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Catalog Data: EE 308 Microprocessor Based System Design (4 cr.) Prerequisites: CS 303. Introduction to hardware and software design of microcomputer systems. Basic working principles of microprocessors, memory and I/O devices, bus interconnections, assembly language programming, integration of hardware and software design. Serial communications, parallel interfacing, interrupts and interrupt handlers, timing analysis and delay handling in microcomputer circuits. A term project involving the design and implementation of a self-contained microcomputer system for a specific purpose (i.e., embedded system) will be assigned, in addition to regular software/hardware lab assignments.

Reference Material:
- ATmega2560 Data Sheet
- AVR Instruction Set Manual
- AVR42787: AVR Software User Guide
- avr-libc Documentation: https://www.nongnu.org/avr-libc/user-manual/


Course Information and Software Resources:
- EE308 Course Web Page: http://acoustics.sabanciuniv.edu/ee308/
- PICSimLab: https://sourceforge.net/projects/picsim/
- AVRDUDE: https://www.nongnu.org/avrdude/
- AVRDUDESS: https://github.com/ZakKemble/AVRDUDESS

Goals: To develop the engineering skills of the students to design microprocessor based systems.

Prerequisites by Topic:
- Analysis and design of logic circuits.
- Basic computer organization, number representations and basic computing algorithms.
- Register transfer microoperations, datapaths, sequencing and control.
- C programming.

Weekly Schedule: (tentative)

01 Basic microcomputer structure
02 Microcomputer programming: basics
03 Microcomputer programming: memory management
04 Microcomputer programming: I/O management Lab#1
05 Microcomputer programming: data structures
06 Interrupt interfacing and management I Lab#2
07 Interrupt interfacing and management II
08 Device driver design Lab#3
09 Keypad, ADC/DAC and display device interfacing
10 Serial interfacing: asynchronous protocols Lab#4
11 Serial interfacing: synchronous protocols
12 Sensor Interfacing: protocols and physical layer Lab#5
13 DC Motor interfacing.
14 DC Motor interfacing. Project

General Rules
- Homework and lab assignments are announced one week before the deadline.
- No lab make-ups. Single exam make-up after the finals.

Grading: (tentative) Midterm 30%; Lab work & Project 35%; HWs 5%; Final 30%.