EE-308 Microprocessor Based System Design
Spring 2021-2022

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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:
- PIC24FJ256GB110 Family Data Sheet
- MPLAB® Assembler, Linker and Utilities for PIC24 MCUs User’s Guide
- PIC24 Family Reference Manuals (contains detailed peripheral information)
- MPLAB® XC16 C Compiler User’s Guide

Computer Usage: Assembler and C in MPLAB® X IDE.

Course Information and Software Resources:
- EE308 Course Web Page : http://acoustics.sabanciuniv.edu/ee308/
- Microchip Website : http://www.microchip.com
- Mississippi State ECE3724 Page : http://sites.google.com/site/ece3724/Home

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:
01 28/02–04/03 Basic microcomputer structure
02 07/03–11/03 Microcomputer programming: basics
03 14/03–18/03 Microcomputer programming: memory management
04 21/03–25/03 Microcomputer programming: I/O management Lab#1
05 28/03–01/04 Microcomputer programming: data structures Lab#2
06 04/04–08/04 Interrupt interfacing and management I
07 11/04–15/04 Interrupt interfacing and management II
08 18/04–22/04 Device driver design Lab#3
09 25/04–29/04 Keypad, ADC/DAC and display device interfacing MIDTERM
10 09/05–13/05 Serial interfacing: asynchronous protocols Lab#4
11 16/05–20/05 Serial interfacing: synchronous protocols
12 23/05–27/05 Sensor Interfacing: protocols and physical layer Lab#5
13 30/05–03/06 DC Motor interfacing.
14 06/06–10/06 DC Motor interfacing. Project

General Rules
- Homework and lab assignments are announced one week before the deadline.
- Submission deadlines and exams are never postponed.
- Shuffling of project groups and lab sessions are not allowed.
- No lab make-ups. Midterm make-up one week after the exam, the latest.
- Midterm to be held during lab hours.
- Cheating and late submissions are severely penalized.

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