

Physics 318: Theory and Applications of Electronic Measurements

Fall 2009

Text: *An Introduction to Modern Electronics* by William L. Faissler
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Course Objectives: Become familiar with modern electronic circuits and their applications. Includes circuit analysis, digital electronics, analog devices, transistor circuits, and computer interfacing.

Course Format: The course will normally meet for two lecture periods on Tuesday and Thursday of each week. We will also complete one lab experiment on Friday of each week. Most labs can be concluded within the 1 hour and 50 minutes allowed provided that students come prepared and work efficiently. Students can also work in the lab at other times to complete the assignments, if necessary. While the course material is not intrinsically difficult, the breadth of the material is substantial. Make sure you keep up with the readings in the text and supplemental materials as well as the problem assignments.

Assignments: Homework and lab assignments will be given each week. Each Tuesday, students may receive a "pre-lab" assignment. The pre-lab will contain questions and problems that test your understanding of key concepts covered in the forthcoming lab. The pre-lab assignments will be due at the beginning of the lab period and must be completed before you can begin the lab. There will also be a post-lab assignment for each experiment. The post-lab will include questions related to the analysis of your data, as well as questions that extend your understanding of the experiment.

Use of Computers The Advance Physics Lab contains six Apple iMac computers. Each computer contains a number of programs that will be useful in this course. In particular, students are encouraged to use *Excel*, a spreadsheet / graphics program for displaying and analyzing data. You should familiarize yourself with this program as well as the basic principles of the *Macintosh Operating System*. The computers also contain *MS Office* for constructing and manipulating graphics, web browsers, and other useful software.

Course Grades: The course grade will be computed as follows:
60% Homework and Lab Assignments
20% Mid-term exam
20% Final Exam (project)

Grade Scale:

94 – 100%	A
85 – 93%	B
76 – 84%	C
67 – 75%	D
≤ 66%	F

Course Outline: (Times are approximate)

Weeks 1-4	Basic Circuit Analysis / DC & AC Circuits / Resonance
Text	Chapters 1-10
Labs	DC Circuits / AC Filters / RLC Circuit
Weeks 5-8	Transistors and Introduction to Digital Electronics
Text	Chapters 40-44; 19-22 & 24 plus supplemental materials
Labs	Transistors / Logic Gates / Latches
Weeks 9-13	Digital Electronics and Operational Amplifiers
Text	Chapters 23, 25 & 28-32
Labs	Counters / Timers & Pulse Generators / Op Amp Circuits
Weeks 14-16	Diodes and Regulators / Analog to Digital / Digital to Analog
Text	Chapters 38, 35, 36, & 39 plus supplemental materials
Labs	Power Supplies / D-A and A-D Converters