

ECE 251: Introduction to Microprocessors

IN

OUT

Number Systems

- Understand number systems
- Understand 2's complement representation and manipulation

Combinational and Sequential Logic

- Understand Boolean algebra
- Understand gate level design
- Understand finite state machines

Memory

- Has basic understanding of structure and behavior of ROM and RAM devices

Pre-requisites

- ECE 102 with a C or higher

Concepts:

- Unsigned and signed number and character representations
 - Components of a microcontroller
 - CPU, register model
 - I/O subsystems
 - Memory subsystems
- Instruction Set and Assembly Language programs
 - Math, logical, and bit instructions
 - Data transfer instructions
 - Programming techniques, flowcharting
 - Using subroutines and stacks
- I/O Capabilities
 - Parallel and serial I/O
 - Memory mapped I/O, I/O programming
 - Interfacing simple devices: pullup resistors, LED biasing, 7-segment display circuitry
 - Interrupt I/O: hardware and interrupt software
- Memory interfacing: logic, timing, and physical

Applications:

- Use of Microprocessors for computational and I/O tasks in stand-alone and embedded systems

Tools:

- Assemblers
- Debuggers

Microprocessor Systems

- Understand major components of a microprocessor system

Instruction Sets and C/Assembly Programs

- Knows microprocessor instruction set and addressing modes
- Write programs to perform computational and I/O tasks

Interfaces

- Write interrupt handlers and perform interrupt I/O

Clocks. A/D. Serial I/O

- Program and use internal I/O devices (e.g. real-time clock, timers, A/D converters, serial I/O)
- Understand various serial I/O protocols, including UART, SSI, SPI, I2C