

Instructor:	James Jacobs
Office:	Science Complex. Room 119.
Phone:	243-4986 or 243-4950
Texts:	Required: <i>The Art of Electronics: Student Manual</i> by Hayes and Horowitz.
	Optional: <i>The Art of Electronics</i> by Horowitz and Hill.
Note:	Two copies of <i>The Art of Electronics</i> are on reserve at the Library and one copy of an earlier edition is available in the Lab (Rm. 12)
Meets:	Lecture: Mondays 3:10-5:00 PM in Rm 12 (Starts Jan 26)
	Lab: Tues or Thurs. 12:30-4 PM

Description: In this course you will receive advanced training in laboratory techniques such as electronics, care of delicate equipment, measurement techniques, and modern optics, as well as exposure to important experimental results in modern physics, spectroscopy and laser science. You will be responsible for completing weekly experiments during the semester (Listed on page two).

The first part of the course will consist mainly of electronics experiments which will require a laboratory notebook to be purchased and kept by each student. Every student will perform their own measurements and record the results in the notebook. As you work your way through the student manual, each question posed by the author must be answered fully and in complete sentences. A complete and accurate circuit diagram is essential for each exercise. Graphs should be well labeled and large enough to clearly see the important features. Feel free to draw conclusions and write down important points about each new circuit. The lab notebooks will be handed in each week and will be carefully checked and graded.

The Monday lectures are designed to prepare you for the weekly lab. It will be extremely time efficient for you to read the material carefully before the lectures. I reserved 2 hours for Monday lectures, but the full two hours will rarely be used (70-90 min is typical).

The second part of the course will consist of several Modern Physics and laser spectroscopy laboratories. For these experiments you will be required to write a formal lab report including purpose, theoretical background, apparatus, procedure, data tables, data analysis, and conclusions. Computer analysis of data is encouraged and some labs will require error analysis. Even though the laboratory reports for this portion of the course are only worth 20% of your grade (see below). Failure to hand in at least 2 lab reports will result in a failing grade regardless of your grades in other areas of the course.

Prerequisites for this course are successful completion of an introductory physics sequence (such as Phys 221-222). Completion of Fundamentals of Modern Physics (Phys 341) is encouraged but not required.

Exams: There will be two practical electronics skills competency exam which will be given during the semester. This exams will determine the extent to which the students have mastered the experimental techniques emphasized in the labs, and the students understanding of the theoretical background of the experiments performed. These tests will be given on an individual basis and will require making measurements.

Grading

Competency exams:	40%
Laboratory Notebook:	40%
Laboratory Reports:	20%

Tentative Schedule for Laboratories and Exams

Laboratories	Exams:
DC Circuits	
Capacitors and RC circuits	
Diode Circuits	
Transistors I	
Transistors II	Competency Exam 1:
Operational Amplifiers I	
Operational Amplifiers II	
Voltage Regulators*	Competency Exam 2:
The reverse Photo-electric effect.	
Measurement of the Index of Refraction of Air Using Laser Interferometry.	
Reflection from a dielectric Surface Verification of the Fresnel Equations	
HeNe Laser with External Mirrors	
Measurement of e/m for the electron	
Use of the Ebert-Mount Spectrometer	

* The starred experiments are optional. Some of the starred experiments will not be available this semester.