

Physics 317 Syllabus Fall 2016

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Text: No text is required for this lab, but you need to buy a lab notebook.

Course overview: This junior level lab is designed to prepare you to do independent research and to expose you to a variety of instruments used in physics research. With those goals in mind, each lab will require you to collect data, analyze data, complete error analysis, and communicate the details of that work. You will be exposed to some basic physics equipment that you may see again in your careers. A primary objective is to foster a spirit of independence and inquisitiveness in the lab.

Course requirements: The requirements for this course will consist of keeping a detailed lab notebook and performing experiments including a video capture project of your own design. Your work will be presented in several different formats with drafts. You will complete a written formal report, a poster and an oral presentation. Attendance during lab is required. If you miss more than two labs, you will fail the course.

Lab Notebook: Your lab notebook is an important part of this course. Each experiment that you conduct should be well documented in your notebook. In order to determine if you have been complete, a good question to ask yourself is "could someone with my background in physics repeat this experiment if they were given my lab notebook?" Your notebook should be detailed. Your lab notebooks will be collected typically one week after your experiment is completed. Each experiment will be graded separately.

Lab reports: You will turn in one formal lab report. It should follow a formal lab write up procedure similar to the 221 and 222 labs. You will be given handouts on formal lab reports and there will be a report writing workshop and a report exchange. The formal lab report you complete will include drafts. The due dates are on the report schedule.

A half a letter grade will be deducted from your report grade for **each day** that the report is late, no exceptions. It is very important that you finish your labs in the allotted time. If you are unable to finish the experiment in class, you must finish it on your own time. The first draft is not graded. However, if it is turned in late, a half letter grade will be deducted from your final report grade.

Experiments: You will be conducting four experiments in this class: Energy Efficiency or Ruby Spectroscopy, Surface Plasmon, Video Capture and Resonance. For the Video Capture Lab, you will work individually to design and complete an experiment using a video camera to collect your data. Ideally enough time is allotted to collect the data AND complete the analysis in the lab. The experiments are described below. Links to the experiment instructions are found in the Lab Assignments tab on the left.

Energy Efficiency

-In this lab you will study the efficiency of energy conversion as light energy is converted to electrical energy using a solar cell, then as electrical energy is converted to chemical energy using an electrolyzer, and finally as chemical energy is converted to electrical energy using a fuel cell.

Ruby Spectroscopy

-In this lab you will learn about the Ruby crystal, its optical and electric properties, and how those properties make it useful as a laser. You will use a spectrometer, function generator and oscilloscope in this experiment.

Surface Plasmon

-More on this experiment later....

Video Project

-This is a lab that you will design and conduct on your own. The project must involve an experiment where the data can be collected using a video camera. You will need to write a brief proposal for your project. Projects will be approved on a first come first serve basis, so if you turn in your proposal early, you have a better chance of being able to perform your proposed idea. You will give an oral presentation on your video experiment to the class.

Resonance

-In this lab you will investigate the phenomenon of resonance. You will work with a partner on some resonant system. You will investigate resonant frequencies and what factors effect them. You will present your results in a poster session during finals week.

Grading :

Lab notebook	40 %
Lab report	20 %
Video Project/Presentation	20 %
Resonance Poster	20 %

Academic Honesty:

The student handbook states on page 149 that "All students at St. Lawrence University are bound by honor to maintain the highest level of academic integrity. By virtue of membership in the St. Lawrence community, every student accepts the responsibility to know the rules of academic honesty, to abide by them at all times, and to encourage all others to do the same." You are responsible for your own work. In this class you will be expected to use reference materials to complete the introduction of your lab reports. The materials you use should be cited properly. You

are expected to cite the lab instructions if you draw from them in your reports. You are also expected to create your own images using a digital camera or a drawing program where appropriate.