

EE 310

1. **Course Number & Name:** EE 310, Microprocessors and System Design
2. **Course Credit and Contact Hours:** 3 Units, 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:** Laptop for class activities
6. **Specific Course Information:**
 - a. **Description:** This course discusses hardware architecture of a general-purpose microprocessor and a micro-controller, memory hierarchy and supporting peripherals in micro controllers, comparison of various micro-controller architectures and capabilities, embedded system design using a micro-controller, data transfer protocols supported by a micro-controller, process of code writing, compiling, and executing programs using an IDE and a simulator.
 - b. **Prerequisites:** ES 210 and EE 230 or consent of instructor.
 - c. **Co-Requisite:** EE 310L 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 how microprocessors and microcontrollers operate.
 - ii. Ability to demonstrate a working knowledge of the necessary steps and methods used to interface a microcomputer system to devices such as stepper motors, sensors, etc.
 - iii. Ability to develop and demonstrate a structured assembly and C language program to accomplish a given task using a microcomputer.

- iv. Ability to demonstrate the use of interrupts and other programming techniques related to micro-controllers. Complete the design, development, programming, and testing of a microcomputer based project.
 - v. Ability to demonstrate a working knowledge of microcomputer busses and the flow of data within a microcomputer system.
 - vi. Ability to write professional product report.
 - vii. Ability to operate in team and work together towards a common goal. Become a more self-motivated and self-learner individual. H. Be able to read the data sheets.
- b. This course supports the following ABET Student Outcome:**
- i. SO-1: an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics.*
 - ii. SO-3: an ability to communicate effectively with a range of audiences.*

8. Brief List of Topics to be Covered:

- a. Microcontroller architecture
- b. Programming and problem solving
- c. Introduction to assembly programming & instructions
- d. C Programming
- e. Stack and subroutines
- f. Input/Output (I/O) ports and interfacing
- g. Interrupts timers & PWM
- h. Data converters
- i. Serial interfaces