CSI 4720: Microprocessor-Based System Design

**Credits Hours:** 4 credits, 3.57 contact hours/week.

**Instructor:** Debatosh Debnath, Ph.D.

**Text book:**


**Specific course information**

Applications of microprocessors and microcomputers to the solution of typical problems; interfacing microprocessors with external systems such as sensors, displays and keyboards; programming considerations; microcomputer system and memory system design. This is a laboratory and design oriented course. Students have to complete several laboratory assignments, several short design projects, and one large design project. Written report and oral presentation are required.

**Prerequisites:** CSI/ECE 3710

**Elective course**

**Course Objectives:** Upon successful completion of this course, students should be able to

- Write assembly language subroutines and call them as functions from C programs
- Use an A/D converter to read analog signals into a microcontroller
- Describe the output compare and input capture operations in a timer module of a microcontroller
- Generate pulse-width modulation (PWM) signals on a microcontroller suitable for controlling the speed of a DC motor or the position of a servo
- Describe how hardware interrupts work in a microcontroller
- Describe how serial data can be sent from one microcontroller to another using an SCI port, an SPI port, or a CAN bus
- Demonstrate the ability to interface external devices (including sensors) to a microcontroller
- Work in a team environment to design a microprocessor-based system and communicate the results in a written report and an oral presentation

**List of Topics:**

- Microprocessors
- Microcomputers
• Interfacing microprocessors with external systems
• Displays and keyboards
• Programming considerations
• Microcomputer system
• Memory system design