

Physics 412 - Analog & Digital Electronics II

Welcome

As physicists, it is important that we have experience in describing how physical systems behave. It is important that we understand how electronic equipment works, as most experimental physics use high-tech equipment to take data. It is important that we know how to present information that we have gathered and how to make appropriate conclusions from that information.

Missions of the course:

1. To build habits useful in our profession.
2. To gain valuable experience in labwork and problem solving.
3. To gain practice in writing highly informative lab reports.
4. To gain skills important in understanding electronics.

The Teaching Assistants

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Class Webpage: http://www.physics.oregonstate.edu/hetheriw/whiki/ph412_w14

Structure

- 7 lab investigations for Fall term.
- We will be spending 2-3 lab days on each lab investigation.
- Strict schedule – it's up to you to come in outside of lab time if you do not finish during the lab time.
 - You can get access to the lab rooms any time you can find someone with a key. This includes that office staff, and the TAs when the office is closed.
- Homework – there are problems assigned from Simpson at the end of the first few sets of lab instructions. These will be turned in with your lab report, but do not need to be computer formatted.
- Due dates will be posted on the website. Check the lab information on the Experimental Tasks page.

Due Date Policies

One week is allowed for the completion of all lab reports and a mandatory rough draft is due a few days after the last dedicated lab day. **Here are the specifics:**

- If the last dedicated lab day for a lab is Tuesday, the rough draft will be due on Friday night, and the final will be due on the following Tuesday night.
- If the last dedicated lab day for a lab is Thursday, the rough draft will be due on Monday night, and the final will be due on the following Thursday night.
- Email all rough draft lab reports to Aaron Kratzer at Kratzera@onid.oregonstate.edu.
- Turn in all final drafts of lab reports to the TAs box (located in the 3rd floor kitchenette).

The rough draft and the final draft will be due at 11:59pm of the assigned night. **If the rough draft is not in by the assigned night, the most credit that a student can receive on their final report is 50%.** If your rough draft is turned in on time, then for every day the final report is late, only 10% will be deducted from the final lab report grade.

Above all, if you have concerns about being able to finish a lab or the report on time, talk to or email us. We are flexible if you have a valid reason for needing an extension, and we understand that we all have busy lives. The extended due date will be just as concrete as the original. Having an extended due date for one lab may not be a valid excuse for getting an extension on another report.

Expectations

Language and Professional Behavior

We expect you all to behave as physicists while in the lab and while reporting what you have observed. This means using professional language both in your lab report and in the lab. We expect you to describe any issues or behavior using scientific language and appropriate diagrams. We expect that you assign credit where credit is due – whether from an author, from a professor’s lecture, or from a website.

In The Lab

Document as you go. Everyone needs to create their own report, but team work is encouraged. You will work in pairs to create and analyze circuits presented in the lab instructions. Compare your observations to what you expect – is it different? Should it be different or is something going wrong? Exploration is encouraged and you have access to many other resources in the lab. Ask for TA guidance if you are unsure if you are allowed to use certain equipment.

Lab Reports

A typed, thoughtfully formatted laboratory report is required for each lab investigation. There are many ways to format a lab report; find one that suits your style of writing and work with your favorite editing program to create a document that reflects what system was studied, what information gathered, what behavior analyzed, and what conclusions or extrapolations can be made.

1. *Understandable and Thorough*

Tell us all the information that you have gathered. We do not want to see lengthy tables of data, but graphical representations are good place to start. A "data available upon request" tag would be appropriate.

2. *Error*

A thorough error analysis is key to understanding data. Make sure you know how to estimate the error in both calculations and data collection. This means showing an understanding how each piece of equipment works.

3. *Graphs and Diagrams*

Graphs are important. They need to have descriptive titles, error analysis, axis labels, a legend if necessary, units, and a short figure description. All graphs need to be discussed in your report: origin, behavior, meaning. All circuits involved in experiments should have a corresponding circuit diagram in the report.

4. *Repeatability*

Provide enough information and documentation of the experiment to reproduce or extend the data. Circuits and other diagrams are key to providing a thorough understanding of your system of study; a circuit diagram should be provided for every circuit that is analyzed.

5. *Relatability*

Use scientific language that allows your information and experience to reflect the behavior of other materials or systems. Can another scientist read your report and easily relate what you observe to another similar system?

6. *Professionalism*

Reminder: You are all physicists now. This is the beginning of your professional career. Let your lab reports reflect what you want the professional community to see. Demonstrating that you understand the fundamentals of the systems that you are discussing is important.

Rough Drafts

Rough drafts, to be submitted by email, count for participation in the course and show us you have made progress on your report. Any well-written report has many drafts and have been extensively edited, added to, and subtracted from—your lab report is no different. Here are the basic requirements for a passing rough draft grade:

- Document title in the format: LastFirst-ph412-lab7rough.pdf (please only PDFs)
- Does it have all circuit diagrams involved in the experiments?
- Is all the data taken in a displayed format (graphs for large data sets, tables for small additions that do not make sense to have in a graph)?
- Is there a clear format? Are there section headers to tell the reader what is happening? Is there a clear progression? We need to see where you are going to insert your analysis and discussion if it is not already there.

If you would like feedback on your rough draft, you must have one experimental section complete so the TA can give proper, helpful feedback. Indicate this desire in the email submission of the rough draft.

College Life

You are in a time in your life, perhaps the only time in your life, where you have the option of easily getting involved in your community. There are opportunities all around us to get involved, but you must find what you are passionate about. Physics is important, and you are here to get a degree, but college is much more than getting certified. Take this chance to go to some different club meetings, some events you would not normally attend, talk to people you might never have the chance to.

Even though you might not ever join these groups or continue talking to these people, it is important to take a chance and see what happens. You might just find an interest you never knew you had!