

Physics 305/505 ELECTRONIC CIRCUITS AND DEVICES

1. General Information

Instructor: Dr. R. Knispel

Office: Halsey Science 348

Phone: (920) 424-4431

Office Hours: M 11:30 a.m. to 12:30 p.m.
T 11:30 a.m. to 12:30 p.m.
W 10:20 to 11:20 a.m.
Th 9:10 to 10:10 a.m.
F 9:10 to 10:10 a.m.

Course Meeting Time: Thursday 11:30 to 12:30 p.m. Lecture HS 456
Friday 3:00 to 4:00 p.m. Lecture HS456
Wednesdays 3:00 to 5:10 pm Lab HS 368

Text: Analog Electronics for Scientific Application by Dennis Barnaal, Waveland Press 1989 (paper)

Supplementary Text: Principles of Electronic Instrumentation, 3rd Edition By A. James Diefenderfer and Brian A Holton

Lab Material: Prepared by Dr. Knispel. Available at the Union Bookstore.

2. Grading

- 1) Tests
- a) 4 tests in the lecture part of the course
 - First, Second, and Third: closed book in class, one sheet of notes
 - Fourth: Take-home test
 - If all four are taken and receive passing grades, the best 3 grades out of 4 will be used to constitute 45%
 - b) Lab Test 9%
- 2) Assignments 16%
- 3) Lab work 30%

To pass and receive a complete grade in the course, the Lab test must be completed satisfactorily.

Course objectives

In this course the student should gain knowledge of DC and AC circuits, Fourier analysis and synthesis, amplifiers, oscillators, power supplies, and discrete circuit elements, including diodes, transistors, and silicon-controlled rectifiers. The ability to use diodes, transistors, operational amplifiers, and silicon-controlled rectifiers in simple applications will be emphasized.

To receive credit on homework, it must be handed in by the date of the test on the unit covered by the homework. Lab work which is not handed in by the day of the test that covers it may be subject to a 10% reduction in grade per week.

Grading Scale:

In-class tests	Take-home Tests	Homework
86-100 A	90-100 A	80-100 A
77-85 AB	84-89 AB	70-79 AB
68-76 B	73-83 B	60-69 B
62-67 BC	67-72 BC	52-59 BC
53-61 C	56-66 C	42-51 C
47-52 CD	50-55 CD	34-41 CD
40-47 D	40-49 D	25-33 D
< 40 F	< 40 F	< 25 F

R = Required to be included for a grade of **A in lab**

Labs	R	1.	DC Circuits and Instruments
	R	2.	Diode Characteristics
		3.	Transistors as Switches
		4.	DC Networks
	R	5.	AC Circuits: & Sine Waves
		6.	AC Circuits: Response to Transients
		7.	Diode Circuits
	R	8.	Power Supplies
	R	9.	Amplifiers: Introduction
		10.	Op Amp Special Circuits
		11.	More on Op Amps
		12.	Bipolar Basics
One		13.	Bipolar Transistor Amplifiers
Required		14.	Field Effect Transistors
	R	15.	Oscillators
	R	16.	Electronic Workbench Assignments These are categorized as one lab.

Note: Eleven Labs must be completed at A quality for a grade of A in the lab part of the course, including those 8 indicated as required for a lab grade of A.

Former Texts for Physics –305/505

Brophy, James, Basic Electronics for Scientists, 4th Edition 1983.

Anderson, L.W. and Beeman, W.W., Electric Circuits and Modern Electronics, 1973, Holt, Rinehart and Winston.

Other Texts

Benedict, R. Ralph, Electronics for Scientists and Engineers, Prentice-Hall.

Close, Charles M., The Analysis of Linear Circuits, 1966, Harcourt, Brace & World, Inc.

Comer, David J., Modern Electronic Circuit Design, Addison-Wesley.

Coughlin, R.F and F.F. Driscoll, Operational Amplifiers and Linear Integrated Circuits, 2nd Edition , Prentice-Hall 1986.

McCray, James A. and Cahill, Thomas A., Electronic Circuit Analysis for Scientists, 1973, Wiley.

Nilsson, James W., Introduction to Circuits, Instruments and Electronics, Harcourt, Brace and World.

Ryder, John D., Electronic Fundamentals and Applications, 4th Edition, Prentice-Hall.

Simpson, Robert E., Introductory Electronics for Scientists and Engineers, 1974 Allyn & Bacon.

*Boylestad, R. and Nashelsky, L., Electronic Devices and Circuit Theory, 5th Edition, 1992.

Malmstadt, Enke and Crouch, Electronics and Instrumentation for Scientists, 1981, Benjamin.

Mitra, S., An Introduction to Digital and Analog Integrated Circuits and Applications, 1980, Harper and Row.

Stringer, G. and Tinker, R., Amplifier Concepts, Technical Education Research Center.

*Horowitz, P. and Hill, W., The Art of Electronics, Cambridge University Press, 1980, 2nd Edition, 1989.

Uffenbock, John E., Introduction to Electronics, 1982, Prentice Hall.

*Excellent treatment at somewhat deeper level than our text.