

PHY 310 Electronics and Circuits



STAFF INFO

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Text: *Principles of Electronic Instrumentation*, by Diefenderfer & Holton, Thompson College Publishing;

The Art of Electronics by Horowitz & Hill, Cambridge Univ. Pres

Lecture/Lab:

M-W-F 9:30-11:20 HS-10B

Welcome to PHY 310!

Physics 310 is a lecture and laboratory course designed for students majoring or minoring in physics or other sciences who are interested in electronic design, experimental instrumentation and techniques used in physics and other experimental disciplines where inside knowledge of equipment is needed and/or highly beneficial. The main objective of this course is to introduce students to electronic elements and circuits and show how they can be applied in instrumentation and experiments. Although the applications will mainly focus on instruments in physics, the basics of electronics can be applied to a variety of experimental disciplines.

Why Electronics?

Physics is an experimental science. While theory is important for giving us the power of predictability and explanation of experimental outcomes, experiments lead us to new discoveries and can confirm existing theories. Most experiments today include measurements which involve electrical signals. Therefore the knowledge of basic manipulation of signals is essential to any experimental science.

Grading policy

Your Physics 310 grade will be based on quizzes, lab book reports, a project or presentation and participation.

Quizzes	40 %
Log Book	40 %
Project/Presentation	18 %
<u>Class participation</u>	<u>2 %</u>
Total	100 %

Schedule

Note: Class schedule is tentative and subject to changes.

No.	Experiment	Note
1	Direct Current Circuits	Ch. 1
2	Capacitors and Inductors	Ch. 2 (HH1)
3	Alternating Circuits	Ch. 3 & 4
4	Diodes and applications	Ch. 5 (HH1)
5	Test equipment and measurement	Ch. 6
6	Transducers	Ch. 7 (HH15)
7	Transistors	Ch. 8 (HH2)
8	Operational amplifiers	Ch. 9 (HH3)
9	Waveform generators	Ch. 10
10	Digital basics and Circuitry	Ch. 11 & 12 (HH8)
11	Digital & Analog I/O	Ch. 14
12	Noise	Ch. 15 (HH7)

Lab book (Reports)

Each topic in our schedule will be followed by lab exercises. The lab book should contain in detail description of the exercise, measurement procedures, calculations, results and conclusions. All circuits should be included as schematics. When possible, sections on measurements and results should contain graphs.

Lab books will be graded on a weekly basis following each topic (chapter).

Quizzes

There will be four quizzes spread over the semester. Since this is a lab course, the quizzes may contain experimental elements.

Class Presentation/Project

You have the choice of doing a presentation on a list of available projects concerning analog or digital electronics, or doing a practical electronic project in the department. Projects should include not just a detailed description of what was carried out, but also a successful demonstration.

Participation/attendance

It is assumed that you will actively participate in all class activities during lecture and lab periods. Participation in lab sessions outside the regular times is possible under special circumstances and with instructors permission. You may leave the lab session early after consulting with the class instructor. Excused absences may be due to serious illness, family reasons, court appearance, religious observance and varsity athletic events.

Exams

There are no formal exams for this course.

Homework

Homework will include preparation for the lecture/lab. This will include reading any handouts and relevant chapters in the textbook and/or any other sources (books, articles in scientific journals or from the web). You should be familiar with each lab project before coming to class.

If you have any special needs or disability please contact the ACE: Assistance to Students with Disabilities office to arrange accommodation.