116C Title
Spring Quarter 2018
Physics 116C

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Physics 317

Lectures: M,W,F 12:10-1:00 PM in Rm. 140 Physics

Lab: Section 1: M 2:10-5:00 PM in Rm. 152 Roessler
Section 2: W 3:10-6:00 PM in Rm. 152 Roessler

Texts: *The Art of Electronics*, 3rd Edition, Horowitz and Hill
An Introduction to Error Analysis, 2nd Edition, John R. Taylor
`https://www.scipy-lectures.org/_downloads/ScipyLectures-simple.pdf`
Office Hours: W 2:00-3:00 PM in 152 Roessler, and also often available during most lab sessions.
Lab Instructor: Christopher Brainerd, cbbrainerd@ucdavis.edu
Midterm Exams: Two Midterm Exams:
These will be in-class, due to cheating in the spring quarter. Tentative date for first midterm in 4 May.

Final Exam: June 11, 2018 at 6:00 PM in Physics 140
Homework: There will be approximately five homework assignments.

Course Description: Use of computing in physics experimentation. The normal, binomial, and poisson distributions; the propagation and statistical analysis of experimental uncertainties; least squares fitting; Fourier transforms.

Course Objections: You will gain proficiency in Arduino microprocessor programing and data analysis with Scientific Python.

Lab Safety: You should complete the online course for Electrical Safety at
`http://safetyservices.ucdavis.edu/training/electrical-safety`.

Lab Reports: There will be three long lab reports for the Geiger Lab, Johnson Noise Lab, and the (floating) Muon Lifetime lab. The remaining labs include instructions for a report, generally much shorter with fewer requirements.

Tentative Course Outline:
The weekly coverage might change as it depends on the progress of the class. Most weeks we'll need to cover some additional material to prepare for the upcoming labs.

Week	**Dates**	**Lecture**	**Lab**
1	2,4,6 Apr	Microprocessors and Assembly	1) Intro to Arduino and Scipy
2	9,11,13 Apr		2) Arduino Function Generator
3	16,18,20 Apr	Statistical Distributions	3) Arduino Digital Scope
4	23,25,27 Apr	Uncertainties	4) Geiger Counter
5	30 Apr 2,4 May	Fourier Transform	4) Geiger Counter
6	7,9,11 May	Noise	5) Fast Fourier Transform
7	14,16,18 May	Statistical Analysis	6) Johnson Noise
8	21,23,25 May		6) Johnson Noise
9	(28),30 May,1 Jun		No Lab
10	4,6 Jun		7) Arithmetic Logic Unit