

Physics 37100 Advanced Physics Laboratory I (Fall 2013)

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Office Hours: Monday 2-4 PM (MR 422)

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Course Description (from Bulletin)

Experiments in electricity, magnetism, and electronics
Prereq.: Physics 20800; Co-requisite: Physics 35300 (required for Physics majors)
3 laboratory and 1 class/conference hour/week; 2 credit

Textbooks: *Introduction to NI ELVIS*, by Barry Paton
[www.ccny.cuny.edu/physics/upload/NIELVISCourseware.pdf]
An Introduction to Error Analysis, Second Edition, by John R. Taylor, University Science Books

Class Schedule: Monday, 4-5 PM, lecture/ conference;
Laboratory session in Room: MR-422, One 3 hour session per week

Class Outline and Schedule (Laboratory Room MR-422)

Week Beginning	Lab	Report due
9/9, 9/16	1. Electrical measurements	9/23
9/23, 9/30	2. Digital thermometer	10/7
10/7, 10/15	3. AC Circuits	10/21
10/21, 10/28	4. Operational amplifier	11/4
11/4, 11/11	5. Digital I/O	11/18
11/18, 11/25	6. Magnetic field sensor	12/2
12/2, 12/9	7. Free space optical communication; OR 8. Radio frequency (RF) wireless communication	12/16

General Information

Attendance: Class sessions will focus on discussion of concepts, relevant theory for the experiments. Regular attendance, on-time arrival, and participation in entire class are required. The real work will get done at the lab (MR-422). Attendance of one 3-hour lab session per week is required, and every experiment should be completed in two lab sessions over 2 weeks.

Reading Assignment: The text material is covered in the lab description. You should read the corresponding sections in the lab manual before coming to laboratory. You may have to look up relevant textbooks for detailed information on some of the materials.

Grades: Grade will be based on the lab accomplishments and the laboratory reports. To obtain full credits students must submit the report before or on the due date indicated above. Overdue reports will be degraded at rate 10% per week.

The reports should be **submitted electronically as a PDF file to shattuck@ccny.cuny.edu** with a copy to Mr. Suhoke at suhoke@sci.ccny.cuny.edu. The e-mail subject line "P371 last name report #N" **must** be indicated.

Course Objectives: Students are expected to understand principles of operations of electronic circuits and devices, build basic electronic circuits and measure parameters and response of the circuits, learn basics of error analysis in experiments. More specifically, after successfully completing this course, students should be able to:

- [1] Understand the main features of NI ELVIS workstation and the LabVIEW programming environment;
- [2] Measure properties of different electronic components and devices;
- [3] Measure properties of thermistor and electronic circuits using a thermistor;
- [4] Use digital multimeter, function generator, oscilloscope, impedance analyzer, and the Bode analyzer for AC circuits;
- [5] Measure the characteristics of a low pass, high pass, and band pass filter;
- [6] Study circuits such as a digital clock, digital counter, and a logic state analyzer;
- [7] Study and to understand the properties of Hall Effect sensors, building a simple Gaussmeter and a digital counter interface, using a linear Hall Effect sensor and a Hall Effect switch respectively;
- [8] Use an infrared optical source to communicate information over free space to a phototransistor detector; or
- [9] Use an antenna to send and to receive messages over a wireless radio frequency link.

Academic Integrity and Plagiarism: The CCNY Policy on Academic Integrity will be strictly adhered to. The document entitled, "CUNY Policy on Academic Integrity" is available from the link at the bottom of the CCNY Home Page. Make sure you have read the details regarding plagiarism and cheating, and be clear about the rules that the college follows. Cases where academic integrity is compromised will be prosecuted to the fullest extent according to these rules.