

**CSCI 255**  
**Introduction to Embedded Systems**  
**Fall 2013**

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Class/Lab: Main Hall 107 (WF 2 pm – 2:50 pm)  
NRB 228 (M 2 pm – 4:50 pm)

Textbook: [\*MSP430 Microcontroller Basics\*](#) by John Davies  
Class web page <http://katie.mtech.edu/classes/csci255/>

Pre-requisites: CSCI 111 or CSCI 112 or consent

**Course Description:**

*Develops basic concepts of computer systems and computer architecture. Includes base-2 arithmetic, octal and hexadecimal number systems, computer addressing modes, I/O, assemblers.*

**Course Goals:**

R1. Students understand basic digital circuits including transistors, logic gates, and latches. (CAC-c; EAC-c)

R2. Students understand at a high-level how a computer processor operates (fetch-and-execute cycle, interrupts, registers, memory, addressing, etc.) (CAC-a; EAC-a)

R3. Students know and can use numbers in any base and can convert numbers between bases. (CAC-a; EAC-a)

R4. Students can use an editor and an assembler to write and execute assembly and C language programs for a specific processor and Software Development Kit. (CAC-c, i; EAC-c, k,1, 3)

R5. Students know the assembly language instruction set for a specific processor. (CAC-c; EAC- 1)

## **Expectations:**

E1. Students have a high-level understanding of the fundamental operations of a computer. (CSCI 111, R1)

E2. Students can use an editor and a compiler or interpreter to design, write and execute programs in a high-level programming language that comply with the MTech CS design language and programming language standards. (CSCI 111, R3)

E3. Students understand data types, variables, assignment, arithmetic and boolean expressions. (CSCI 111, R4)

E4. Students know how to use the basic selection and repetition control structures in a high-level programming language. (CSCI 111, R5)

## **Topics:**

- Intro to Embedded Systems
- Numerical Systems and conversion
- Bit Operations: Logical & Arithmetic
- Boolean Algebra
- Combinational Logical circuits
- Minimization/K-maps
- Sequential Logical circuits
- Computer Building Blocks
- Assembly Language MSP430
- Registers/Memory/Addressing/Program Flow
- Subroutines
- Timing & Interrupts
- Low-Power
- LCD programming
- Analog-to-Digital
- Serial Communication

## **Grading:**

- Assignments/Labs..... (20%)
- Quizzes..... (10%)
- Exam 1..... (15%) – Sept 27<sup>th</sup>
- Exam 2..... (15%) – Oct. 25<sup>th</sup>
- Exam 3..... (15%) – Nov. 22<sup>nd</sup>
- Final Exam..... (25%) – Dec. 13<sup>th</sup>

## **Class Rules:**

1. **Excused Absences.** If there is any medical or any other kind of emergency, please let the instructor know immediately. Makeup exams will only be given if you bring a valid medical documentation.
2. **Academic Conduct.** It is expected that the students will conduct with integrity in all course areas. Do not attempt to engage in a dishonest activity such as copying, plagiarism, falsifying information, etc. The instructor will take measures to check such instances and will submit the case to the proper authorities.
3. **Exemption.** A student may be exempt from the final exam if the student averages an "A" or 90 or better grade before the final exam. An "A" or 90 or better grade will be defined as the 90% or higher for the total percentage accumulated before the final exam.
4. **Disability.** Any student who may need an accommodation due to a disability, please make an appointment to see me during my office hours. A letter from a Montana Tech Disability Coordinator authorizing your accommodations is needed.