PHY 335: Electronics and Instrumentation Laboratory

Spring 2013

Prerequisite: PHY 251 with lab (PHY252)

Time and place:
L01: Tu and Th, 12: 50 p.m. to 3:50 p.m., in A-127, Physics
L02: M and W, 12: 50 p.m. to 3:50 p.m., in A-127, Physics

Instructor: Prof. M. Gurvitch, office B-147, x 2-7298, michael.gurvitch@stonybrook.edu
or avgur2001@yahoo.com ; Office hours TBA

Teaching Assistants (TAs): TBA

The required books:


Recommended additional book:


Also required: Two laboratory Science Notebooks

General organization of the course:

All material is divided into Units, with each Unit covering internally related topics (see below). Each Unit may occupy from 2 to 5 lab periods. Extensions of lab time may be arranged with the TA by prior mutual agreement, but should be done only under exceptional circumstances. No substitution of regularly scheduled lab periods is possible. There will be a short (about 30-45 min) mini-lecture at the beginning of most labs (please come to class on time, or you will be missing the mini-lectures). The mini-lecture may cover the main points of the upcoming lab, or may concern some other, related subject in electronics and physics. Understanding material covered in mini-lectures is absolutely essential in order to complete this course.

You must have two lab books with lined and graph paper (scientific notebooks). These books will contain your notes, circuits, calculations and data taken in the lab. After finishing a Unit, you will write a Report based on your own data and submit this Report and your lab book to TA for grading, while using the second book for the next Unit.
You will be doing the lab work either individually or in groups of 2 per setup. All students should make the best effort to participate equally in the experimental part. You will write your individual lab report after completion of each Unit. Except for the raw data which you will take with your partner, the reports are expected to be different and reflect individual work. Copying of any part of a report is unacceptable and will automatically lead to zero grade, as a first warning.

There will be *Midterm practical exam* during the semester (after Unit 3), and a *Final practical exam* at the end (after Unit 6). Exams include doing experimental tasks in the Lab, explaining the relevant theory, deriving essential formulas, and data analysis. Each exam will resemble a lab period and writing of the report combined. The exams are given in two shifts, so that each student will have to work on the exam problems on his or her own. Active and equal participation in experimental work and study of the material covered in mini-lectures during the course will prepare you for the exams. Sign-up sheets for each shift of the midterm will be posted in the lab 2-3 weeks in advance.

**Topics (Units) to be covered (some more in-depth than others):**

1. Lab instruments, signals, resistors, DC circuit analysis
2. AC circuits, capacitors, inductors, RC filters
3. Diodes and diode circuits; diode I-V characteristic
4. Transistors and transistor circuits; different types of transistors
5. Operational Amplifiers and negative feedback
6. Elements of digital electronics, Boolean logic, simple gates

**Grading:**

At least six units, the midterm and the final must be completed to pass this course.

The course grade will be calculated as follows: **60% Units + 20% 1-st exam + 20% 2-nd exam.**

*The 60% for Units includes 50% for Lab reports and 10% general quality of Lab work and level of participation as judged by the TA.*

**ACADEMIC INTEGRITY:** Each student must pursue his or her academic goals honestly and be personally accountable for all submitted work. Representing another person's work as your own is always wrong. Faculties are required to report any suspected instance of academic dishonesty to the Academic Judiciary. For more comprehensive information on academic integrity, including categories of academic dishonesty, please refer to the academic judiciary website at [http://www.stonybrook.edu/uaa/academicjudiciary/](http://www.stonybrook.edu/uaa/academicjudiciary/)