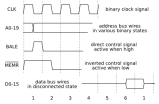
ECE 371-1

Microcontroller Interfacing

Fall 2017



2:30-3:20 Monday, Wednesday, Friday — 100 Holtzendorff

Instructor – William J. (Bill) Reid III **Office** – 207 B Riggs **Phone** – 656-5932

E-Mail – breid@clemson.edu **Office Hours** – 10:10–11:10 Mon & Wed or by appointment

Exam Time – Thursday, December 14th, 3:00-5:30 P.M.

Required Materials –

- ***Embedded Computing and Mechatronics with the PIC32 Microcontroller***, by Lynch, Marchuk, & Elwin, Elsevier, Newnes, 2016.
- ***Lecture Slides*** and ***Homework*** found on Clemson's Canvas: *https://www.clemson.edu/canvas/*
- **C Programming Tutorial**, online at http://www.cs.cf.ac.uk/Dave/C/CE.html
- **Manufacturers' Notes on Microcontroller**, online at http://www.microchip.com
- ***Laptop Computer*** – All or part of your tests and final exam will be taken on your laptop computer. ***Therefore, your laptop battery should be capable of lasting several hours.***
- ***Respondus Lockdown Browser*** – The first week of class you must install the and test this browser on your laptop: https://www.clemson.edu/online/tools/responduslockdown.html

Topics Covered

- Introduction to Microcontrollers
- Introduction to the PIC32MX
- Hardware & Software Tools
- Memory Interfacing on HC9S12
- I/O and keypad Interfacing
- Power and real-world constraints
- Exception Processing (Resets and Interrupts, Real-Time Interrupts)
- Timers and Counters
- Pulse Width Modulation
- Comparators
- Analog-to-Digital Conversion
- Digital-to-Analog conversion
- Synchronous Serial Comm. (SPI, I2C)
- Asynchronous Serial Comm. (UARTs)
- Engineering Ethics

Goals – Interfacing of microcomputers to peripherals or other computers for purposes of data acquisition, device monitoring and control, and other communications. The interfacing problem is considered at all levels including computer architecture, logic, timing, loading, protocols, and software for building and simulating designs. The course goals are satisfied by studying the widely used PIC32MX microcontroller chip family.

Grading Policy – Your final grade for this course will be determined by the following averaging procedure:

Tests	**≈ 50 %**
Short Quizzes/Homework/Class Participation	**≈ 15 %**
Final Examination	**≈ 35 %**

A = 90 – 100, B = 80 – 89, C = 70 – 79, D = 60 – 69, F = 0 – 59

Prerequisites – ECE 262 and ECE 272 (with a C or better grade.) It is crucial for all ECE 371 students to have a good working knowledge of low-level C programming.

Attendance – Punctual attendance is expected *and will be tested for*. Students are responsible for all material and assignments covered in class. If an instructor does not arrive within fifteen minutes of the scheduled start of class, you may leave.

Assignments and Tests – All assignments are due on the day and time specified and make-up work is possible *only* with a valid excuse. Students are expected to complete all assignments independently unless specified otherwise.

Academic Integrity, Manners, and **Title IX** statement **–** Please refer to the **`Academic Integrity`**, **`Manners`**, and **`Title IX pdf`** files in the class information module on ***Canvas***.

Students with Disabilities – Clemson policy states that students with disabilities needing accommodations should contact the Office of Student Disability Services in 707 University Union, 656-0515, prior to contacting instructor during office hours.

Legal Disclaimer – Any portion of this syllabus may be changed during the semester. Adequate notice will be given in class when necessary.