

ECE 3362: Microcontrollers

Credit / Contact hours: 3/3

Course coordinator: Brian Nutter

Textbook(s) and/or other required material: *MSP430 Microcontroller Basics*, John H. Davis, Elsevier, 2008, ISBN: 978-0-7506-8276-3.

Catalog description: Advanced digital systems design and assembly language programming, interfacing, and applications of microcontrollers.

Pre-requisite(s) or co-requisites: ECE 1305 or CS 1411 and ECE 2372 (may be taken concurrently)

Designation: Required

Course learning outcomes: Upon completion of this course, students should be able to:

1. Analyze software aspects of digital systems using microprocessors and microcontrollers.
2. Design software aspects of digital systems using microprocessors and microcontrollers.
3. Write and debug assembly language programs.

ABET Student Outcomes addressed: a, b, c, e, and k.

Topics covered:

1. MicroControllers vs hard-wired logic, MicroControllers vs MicroProcessors - 1 hour
2. Mathematics of computers and elementary computer operations – 2 hours
3. Introduction to the MSP430 Micro-Controller Family – 2 hour
4. LaunchPad (Evaluation Board) familiarization – 2 hour
5. Input/output using ports of the MSP430 - 3 hours
6. Transfer, arithmetic and logic instructions – 3 hours
7. Branches, stacks, and subroutines - 4 hours
8. Execution speed and Real-Time Control – 1 hour
9. Assemblers and simulators – 6 hours
10. Hardware configuration, resets and interrupts – 4 hours
11. Timing and Pulse Width Modulation (PWM) system – 2 hours
12. Use of Analog to Digital system - 3 hours
13. Function and use of the Serial communication systems – 3 hours
14. Use of C language in the Microcontroller environment – 3 hours
15. Tests and reviews – 3 hours