

**Physics Laboratory**  
**Third Quarter**  
**130-c**  
Spring Quarter 2012

This laboratory begins Saturday, March 31, 2012, and will meet in TECH room MG35 (see map at end). Each lab section meets every week for two hours.

The following eight experiments will be performed:

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|---|-------------------|
| 1. Sound pp. 1 - 8  | (Mar. 31 - 5)     |
| 2. Snell's Law: pp. 11 - 16   | (Apr. 7 - 12)     |
| 3. Geometric Optics: pp. 17 - 27  | (Apr. 14- 19)     |
| 4. Interference: 29 - 40  | (Apr. 21 - 26)    |
| 5. Diffraction: pp. 41 - 54   | (Apr. 28 - May 3) |
| 6. Intensity Distribution of a Diffraction Pattern: Experiment 1: pp. 55 - 61 | (May 5 - 10)      |
| 7. Polarization: pp. 61 - 72  | (May 12 - 17)     |
| 8. Spectral Nature of Light: pp. 87 - 98                                      | (May 19 - 24)     |

Please bring to each lab session: (1) the lab manual, available from the Norris bookstore and as separate PDF documents for each lab on line at <http://www.physics.northwestern.edu/Lab/index.html>; (2) a quadrille ruled lab logbook for recording your data available from the Society of Physics Students F210 at times posted on their door; (3) a ruler with mm scale; (4) a calculator. Note: if you didn't pick up your lab book from last quarter, they will be available yet in the lab when you come to the first lab session..

### Changing Lab Sessions

You **must** attend the lab session you have registered for. If due to rescheduling of your classes you have a conflict with the time that your lab meets (the one that you have registered for), you can try to change your lab session on line with CAESAR or with Dr. Schmidt in Rm F214, from Monday March 30 to Friday April 3 by e-mailing your proposed change to Dr. Schmidt at <aschmidt@northwestern.edu>.

If you are unable to attend a particular session, see Mr. Buntin, Room MG71 Tech **before** your regular session to obtain an admit slip to reschedule you into a different lab group (one within the one week period that the experiment is being offered-remember-no labs on Friday). This will be the only opportunity to make up the lab. You will not be allowed in a lab you are not registered for without an admit slip. You may only request a lab change if you are sick (a note from Searle may be requested), or called out of town for an emergency or family event (proof may be requested). You may change lab sections only twice per quarter. **Admit slips cannot be issued to allow study time for midterm exams.** Oversleeping is also not a valid excuse. Sorry. **No make-up labs will be offered at the end of the quarter.**

Failure to attend the lab session for which you are registered will result in a reduction of your lab grade by 7 points. If this should happen repeatedly, you will not be allowed to continue taking the lab for this quarter nor will you be allowed to transfer your lab grades!

You must complete at least 6 of the eight labs to obtain a passing grade for the lab. If you fail the lab you will be given an F for the course.

### Goals of the Laboratory

The goal of the physics laboratory is to deepen your understanding of the physical concepts discussed in the classroom and to expose you to some approaches encountered in experimental research. **The laboratory course does not follow the development of physics concepts as encountered in the classroom, but rather focuses on a few well-defined physics problems that you may or may not have discussed in your physics lecture by the time you carry out your laboratory work.** The physics laboratory puts you in a situation very similar to what you will encounter after graduation. You will be expected to solve specific problems, regardless of whether you have solved similar problems in your college career or have never seen such problems before.

## Lab Write-ups

The laboratory write-ups have been written keeping the described situation in mind. They include a brief description of the basic physics concepts and formulas which underlie the experiments you will be carrying out. They describe what you have to do and how to carry out the measurements. These write-ups **must be carefully studied** before your laboratory session. They also include a list of questions which should help you in testing your preparation for the laboratory.

## Lab Structure

Each lab will start with a brief quiz to test your preparation. In the laboratory there will be two students per lab set-up. Measurements, calculations, and results with error calculations will be recorded in a **lab book** (one for each student) which will be collected by the lab instructor at the end of each lab session and returned to you at the beginning of your next laboratory session. Each lab grade amounts to 25 points and is based upon a) your quiz results, b) upon how well you can carry out the experiment during the lab session, c) and also upon your lab report. TA's will be judging your preparation (the quiz will count 5 points), as well as your skills as an experimentalist, the correctness of your results, the presentation of your lab report, and the amount completed (up to 20 points). Final lab grades will be determined by gathering all grades from all sections and normalizing the grades to take into account differences in the grading practice of the individual TA's. Thus the grade you receive may not be equal to the total points you receive on your lab reports. In this way, no student is penalized because his TA is a harsher grader, nor is a student unfairly graded because he has a more lenient TA. The weight of the laboratory grade towards the final course grade depends upon the class instructor, but it is supposed to be no less than 16%.

## Transfer of Grades

Should you have to repeat a physics course, you may **transfer the final lab grade** from the previous attempt. **This does not happen automatically.** You must submit a request. If you do not make this request and do not attend a lab you will receive an F for the lab and consequently an F for the course. You can request a lab grade transfer in F214 during the first week of classes, at the times posted for drop-add, or by special appointment with Dr. Schmidt. To avoid misunderstandings, make sure that you keep your laboratory logbook and that you know the name of your TA.

We welcome any comments you may have regarding the lab and possible improvements. You may have noticed that there have been some recent changes made in the lab scheduling and in the lab write-ups. These changes are being made in an effort to respond to the suggestions that have been put forward. And more updates are planned for the future. We hope you see it as a positive step.

For the latest information on labs consult the lab home page on the net at "<http://www.physics.northwestern.edu/Lab/index.html>" Thanks.

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