EE 310L

1. **Course Number & Name:** EE 310L, Microprocessors & System Design Lab
2. **Course Credit and Contact hours:** 1 Unit, 3 hours
3. **Course Coordinator:** Dr. Farid Farahmand
4. **Textbook:** Muhammad Ali Mazidi, Rolin McKinlay, and Danny Causey, *PIC Microcontroller and Embedded Systems: Using Assembly and C for PIC18*, 1st Edition, Prentice Teall, 2008. ISBN 978-0131194045.
5. **Supplemental Materials:** Lab instructions and slides / development board/kit / electronic parts.
6. **Specific Course Information:**
   a. **Description:** Laboratory work includes building and programming a microcontroller-based system and interfacing it to various external peripherals.
   b. **Prerequisites:** ES 210 and EE 230, co-requisite EE 310L, or consent of instructor.
   c. **Co-Requisite:** EE 310, or consent of instructor
   d. **Status:** ☑ Required for EE program, ☐ Elective, ☐ Selected Elective
7. **Specific Goals for the Course:**
   a. **Specific outcomes of instruction:** Upon successful completion of this course the students will gain:
      i. Ability to understand the internal architecture of a microcontroller, including working registers, ALU, memory, stacks, and bus systems.
      ii. Ability to write working programs using assembly language.
      iii. Ability to use programming tools and IDE to program microcontrollers.
      iv. Ability to program microcontrollers using C language.
      v. Ability to configure I/O ports.
      vi. Ability to understand how to interface various sensors, actuators, and display devices tot eh microcontrollers.
      vii. Ability to understand how different peripherals, such as ADC and DAC operate.
      viii. Ability to gain working knowledge of how to work with drivers, relays, and level shifters needed to interface with microcontrollers.
      ix. Ability to configure different timers and design counters.

x. Ability to understand the existing serial interfaces in microcontrollers.

b. This course supports the following ABET Student Outcomes:

i. SO-5: an ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives

8. Brief List of Topics to be Covered:

a. General micro-controllers architecture
b. Assembly language programming
c. Programming tools, including IDE
d. I/O port configurations
e. Sensors, actuators, display devices
f. ADC and DAC
g. Drivers, relays, and level shifters
h. Timers and counters
i. Serial interfaces