

Course title:

Analog Electronics

Class hours:

Monday, Wednesday, Friday 11:00-11:50

Office hours:

MWF 14-15

Instructor:

Dr. Anders M. Jorgensen

Workman 227

Phone: 505-835-5450

e-mail: anders@nmt.edu

Classroom location:

Workman 109

Textbook:

- *Adel S. Sedra and Kenneth C. Smith*, Microelectronics Circuits, Fifth edition, Oxford University Press.

Learning objectives:

1. You will learn the physical principles behind several analog electronic components.
2. You will learn the characteristics of amplifiers, diodes, Field effect transistors (FETs), and Bipolar Junction Transistors (BJTs).
3. You will learn how to design and analyze circuits containing one or more of these components.
4. In the accompanying laboratory exercises you will receive practical experience in building circuits with these components.

Prerequisites:

EE 212 and 212L (Circuits and Signals II).
Physics 122 or 132 (General physics II).
EE 321 and 321L are co-requisites of each other.

Topics covered:

In this course we will explore the physics behind modern semiconductor devices and learn how to use them in electronic circuits including as signal amplifiers and switches. The specific topics that we will cover are

1. Amplifiers, models, circuits, data sheets.
2. The PN junction, diodes, models, data sheets.
3. Zener diodes, and other types of diodes.
4. Field effect transistors (FETs)
5. Biasing FETs.
6. Designing amplifiers using FETs.
7. Bipolar junction transistors (BJTs)
8. Biasing BJTs
9. Designing amplifiers using BJTs

Course work:

1. Reading. You will be required to keep up with the course by reading the assigned sections in the books and writing reading summaries.
2. Active participation in class. Show up and respond to questions.
3. Homework. Assigned approximately weekly.
4. Exams. There will be a total of four exams during the semester. Only your the three highest exam scores will be counted.

Grading policy:

1. Active participation in class 10%
2. Reading summaries 10%
3. Homework 25%
4. Four exams 55%. The lowest exam score is dropped.

Approximate Lecture Schedule:

Week of	Lecture	Exam
Aug 24	Amplifiers	
Aug 31	Circuit models of amplifiers, frequency response	
Sep 7	Inverting and non-inverting amplifiers	
Sep 14	Difference amplifiers, feedback	
Sep 21	Integrators and differentiators	1
Sep 28	Diodes I-V characteristics	
Oct 5	Zener and other types of diodes	
Oct 12	MOSFETs and I-V characteristics	
Oct 19	MOSFETs and DC operation	2
Oct 26	MOSFETs as amplifiers	
Nov 2	Bipolar Junction Transistors (BJTs)	
Nov 9	BJT as amplifiers and switches	
Nov 16	BJT small signal operation	3
Nov 23	Current mirrors	
Nov 30	Amplifiers with active loads	
Dec 7	Review	4