EE 20242 **Electronic Circuits I** Instructor: Patrick Fay
Spring 2013 261 Fitzpatrick Hall
631-5693
pfay@nd.edu

Text: A. Sedra and K. Smith, *Microelectronic Circuits, 6th Ed.*, Oxford Univ. Press, 2010.
Web site: http://www.nd.edu/~hscdlab (homework assignments, other resources)

Supplementary reading:

B. Razavi, *Fundamentals of Microelectronics*, Wiley, 2008.
R. C. Jaeger and T. Blalock, *Microelectronic Circuit Design, 2nd. ed.*, McGraw-Hill, 2004.

Office hours:

P. Fay (261 Fitzpatrick): Wednesdays, 8:30-9:30 (tentative)
Chao Luo, TA (229 Cushing): Tuesdays, 5:00 pm

Description:

The course provides an introduction to the analysis and synthesis of electronic circuits for signal processing, using passive elements (resistors, capacitors, and inductors) as well as modern active devices including solid-state diodes and transistors. The design of both digital and analog circuitry will be discussed, and the applications and limitations of these circuits and devices will be addressed. The course includes an electronics laboratory to provide hands-on experience with the concepts and devices discussed in class.

Course Outline:

1.) Introduction and review; properties of amplifiers, input and output loading; operational amplifiers and related circuits: inverting, non-inverting amplifier configurations; summing and difference amplifiers; voltage comparators
2.) Solid-state diodes (pn junctions); analysis of diode circuits; applications of diodes: rectification, waveshaping, voltage regulation, and logic applications
3.) Bipolar junction transistors (BJTs); physical operation of BJT, biasing regimes, and circuit models; single-stage amplifiers; quiescent and small-signal analysis; large-signal and logic applications
4.) Field-effect transistors (MOSFETs): physics of operation, operational modes (enhancement, depletion), types (n-, p-channel), biasing regimes, and circuit models; amplifier circuits and analysis
5.) Logic inverters and other logic gates; CMOS switches for digital and analog applications

Homework:

Homework will be assigned and collected approximately weekly.

Examinations:

Two one-hour exams: Exam 1 covering topics 1 and 2 (estimated)
Exam 2 covering topics 3 and 4 (estimated)

Final exam: Cumulative

Grading:		
	Homework	15 %
	Exam 1	20 %
	Exam 2	20 %
	Laboratory	20 %
	Final exam	25 %