude of your uncertainties is consistent with the precision of your equipment.
Grading

The lab is a standalone 1-credit C/NC course. Labs will be graded by your section TA, normally as you exit the lab. **You must complete all 8 labs in order to receive credit!**

Important notice: Check your scores on TYCHO weekly. TAs are instructed to post lab scores before returning the reports. Lost reports and incorrectly entered scores are easy to correct if caught early.

Makeups; Attending a different session

- **If you must miss your lab session:** Please try to attend a different section in the same week. You need to obtain permission of its TA, and to inform him/her of your regular section. It is better to complete a lab the same week it is scheduled rather than in the makeup week because subsequent labs may build on it and the last week of classes tends to be very busy.
- If you attend a lab section other than your assigned section, the report must be turned in to the TA for the section you attended at the conclusion of the lab and the TA must initial the report.
- However, if you can’t attend any of the labs during a given week, you may make up the missed lab during the last week of classes.
- **Only one lab can be made up** without special permission. Under special circumstances, a maximum of two labs can be made up with permission of the lab course professor. No more than one lab can be completed in a lab session.

Introductory Physics Courses Administrative Support

If you need assistance with registration, have questions about grades or lab or tutorial policies, consult with the Program Coordinator in PAB C136  206-543-4982

If you wish to talk with an academic counselor about becoming a physics major or minor, or have general questions about the physics program, please contact Margot Nims margot@phys.washington.edu, PAB C139 , 543-2772.

The 11x courses are under the administration of Professor Daryl Pedigo pedigo@phys.washington.edu PAB C138  543-4983.