CSI 4720: Microprocessor-Based System Design

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

Instructor: Debatosh Debnath, Ph.D.

Text book:

1. R. E. Haskell and D. M. Hanna, Learning by Example Using C—Programming the DRAGON12-Plus Using CodeWarrior, LBE Books, 2008.

2. H.-W. Huang, The HCS12/9S12: An Introduction to Software & Hardware Interfacing, Thomson Delmar Learning, 2006.

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