

PHYS 310 Electronics

California State University Channel Islands – Fall 2008
Aliso Hall Science Building, Room 133

Instructor:

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Prerequisites:

Phys 101 or 201: introduction to physics and calculus.

Course Description & Objectives:

Electronics is everywhere in our lives, and is one of the fastest expanding fields in research, application development and commercialization. This new course explores electronics, from simple devices to complex instruments, at levels of abstraction from wavefunctions to software, blending theory with practical methods. There is a strong hands-on component to the subject to enable students to gain practical experience. Experiments will include the building, testing, programming, and modeling electronic circuits.

Student Learning Outcomes

Through this course, students will be able to

- explain the basic concepts of analog and digital electronics
- identify common electronic components and their applications
- search and retrieve practical information on electronic devices and circuits
- read, analyze and use simple circuit diagrams
- build, test and use analog and digital circuits
- understand and be able to use electronic test equipment including the multimeter, oscilloscope, signal generator, power supply
- demonstrate the role of electronics in data acquisition, metrology and the control of experiments
- use simulation and data analysis and display software to derive conclusions about experimental situations
- organize and express ideas clearly and convincingly in oral and written forms.

The course does not meet the University Writing and/or Language requirements.

Required Text

Horowitz, P., and W. Hill. The Art of Electronics. 2nd ed. Cambridge Univ. Press, 1989.

Grading criteria

Lab Reports (~10)	50%
Quizzes (~10)	25%
Participation (daily)	25%
Final Exam	25%
Extra Credit	5%

Lab reports, based on lab activities, make up the bulk of your grade. Students are encouraged to borrow or purchase equipment so they can continue to explore circuits at home. Lab reports should be written in standard technical style with a logical organization (e.g., Objective, Methods, Results, Discussion, Conclusions). Data should be intelligently organized in tables or graphs as appropriate. Reports are due at the beginning of class on the due date, and points will be taken off for late reports.

Quizzes. Students are expected to have completed all assigned reading and homework before class, and should expect daily 10-minute quizzes on this material. Quizzes will typically be at the beginning of class after questions, so please be on time. **There will be no make-ups for missed quizzes.**

Participation. Class attendance is required and has a significant effect on a student's success. In-class work is important to the understanding of the course concepts. A student who is absent is responsible to find out what material was missed.

Final Exam. The final exam will test on material from the entire semester.

Extra Credit (up to 5%). Opportunities can be arranged with the instructor. Students are encouraged to propose suitable projects that interest them.

Students are evaluated on their labs, participation, attendance and overall development. Grading will be based *approximately* on A: >90%, B: 90-80%, C: 80-70%, D: 70-60%, F: <60% and will not include +/- grades. Specific grade cutoffs may vary. Grades will be lowered for late or incomplete assignments.

Course Schedule

We will to cover the initial general topics in detail, and then survey the remaining and additional topics driven by student interest.

Basic concepts in electricity
Measuring electric parameters: VOM meter & oscilloscope
The art of electronic construction and debugging
Passive components
Simple circuits
Transistors, FETs, Op-Amps
AC sinusoidal steady state
Time vs frequency domain
Analog vs digital domains
Digital devices
Opto-electronics
Sensors and actuators

Summary of class rules:

Do the assigned reading before class. Write down some questions to test your understanding.
Be active and (relevantly) verbal in class. Explore your understanding with your peers and teacher.
Explore other sources, at the library, online, etc.

Don't be silent or complacent about not understanding something.
Don't try to memorize everything – nor try to understand everything.
Try to look at things from different angles, to analyze things in various (and new) ways.

Academic Dishonesty:

The University's policy on academic dishonesty is stated in the 2008-2009 Catalog and at http://www.csuci.edu/academics/catalog/2007-2008/12_policiesandregulations/50_academicdishonesty.htm. All work should be your own unless clearly attributed to other sources. Consequences for cheating are serious and will be taken seriously in this class.

Disability Accommodation Services:

The University provides a broad range of support services to meet the needs of students with all types of physical, psychological and learning disabilities. Please contact the Disability Accommodation Services in Bell Tower Room 1796 if you need accommodations and then discuss the prescribed services with your instructor as soon as possible. For more info, <http://www.csuci.edu/disability/disability.htm>.

Information contained in this syllabus, other than that mandated by the University, may be subject to change with advance notice, as deemed appropriate by the instructor.