

## **EL 250 - Analog Electronics w/Lab**

4 Credit Hours

Introduces Operational-amplifier characteristics, Non-ideal behavior, saturation, frequency response, slew rate. Basic uses of op-amp: integrator, adder, differentiator, phase shifter, follower and filter. Other uses of op-amp: comparator, zero-crossing detector, clipping, clamping, waveform generators and wave-shaping circuits, Precision rectifier, schmitt trigger, Regulators: basic series and shunt regulators, series regulator with transistor feedback and with op-amp, Driving Digital logic from comparators, Sensors and Measurements, Transducers, Digital to Analog Converters (DAC's): Binary weighted resistor ladder, R-2R ladder, Analog to Digital Converters (ADC's): Flash ADC, Successive approximation ADC, Delta-sigma converters, Switched-capacitor ADC Feed-back technique and multi-stage amplifiers, differential amplifiers, and application of some special integrated circuits (IC's).