CSE453: HARDWARE/SOFTWARE INTEGRATED SYSTEMS DESIGN (4 Credits, Required)

Catalog Description
Software designs produced in the prerequisite CSE442 Software Engineering course are carried here to a complete hardware realization. Bringing skills learned from previous hardware and software-oriented courses, students form multidisciplinary workgroups and are given tools, parts, goals, and constraints, all of which define the integrated design setting. These workgroups identify, formulate, and solve the hardware and software problems posed by their project, and defend their realization concepts at key intervals during the project build-out. Projects are tested, and a report analyzing the level of satisfaction of design and performance specifications submitted. Each group prepares a 'rollout' presentation, which includes a demonstration of their project in operation. This is a required course for CEN majors.

Prerequisites
Prerequisites: CSE380 and CSE442, or permission of instructor
Corequisites: None

Textbooks(s) and/or other required material
PLC simulator (downloadable)
Project Management software (provided)
Software development environment (provided)

Course Objectives
To provide students with a complete design and implementation experience as a capstone to their education.

At the end of this course, students will be able to apply their experience on new career projects by having taken part in all phases of a design and implementation effort here, including working with real clients on a multi-disciplinary team, conceptualizing, analyzing, and designing a system, purchasing and assembling requisite hardware, and testing and delivering a completed system.

Topics Covered
Threads
Bandwidth
The Memory Model
Safety
Hardware I/O and Hardware Simulations
VB - using spreadsheets
VB - using databases
Programmable Logic Controllers
Sensors and Actuators

Class / Lab Schedule
Three 50-minutes lectures per week, and at least one 50-minute design team meeting (Recitation) per week.

Contribution of course to professional component/criterion 5
Engineering Topics: 4 credits
Engineering Design

Relationship of course to program outcomes
This course is required of all computer engineering students and has a significant relationship with the following program objectives for computer engineering:

> (k) an ability to use the techniques, skills, and modern hardware and software engineering tools necessary for computer engineering practice

This course has a strong relationship with the following program objectives for computer engineering:

> (c) an ability to design and construct a complex hardware and software system, component, or process to meet desired needs using relevant software engineering principles, within realistic constraints such as economic, environmental, social, political, ethical, health & safety, manufacturability, and sustainability
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> (d) an ability to function on multidisciplinary teams.
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> (e) an ability to identify, formulate, and solve hardware and software computer engineering problems using sound computer engineering principles

Persons who prepared this description and date of preparation
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