ECE 473/573 – Microcontroller System Design

Catalog Description: Implementation of embedded computer systems focusing on the development of hardware and software for an embedded microcontroller system. Topics include: (i) internal microcontroller architecture, (ii), interfacing peripheral devices, (iii) mixed analog and digital systems, (iv) hardware and software implementation of several systems using a microcontroller and peripherals.

Credits: 4   **Terms Offered:** Fall

Prerequisites: ECE 322, ECE 375, CS 261

Courses that require this as a prerequisite: None

Structure: Two 80-minute lectures plus one 3-hour lab per week

Instructors: R. Traylor

Course Content:
- Introduction to microcontroller-based system design
- Microcontroller architecture
- GNU/Linux C programming environment
- Hardware/software debug issues
- Creating and interfacing analog peripherals
- Timers/counters
- Interrupts
- Analog to Digital Converter
- I2C
- EEPROM
- SPI
- UART
- Embedded system software development.
- Lab Projects: 5-7 lab projects requiring hardware/software design, implementation, and documentation

Measurable Student Learning Outcomes:
ECE 473: At the completion of the course, students will be able to…
1. **Build** hardware that interfaces an embedded microcontroller to various peripheral devices such as DC motors, displays, analog, and digital circuitry (ABET outcomes: a, c, e, j, k)
2. **Program** this system using its interrupt, timer/counter, analog to digital converter, and serial communication facilities (ABET outcomes: a, c, k, p, q)
3. **Interface** analog circuitry with the microcontroller (ABET outcomes: a, c, k, p, q)
4. **Effectively utilize** microcontroller software development tools such as a compiler, make files, or compile scripts (ABET outcomes: a, c, e, k)
ECE 574: In addition to the above, ECE573 students shall...

5. **Write** a paper or **present** a talk **analyzing** a problem relevant to embedded processing or a problem particular one of the class projects.
6. **Implement** some significant, new functionality to one of the class projects well beyond the minimum required for ECE473 students.

Students with Disabilities:
Accommodations are collaborative efforts between students, faculty and Disability Access Services (DAS). Students with accommodations approved through DAS are responsible for contacting the faculty member in charge of the course prior to or during the first week of the term to discuss accommodations. Students who believe they are eligible for accommodations but who have not yet obtained approval through DAS should contact DAS immediately at 737-4098.

Link to Statement of Expectations for Student Conduct:
http://oregonstate.edu/studentconduct/http:/%252Foregonstate.edu/studentconduct/code/index.php

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