

ECE251 Course Syllabus: Fall 2019

Introduction to Microprocessors

TR 8:00 – 9:15 Clark A104

Instructor: **Dr. Bill Eads, Engr C103E**
Office phone: (970) 491-0717 (during office hours only)
Home phone: (970) 667-6914 (until 10 p.m., please)
Email: BEadsinCO@gmail.com
Office hours: Tuesday 9:30–10:30 and Thursday 9:30–11:00 or by appointment

Lab TAs **Emily Dalton** edalton4@rams.colostate.edu
Yingheng Li yhli@rams.colostate.edu
Grader **Jim Bryce** jbryce@southeastoffset.com

Text: Embedded Systems with ARM Cortex-M Microcontrollers in Assembly Language and C (Third Edition), Dr. Yifeng Zhu, ISBN: 978-0-9826926-6-0 First or second edition acceptable.

Course Description: Microprocessor organization, assembly language, I/O techniques, device interfaces, applications, hardware and software.

Prerequisite: ECE102 (Digital Circuit Logic)

Grading and Exams (tentative): (+/- Grading is used)

Midterm Exam	20%
Final Exam	20%
Labs & Practicals	20%
Homework Assignments	10%
Quizzes & Participation	30%

Homework: Homework problems will usually be assigned every other week due two weeks later in the ECE251 box in the BC infill. Late homework will not be accepted.

Labs: There will be a series of 9 labs using the TM4C123G board and processor ; they are one and two week labs. There will be two lab practical exams in lab during the course, focused on programming this processor. Successful completion of **all labs** is required for a passing course grade.

Collaboration: You are expected to work on all homework problems and labs yourself (or within your team), but reasonable collaboration is allowed and encouraged. Copying homework or software from another student is not allowed. No collaboration will be allowed on any quiz, exam or practical.

Attendance in class is expected. If you are unable to attend class, it is your responsibility to obtain class notes or other information. Make-up quizzes will not be allowed; however, your lowest quiz score will be dropped from your quiz average.

ECE 251 Course Outline

Digital Logic Fundamentals

Microprocessors: Major Components

ARM Cortex Microcontroller: Register Model & Addressing Modes

ARM Cortex Assembly Language Programming

ARM Cortex Instruction Set:

**Data transfer and manipulation
instructions**

Arithmetic Instructions

Logical and Bit Operations

Branch Instructions

Advanced Assembly Programming

Software Delay

Programming Techniques

Assembly Process

Loops

Stack and Stack Pointer

Subroutines and Parameter Passing

Parallel I/O

Exceptions: Resets and Interrupts

MID-TERM Exam (about October 10) in class.

ARM Cortex Communication Systems—Serial vs. Parallel

Analog-to-Digital Conversion

SysTick Real Time Clock

Timer Module

Fixed-Point and Floating-Point Numbers

Adding Memory to Processor

Guest Lecture: Future of Computing

Course Review

FINAL EXAM—Thursday, Dec. 19, 9:40am (1 to 1¼ hours)