

PHY271: Electronics and Instrumentation Lab

Gustavus Adolphus College

Spring 2020

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1. **Meeting Time:** The laboratory meets once each week for two hours in Olin 113.
2. **Lab Notebooks:** Each student's primary responsibility will be to maintain lab notebooks detailing his/her lab experiments. Two such books will need to be purchased, because they will be handed in on a rotating basis. The books should be bound, 8.5" × 11" laboratory notebooks (available at the Book Mark). The purpose of the lab notebook is to detail completely the theory, procedures, data, analysis and conclusions for every experiment. It is a complete, chronological record of everything you do for each experiment. The lab notebook must be handed in to the instructor at the beginning of the lab period one week after the experiment is performed. Notebooks will be graded on a 10 point basis. While a single, ten-point-maximum score will be given, all of the following will be important in determining the grade: successful completion of the experimental measurements and data analysis; documentation, appropriateness and accuracy of procedures and data analysis used for the experiment. Pervasive errors in grammar, spelling and proper English usage may adversely affect the lab grade. A penalty of 1 point per day will be deducted for late reports. For work that is turned in significantly late, there will be a 50% reduction of the grade on that assignment as a maximum late penalty. No lab reports will be accepted after 5:00 PM on Reading Day.
3. **Formal Laboratory Reports:** Formal written laboratory reports will be required for two experiments. The format for the reports and the method of evaluation are described in a separate sheet. Reports will be due at the beginning of the lab period one week after the lab is performed.
4. **Attendance:** Students are expected to attend all laboratories during the scheduled hours. Students may only arrange to switch lab sections with permission of the instructors. Students are responsible for informing themselves of material and assignments covered during absences. Students must advise the instructor in writing during the first week of class of any scheduled athletic, music, or other college activities that will require their absence during the semester. Such written notice does not imply a waiver of course requirements or an agreement to reschedule lab periods or exams. Missed labs must be made up. Permission to perform a lab at other than the scheduled time must be scheduled with the instructor.
5. **Preparation for Laboratory:** Students are expected to be thoroughly familiar with the purpose and general procedures of the laboratory experiment before coming to the lab. Advance preparation is an absolute requirement for the efficient use of the limited lab time, and failure to prepare can be (painfully) obvious. A [WebAssign](#) pre-lab quiz is due 15 minutes before the beginning of the lab period for each experiment, and will cover the information provided in the lab manual for that week's experiment. Please bring a calculator to lab (in case any calculations need to be performed). It is recommended that the course textbook be available for reference purposes during the lab period.

6. **Lab Final Project:** During the last two weeks of the course, there will be a final project. This project will ask each student to design a circuit using components or combinations of components that have not previously been investigated in class. Successful completion of the project will, however, require using the techniques learned throughout the course. Students will be required to demonstrate their project to the instructor, and write a formal report describing their project. A proposal for the project will be due several weeks before the end of the semester.
7. **Academic Honesty:** Having signed and agreed to abide by the College's Honor Code, students thereby pledge that, in all academic exercises, examinations, papers, and reports, they shall submit their own work. Footnotes, or some other acceptable form of citation must accompany any use of another's words or ideas. In the context of this course, students are expected to collaborate and to discuss their out-of-class assignments. However, submitting under one's own name work that is merely copied from another is a violation of the Honor Code. (The full text of the Gustavus Academic Honor Code Policy may be found at: https://gustavus.edu/general_catalog/current/acainfo)

8. **Incompletes:** A grade of incomplete will only be given for work not completed due to circumstances beyond the control of the student. (This is the college policy).

9. **Evaluation:**

Lab Notebooks	60%
Formal Reports	10%
Lab Final Project	15%
Pre-labs	15%

Final course grades will be assigned using the following scale as a guide:

94-100 A	78-82 B-	62-66 D+
90-94 A-	74-78 C+	58-62 D
86-90 B+	70-74 C	0-58 F
82-86 B	66-70 C-	

10. **Schedule of Labs** - * indicates that a formal report must be submitted along with the lab notebook

1. Introduction to Test Equipment	Feb. 12	Feb. 13
2. AC Circuits	Feb. 19	Feb. 20
3. Passive RC Filters	Feb. 26	Feb. 27
4. Regulated DC Power Supplies	Mar. 4	Mar. 5
5. Design and Construction of an Amplifier	Mar. 11	Mar. 12
6. Operational Amplifier Practicum *	Mar. 18	Mar. 19
7. Comparators and Schmitt Triggers	Mar. 25	Mar. 26
8. Transistors, Phototransistors and Relays	Apr. 1	Apr. 2
9. Properties of Digital Logic Gates	Apr. 15	Apr. 16
10. Introduction to Sequential Logic	Apr. 22	Apr. 23
11. Introduction to Soldering and Arduino	Apr. 29	Apr. 30
12. Final Project *	May 6 & 13	May 7 & 14