

ECE 340: Microcontrollers

Credits and Contact Hours: 3 credits, 3 lecture hours per week

Course Instructor or Coordinator: James F. Frenzel, PhD

Textbook: “Programming 32-bit Microcontrollers in C - Exploring the PIC32,” Lucio Di Jasio, 2008.

Supplemental Materials: Course handouts (course web page)

Course Catalog Description:

Introduction to use of embedded microcontrollers and microprocessors; processor architecture; assembly language programming; use of development systems and/or emulators for system testing and debugging; software and hardware considerations of processor interfacing for I/O and memory expansion; programmed and interrupt driven I/O techniques.

Prereqs: ECE 212, 213, 240, 241, and CS 112 or 120

Coreq: ECE 341

Course Type: Required

Course Goals:

- Teach students how to solve engineering problems using microcontrollers
- Teach students how manage microprocessor resources
- Teach students to model software based systems

Student Outcomes:

Data collected in this course are used to assess achievement of Student Outcome (1): An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics.

Course Topics:

- 1) Elements of C programming
- 2) Program format and styles
- 3) Integrated Development Environment
- 4) Program Instrumentation (hardware and software)
- 5) Microprocessor Resource Management
 - a) Input / Output (I/O)
 - b) Timers and clocks
 - c) Interrupts
- 6) Parallel Communication
- 7) Serial Communication – Asynchronous and Synchronous
- 8) Pulse Width Modulation
- 9) Event Timing