

Physics 222

Electronics Lab

Dr. Bo Gao

Office: 1240B HN

Email: bgao@hunter.cuny.edu

Tel: (212) 396-6828

3:00 pm or by appointment

Spring 2019

Tuesday & Friday

12:10 - 2:00 pm Office Hours: Tuesdays 2:00 -

3 Credits

Course Objective and Outcomes:

This lab course is intended to supplement the material students learn in Physics 221 Electronics lecture. The experiments are designed to cover and verify the lecture theory. The lab also introduces measurement techniques using a multimeter, function generator and oscilloscope. Students will learn to design, assembly and determine the behavior of electronic devices and circuits that use resistors, capacitors, inductors, diodes, transistors and operational amplifiers. Successful completion of this lab will help students to demonstrate (1) understanding of electrical circuits in practical applications, (2) ability to conduct standard laboratory tests and measurements and to analyze and interpret experiments, (3) ability to use lab equipment safely and properly, (4) ability to apply circuit analysis and design, analog and digital electronics to the testing, operation and maintenance of electrical/electronic(s) systems.

Prerequisite: Physics 120 or 121.

Corequisite: Physics 221 Electronics (Must be taken simultaneously)

Text: Lab Manuals are provided and can be downloaded through Blackboard. Please purchase a notebook for notes and data recording.

Class Rules and Regulations:

1. No eating or drinking in the labs.
2. Students must read the manual before every lab and prepare for the experimental procedure with your understanding of the relevant theory.
3. Complete the experiment with the help of the instructor.
Record lab notes, introduction/objectives, circuit diagrams, the procedures and data on the lab notebook. Processing, analyzing the data and conclusions should be finished during the lab sessions. Make sure your notes are signed by the instructor each time before you leave the lab session.
4. Clean up the workstation after you finish each lab session. All equipment should be placed just as before you use. All the electronic components should be placed back in the component box.
5. No makeup labs.

Grading

Lab records (no attendance, no credit)	85%
Quizzes	15%

Lab Schedule for Physics 222 Spring 2019 (Tentative)

1/25 01: Introduction to the course and Ohms law

1/29 02: Oscilloscope and function generator

2/1 03: Ohm law continued

2/5 04: Voltage divider and complicated circuits

2/8 05: Fuses and Potentiometer

2/15 06: Wheatstone Bridge

2/19 07: Thevenin's theorem

2/22 08: Norton's theorem

2/26 09: RMS values of AC circuit

3/1 10: Capacitors

3/5 11: RC circuit (a)

3/8 12: RC circuit (b)

3/12 13: Capacitive reactance

3/15 14: Inductors

3/19 15: Impedance

3/22 16: Resonant circuits series tuned circuits

3/26 17: Resonant circuits parallel tuned circuit

3/29 18: Phase shift circuits - RC circuits

4/2 19: Phase shift circuits in series

4/5 20: Phase shift circuits - RL circuits

4/9 21: Voltage-Current characteristics of diodes and resistors

4/12 22: Rectifiers

4/16 23: Rectifiers with a capacitor filter

4/30 24: Operational amplifier

5/3 25: Square-wave oscillator

5/7 26: TBA

5/10 27: TBA

5/14 28: TBA