ELECTRONICS

Physics 226 - Spring Quarter, 2009 - University of Chicago

SUGGESTIONS FOR PROJECTS

It is time to begin thinking about your final project. Here are some guidelines. Remember that the course grade will consist of 60% for the laboratories, 10% for review exercises, 10% for a midquarter exam to be held on Thursday, May 7, and 20% for the final project.

The project may be undertaken in collaboration with another student in the course. The subject should be chosen by Tuesday, May 5. You are welcome to choose any subject with some relation to the topics covered in this course. Either design or construction (or both) will be acceptable.

On May 19, a preliminary account of the project should be handed in, including a circuit diagram and a one-page statement of what the project is intended to accomplish. The final paper on the project is due on the last day of class (June 4). Try to keep the length of the paper below 10 pages. We intend to post the final papers on the course web page, so PDF versions sent via e-mail (or with a URL) would be appreciated in addition to hard copies.

The idea of the project will be to identify some piece of electronic equipment which interests you and construct it, show how it works, or both. If a ready-made circuit is used, you should either build it or at least analyze its behavior in detail. If you design your own circuit, the design (and some analysis to prove that it will work) will be enough. The design must include power supply requirements.

On the next page are some suggestions for possible projects. Other circuit ideas can be found at the end of chapters 3, 4, and 5 of Horowitz and Hill. A copy of the American Radio Relay League Handbook is kept in the Electronics Lab. There is a Radio Shack at 1453 East 53rd Street if you need parts. A project which is constructed (on a circuit board) using parts from the Electronics Laboratory is acceptable as long as you return the parts afterward. The University has an amateur radio club station with several antennas which may be useful in testing certain final projects.

Microprocessor
Octave box
Modelling and testing a filter (Pspice, Orcad)
Automatic fuel injection controller
Touch pad decoder/generator
Automatic product code decoder
How your University ID card works
Optoelectronics: fibers, photodiodes, CCD's, switches
Nuclear magnetic resonance circuit
Impedance / standing wave ratio meter
Antenna modeling (EZNEC)
RF noise environment in Hyde Park
Coincidence circuits
Pulse amplification
Johnson noise in variable-gain amplifier
Voltage multipliers
Interface between oscilloscope and computer
Elementary analog computer
Elementary digital computer
Digital tuner
Analog-to-digital converter
Data acquisition system
Single-sideband modulator
Low-power radio transmitter
Earth-Moon-Earth Communication