Course Number and Title:

**CompE-375: Introduction to Computer Programming**

Catalog Description:

Embedded system architecture; IO programming using parallel ports, serial ports, timers, and D/A and A/D converters; interrupts and real-time programming; program development and debugging tools; C language and assembler.

Credits: 3.0

Prerequisites by course: CompE-271

Textbooks and References:

Manufacturer's Data Sheets, Programming Reference materials
Web Resources, Instructor Notes

Lab resources: E-221 Lab with PCs, Rapsberry Pi, breadboard, LEDs and switches

Course Learning Outcomes:

1. Understand the differences between embedded systems and general purpose PCs
2. Apply microcontrollers to typical embedded systems
3. Cross-Development IDEs for Programming in the C language
4. Perform Low Level Hardware and Software Interfacing

Topics Covered:

1. Embedded Systems, Applications, Characteristics
2. Cross-development process - Host: edit; compile; Target: program and test
3. Volatile and other C language uses in Embedded applications
4. Implementation Dependencies: C data types: int, long, short, etc.
5. Bitwise operators: &, |, ^, and ~
6. Discrete Inputs: Basic Switch and Matrix Keypad Input
7. Discrete Outputs: LEDs
8. Timer/Counters
9. Asynchronous Serial Communication (UART)
10. Synchronous Serial Communication (I2C, SPI, I-Wire)
11. Simulation vs. In-system debuggers
12. Pointers, Tables, Interpolation, Preprocessing vs. Real-time calculation
13.

Class Schedule: Two 50 minute lectures and 3 hours of lab per week.