ECE 251: Introduction to Microprocessors

IN

Number Systems

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

Combinational and Sequential Logic

- Boolean algebra
- Gate level design
- Finite state machines

Memory

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

Pre-requisites:

- ECE 102

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

P.O.C.: Bill Eads

OUT

Microprocessor Systems

- Understands major components of a microprocessor system

Instruction Sets and Assembly Programs

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

Complex Arithmetic

- Able to perform complex operations using simpler primitives

Interfaces

- Able to interface simple devices to processor (e.g. switches, LEDs) to perform direct I/O
- Can interface memory to microprocessor

Interrupts and I/O

- Able to write interrupt handlers and perform interrupt I/O

Clocks, A/D, Serial I/O

- Able to program and use internal I/O devices (e.g. real-time clock, timers, A/D converters, serial I/O)

As of 12/9/08