ECE450 - Embedded Systems Design
University: Midwest Engineering College
Course Duration: Full Year (Fall and Winter)
Instructor: Dr. Emily Johnson
Contact Information: emily.johnson@mec.edu
Office Hours: Mondays and Wednesdays, 1:00 PM - 3:00 PM

Course Description
This course focuses on the design and development of embedded systems. Students work on projects such as building a fully functional radio, developing a home automation system, or creating a component for a robot. The course emphasizes hands-on experience with microcontrollers, sensors, and actuators.

Learning Outcomes
By the end of this course, students will be able to:
1. Program microcontrollers for various applications.
2. Integrate sensors and actuators into embedded systems.
3. Design and implement embedded system software.
4. Test and debug embedded systems.
5. Document and present their design and implementation process.

Course Schedule and Deliverables
Fall Semester:
Table

Date	Deliverable	Description	Weight
September 15, 2020	Team Formation and Project Proposal	Teams form and submit a proposal outlining the project scope and objectives.	10%
October 20, 2020	Requirements Specification Document	Detailed requirements analysis and specification document.	15%
November 25, 2020	Preliminary Design Review	Presentation of initial design, including architecture and key components.	15%
December 10, 2020	Midterm Progress Report	Report on progress, challenges, and next steps.	10%

Winter Semester:
Table

Date	Deliverable	Description	Weight
February 15, 2021	Detailed Design Document	Comprehensive design document with detailed architecture and component design.	15%
March 20, 2021	Implementation and Testing Report	Report on implementation progress and testing results.	20%
April 10, 2021	Final Presentation and Demonstration	Final presentation and demonstration of the embedded system project.	15%

Grading Breakdown

- Team Formation and Project Proposal: 10%
- Requirements Specification Document: 15%
- Preliminary Design Review: 15%
- Midterm Progress Report: 10%
- Detailed Design Document: 15%
- Implementation and Testing Report: 20%
- Final Presentation and Demonstration: 15%

Total: 100%

Course Policies

- **Attendance:** Regular attendance is required. More than three unexcused absences may result in a lower grade.
- **Late Submissions:** Assignments submitted late will incur a penalty of 5% per day, up to a maximum of 25%.
- **Academic Integrity:** All students are expected to adhere to the university's academic integrity policy. Plagiarism or cheating will result in disciplinary action.

Required Materials

- Textbook: "Embedded Systems: Real-Time Interfacing to Arm Cortex-M Microcontrollers" by Jonathan W. Valvano
- Access to microcontroller development kits (e.g., Arduino, Raspberry Pi)
- Prototyping materials (to be specified based on project requirements)

Additional Resources

- University Library
- Embedded Systems Lab
- Online tutorials and workshops