

Fall 2022 Physics 361 Electronics Laboratory

Class Hours: Tue & Thu 1:10 - 3:55 PM

Class Location: Nielsen 603 + 605

Credit Hours: 3

Instructor: Joon Sue Lee (Physics & Astronomy)

Office: 515 Nielsen

Office hour: Immediately after every class or by appointment

E-mail: jslee@utk.edu

Course GTA: TBD

Learning objectives of the course

- 1) Learn the mathematical foundation of electronics.
- 2) Learn to assemble and characterize common electronic circuits. Learn to use instruments (oscilloscopes, function generators, digital multimeters, DACs etc). Learn NI DAQ and LTspice.
- 3) Develop good laboratory habits on data collection, laboratory logbook, and how to write a well structured experiment report.

Required Textbook

Main: Curtis A. Meyer, An Introduction to Electronics for Science Students, Second Edition

Reference: Practical Electronics for Inventors, Fourth Edition, published by McGraw-Hill Education

Lab notebook

A quad ruled lab notebook is recommended. Preferably smaller than Letter size paper ($8\frac{1}{2} \times 11$ inches), so that you can make easily photocopies. The UTK bookstore has several suitable notebooks that meet this requirement. Do not use a piece of paper.

Electronic notebooks/notepads are also accepted.

Note-taking in laboratory is an important skill. Your notes do not need to look nice but it must be detailed allowing you or somebody else to reproduce the experiment later and/or to troubleshoot problem if something went wrong. You should draw detailed experimental schematics and record data to notebook.

Lab Reports

Everybody should write lab report for the first (#1) and the last (#8) lab (the last/final lab is the capstone). For Labs from #2 to #6 there will be one report per group. You share points with your lab partner, thus you are encouraged to work in lab reports together. Lab reports are due one week after the last lab. Use electronic software such as MS Word and LaTeX to prepare lab reports. **All lab reports (pdf format) must be uploaded on Canvas.**

Report should consist of the following parts:

1. **Title.** List the course name and number, name of the experiment, the date performed, your lab partner.
2. **Introduction.** A paragraph stating the goals of the experiment (keep it short and to the point). Give a brief explanation of the formulae you will use and how you will use them but do not re-derive formulas from the textbook.
3. **Methods.** A diagram of the experiment with all the associated instrumentation and wiring. Explain briefly data acquisition procedures.
4. **Results.** Present the raw data (can be copied from lab notebook). Graphs of all data and analysis of data.
5. **Discussion and conclusions.** This section should give a concise listing of the major findings of the experiment. Discuss your results and theoretical expectations.

Final Lab Report: There will be one in depth formal report due at the end of the semester. The specific experiment will be announced later. The formal lab report should contain the same sections as all other lab reports but have in depth Introduction, Methods and Discussion sessions. You should format your report as a scientific paper and follow formal writing style that is common in (technical) scientific papers.

Homework

Homework assignments are designed to prepare you for the analysis of lab exercises. Homework assignments are listed in the posted course schedule. They are due on the dates posted there. The homework assignments are longer at the beginning of the semester; as the labs get harder, the homework may decrease in intensity. **All homework must be delivered electronically on Canvas. Photographs of handwritten homework are acceptable.**

Missed deadlines

Missed deadlines for homework and reports will be reviewed with 20% penalty within a week after the due date. Additional 20% penalty will be cumulatively applied every week.

Attendance

Attending labs regularly is important to be successful in this course. If you have to miss a lab, contact the instructor. Every unexcused absence will lead to cumulative 20% penalty

to the lab report of the missed lab. No penalty is applied to the lab partner who attended the lab.

No exams: There will not be midterm and final exams.

Grading distribution

Reports (#1-7) 60%

Final Report 20%

Homework 20%

Grading scale

90% and above A

87% - 89% A- 83% - 86% B+ 80% - 82% B

77% - 79% B- 73% - 76% C+ 70% - 72% C

67% - 69% C- 63% - 66% D+ 60% - 62% D

57% - 59% D-

In final grades scaling may apply. Scaling will not lower your grade.

Announcements: For announcements check Announcements on Canvas regularly.

COVID-19 guidelines

[CDC guidance](#) recognizes the changing dynamics of living in a world with COVID-19. It rates COVID-19 community levels as low, medium, and high, with recommendations at each level about the use of masks and other precautions. At all levels of community spread, staying up-to-date with vaccination is the best way to protect yourself from serious illness and to limit the spread of COVID-19. Wearing a mask is always an option for any individual who chooses to do so, and the CDC recommends that those with high risk of severe illness talk with their health care providers. If you are sick, please stay in, avoid being around others as much as possible, and contact your health care provider for any symptoms that are worsening, moderate to severe, or concerning to you. For more information about vaccination or to self-report an illness and receive support, visit <https://studenthealth.utk.edu/CommunityHealth>. For more information about COVID-19, visit <https://studenthealth.utk.edu/covid-19>.

If you need to miss class for illness, contact the instructor.

Additional information

Please see the Campus Syllabus, which contains information that is common to all courses at UTK, such as academic integrity and addressing disability needs. <https://teaching.utk.edu/the-syllabus/>