

ECE4185 Course Syllabus

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Embedded Microcontroller Design (3-3-4)

Prerequisites

ECE 2031/20X2 and (ECE 3040 or ECE 3055/3056 or CS 3240 or CS 3510) [all ECE courses min C]

Corequisites

None

Catalog Description

Design, implement, and debug embedded microcontroller systems. Develop code; understand underlying assembly code instructions and addressing modes. Use ADC, timers, and other resources.

Textbook(s)

Peatman, *Coin-Cell-Powered Embedded Design* (2nd edition), Qwik&Low, 2008. ISBN 9780979977008 (required)

Topical Outline

1. Introduction to C programming of a microcontroller via the
2. CPU structure, instruction set, addressing modes examined a
3. Sleep and idle modes for low-power operation
4. Interrupt operation and options
5. Internal microcontroller resources and their use
 - a. Clock sources
 - b. Watchdog timer
 - c. Timer/counters
 - d. Analog-to-digital converter
 - e. Input capture
 - f. Output compare
 - g. Data EEPROM
 - h. Serial peripheral interface
 - i. I2C interface
6. Typical external resources
 - a. LCD
 - b. Potentiometer
 - c. Rotary pulse generator
 - d. Accelerometer
 - e. Stepper motor

f. Temperature sensor