United States Naval Academy
Department of Weapons, Robotics, and Control Engineering

Course: EW430 Embedded Systems

Credits: 3 credits – 2 recitation hours – 2 laboratory hours

Course Description: This is an applications focused introduction to embedded system design. Embedded systems are the electronic devices that surround us every day from cell phones to fitness devices, smart watches and more. This course emphasizes hands on design. Students are issued portable hardware kits used for weekly labs and a comprehensive final project. This course assumes a functional knowledge of C programming and familiarity with basic electronic circuits.

Pre-requisites: EW200 or Instructor Approval

Course Coordinator: Prof. John Donnal

Textbook: Make: AVR Programming by Elliot Williams (ISBN-13: 978-1449355784)

Course Objectives: At the completion of this course students will be able to:

- Create the core components of a modern computer processor from transistors
- Write code using the binary "1's and 0's" of assembly language
- Control a variety of hardware devices including graphic displays, speakers, and keypads
- Design and solder a printed circuit board (PCB)
- Build a complete embedded system

Topics: This course will cover the following major topics:

- Interfacing electronic sensors and actuators with a microcontroller.
- Advanced C programming to include:
    - Function based programming
    - Memory Management
    - Hardware Interrupts
- Familiarity with hardware design tools to include:
    - Logic Analyzers
    - Oscilloscopes
    - Debuggers
    - Multimeters
- Printed Circuit Board (PCB) Design, Fabrication, and Assembly

Last Updated: 07-January-2020