THE OHIO STATE UNIVERSITY
COLLEGE OF ENGINEERING

Electronics for CSE majors

ECE 2360

Credit Hours:
3.00

Course Levels:
Undergraduate (1000-5000 level)

Course Components:
Lecture

Course Description:
Electronics course for CSE majors. Circuits analysis and design around embedded systems

Prerequisites and Co-requisites:
Prereq: Engr 1182.01, 1182.02, 1182.03, 1282.01H, 1282.02H, 1282.03H, or 1282.04H, or 1186 and 1187 and 1188 concurrent; and Math 1152, 1161.01, 1161.02, 1172, or 1181H; and Physics 1250 or 1260; and CPHR 2.00 or above; and enrollment in CSE major.

Course Goals / Objectives:
- Master circuit concepts such as voltage, current, charge, resistors, inductors, capacitors, etc.
- Master how to analyze, design and implement circuits using Ohm's Law, Kirchhoff's laws, and device abstractions
- Be competent in GPIO and ADC interfaces of MCUs
- Be familiar with additional MCU peripherals (Such as Timers, PWM, SPI, I2C) and SoC architecture
- Be competent in analyzing complex embedded systems using a power, input, processing, output framework (PIPO)
- Be competent in prototyping embedded systems with multiple inputs and outputs
- Be familiar with how to use laboratory instruments, measurement methods, and troubleshooting skills

Course Topics:

- Course introduction and structure.
- Electronics circuits for ubiquitous computing
- Electronic circuits top-down overview
- Digital, microcontroller, and analog functions in digital circuits
- Lab equipment and project methods
- Electrical energy via current and voltage; resistor and device abstraction
- Circuit schematic analysis: voltage node method, energy storage and memory preview
- Circuits for digital electronics: inverters, logic, repeaters and amplifiers
- Internet of Things; robot circuits
- Electronics: bottom-up approach
- Linear vs. nonlinear hardware vs algorithms
- Diodes
- MOS transistors inside digital electronics; trillion-component computers
- Physical digital abstractions; bipolar transistors in board design
- Analog energy storage in lumped field: capacitance, inductance, delay, and frequency, LCR abstractions
- I/O interfaces, operational amplifiers

Designation:
Required