ECE 251: Introduction to Microprocessors

**IN**

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

**OUT**

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