EE 321 Analog Electronics

Course title:
Analog Electronics

Office hours:
TBD

Class hours:
M 11-11:50 (C), W 11-11:50 (C),
W 12-12:50 (J), (sometimes) F 11-11:50 (C)

Laboratory hours:
M 14-16:45

Instructor:
Dr. Anders M. Jorgensen
Workman 227
Phone: 505-835-5450
e-mail: `anders@nmt.edu`

Classroom location:
Cramer 101 (C)
Jones Annex 101 (J)

Laboratory location:
Workman 183

Textbook:

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

Learning objectives:

1. You will learn about the non-ideal properties of operational amplifiers.

2. You will learn about the physical principles of the PN junction, and how it is used to implement Diodes and Bipolar Junction Transistors (BJTs).

3. You will learn to use BJTs to build simple amplifier circuits.

4. You will learn the physical principles behind the Metal Oxide Field Effect Transistor (MOSFET).

5. You will learn how to build simple amplifier circuits with MOSFETs.

6. In the accompanying laboratory exercises you will gain hands-on experience building and operating all of these devices.

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. Stay current with assigned sections in the textbook.

2. Active participation in class. Show up, respond to questions, ask questions.

3. Homework. Turn in homework in class on the weekly due date.

4. Exams. Take exams. Three highest exam scores will be counted.

5. Laboratory exercises. Adequate preparation, prelabs when required, complete assignment in allotted time.

Grading policy:

EE 321	EE 321L
1. Homework 40%.	1. Weekly labs: 100%
2. Four exams 60%. The lowest exam score is dropped.	2. One lab grade is dropped

Approximate Schedule (subject to change, see website for actual schedule):

Week of	Lecture	Exam	Labs
Aug 23	Amplifiers		
Aug 30	Circuit models of amplifiers, frequency response		
Sep 6	Inverting and non-inverting amplifiers		
Sep 13	Difference amplifiers, feedback		1
Sep 20	Integrators and differentiators		2
Sep 27	Diodes I-V characteristics	1	3
Oct 4	Zener and other types of diodes		4
Oct 11	MOSFETs and I-V characteristics		5
Oct 18	MOSFETs and DC operation	2	6
Oct 25	MOSFETs as amplifiers		7
Nov 1	Bipolar Junction Transistors (BJTs)		8
Nov 8	BJT as amplifiers and switches		9
Nov 15	BJT small signal operation	3	10
Nov 22	Current mirrors		11
Nov 29	Amplifiers with active loads		12
Dec 6	Review	4	