New York University Tandon School of Engineering

Electrical and Computer Engineering
Course Outline for ECE4144 Intro to Embedded Systems (4 Credits)
Spring 2025
Professor Matthew S. Campisi
T/Th 10:00AM – 11:20 AM Room: 2MTC 801

To contact professor: mcampisi@nyu.edu
370 Jay Street, 8th Floor
Phone: 646-997-3893

Course Pre-requisites:

Prerequisite(s): CS 2204 (C- or better) and EE 2024 (C- or better).
Note: ABET competencies: a, c, d, e, g, j, k.

Course Description:
The course covers architecture and operation of embedded microprocessors; microprocessor assembly language programming; address decoding; interfacing to static and dynamic RAM; Serial I/O, Parallel I/O, analog I/O; interrupts and direct memory access; A/D and D/A converters; sensors; microcontrollers. Alternate-week laboratory.

Course Objective:
The objective of this course is to provide foundations of embedded systems design and analysis techniques; expose students to system level design; and teach integration of analog sensors with digital embedded microprocessors.

Course Structure
3 Hours Lecture Weekly (M/W)
Bi-weekly Lab (Multiple days)

Requirements:

1. Adafruit Circuit Playground Classic - https://www.adafruit.com/product/3000
2. Adafruit Parts Pal : ID 2975 : $19.95 : Adafruit Industries, Unique & fun DIY electronics and kits
3. Small Alligator Clip to Male Jumper Wire Bundle - 6 Pieces : ID 3448 : $3.95 : Adafruit Industries, Unique & fun DIY electronics and kits
4. VS Code/PlatformIO IDE

Text (NOT Required):
Introduction to Embedded Systems: Using ANSI C and the Arduino Development Environment (Synthesis Lectures on Digital Circuits and Systems) 1st Edition

David Russell, ISBN-13: 978-1608454983 , ISBN-10: 1608454983
Topics Covered:

- Microprocessor Basics
- Embedded System Design
- ADC/DAC/PWM
- Sensors and Actuators
- Interrupts
- Timers
- Programming Interfaces
    - IDE
    - C
    - Assembly
- Communication Interfaces
    - GPIO
    - I2C
    - SPI
    - SDI
    - UART

Course requirements

1. Homeworks/Labs(4): Assignments to be completed biweekly. Demonstrated and submitted during scheduled lab.
   20% of Final Grade

2. 2 In-class quizzes
   40% of Final Grade

3. Term Project (Embedded Challenge Fall 2021)
   40% of Final Grade

Moses Center Statement of Disability

If you are student with a disability who is requesting accommodations, please contact New York University's Moses Center for Students with Disabilities at 212-998-4980 or mosescsd@nyu.edu. You must be registered with CSD to receive accommodations. Information about the Moses Center can be found at www.nyu.edu/csd. The Moses Center is located at 726 Broadway on the 2nd floor.