



THE OHIO STATE UNIVERSITY
COLLEGE OF ENGINEERING

Electronics Laboratory

ECE 3027

Credit Hours:

1.00

Course Levels:

Undergraduate (1000-5000 level)

Course Components:

Lab

Course Description:

Electronic amplification, signal processing, timing, and power regulation circuits. Experiments with electronics evaluation modules and use of an analog system lab kit for electronics testing.

Prerequisites and Co-requisites:

Prereq: 3020; and ECE or EngPhysics major.

Course Goals / Objectives:

- Use knowledge of circuits and electronics to design electronic circuits, and to measure and document performance of electronic circuits
 - Provide the student the experience of designing, constructing, testing, and debugging electronic circuits
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Course Topics:

- Overview of the TI Analog System Lab Kit Pro and lab procedures. Op Amp Circuits - verify correct operation by reducing offset voltage with unity gain configuration, and use this to estimate open loop gain.
 - Op Amp Circuits: Inverting and non-inverting configurations.
 - Op amp based Schmitt trigger, oscillators, and monostable multivibrator. Dual supply vs. single supply designs. Oscillator driving light emitting diode circuits.
 - Op amp integrators and differentiators - dual vs. single supply. Slew rate effects, settling time, and ringing behaviors.
 - Transistor amplifiers and inverters - single supply vs dual supply designs. N type vs P type transistor amplifier configurations.
 - Op amps combined with transistor buffer amplifiers for driving higher current loads such as light emission, sound, and other power considerations, such as regulation.
 - Measurements of TI Analog System Lab Kit's built-in low dropout regulator and DC-DC switching regulator.
 - Discrete low dropout regulator design and measurement. Op Amp selection with respect to stability and settling time.
 - Discrete form of switching regulator - LCR plus transistor switch.
 - Analog multipliers vs. multiplying Digital to Analog Converters (DAC). Programmable oscillator with analog multiplier vs. DAC.
 - Programmable filter with analog multiplier vs DAC. Controlling DAC with TI Launchpad Microcontroller.
 - Analog to Digital Converter in TI Launchpad Microcontroller.
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Designation:

Required