# Lecture 1

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# 1 General Information

In ECE360, we learn about semiconductor devices. We have a hardware/software co-design process.

## 1.1 Course Outline

- Diodes

- Field-effect transistor (FET)

- Bipolar junction transistors (BJT)

- Small-signal analysis

- Single-stage amplifiers

- Operational amplifiers

- Introductory frequency-domain analysis

# 2 Diodes

Diodes are electronic one-way valves. They can be biased to compute any function, even an exponential. (Applications in machine learning.)

- Forward Biased
  Anode voltage greater than cathode

- Reverse Biased
  Cathode voltage greater than anode

*Note: current enters from anode and exits from cathode*
We can essentially replace diodes with open and short circuits depending on the polarity.