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

**OUT**

**Microprocessor Systems**
- Understand major components of a microprocessor system

**Instruction Sets and 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

**Interrupts and I/O**
- Understand basics of random signals and noise
- Analyze signal to noise ratio of an analog-modulated communication system

**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)

**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

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