

EE-308 Microprocessor Based System Design

Spring 2020-2021

Instructor: Ayhan Bozkurt, Room: FENS-1047, ext. 9537, e-mail: abozkurt@sabanciuniv.edu

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
- dsPIC30F/33F Programmer's Reference Manual
- PIC24 Family Reference Manuals (contains detailed peripheral information)
- MPLAB[®] XC16 C Compiler Users Guide
- R. Reese, J. W. Bruce, B. A. Jones, *Microcontrollers: From Assembly Language to C Using the PIC24 Family*, Course Technology, 2009.

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	22/02–26/02	Basic microcomputer structure	
02	01/03–05/03	Microcomputer programming: basics	
03	08/03–12/03	Microcomputer programming: memory management	Quiz#1
04	15/03–19/03	Microcomputer programming: I/O management	Lab#1
05	22/03–26/03	Microcomputer programming: data structures	Quiz#2
06	29/03–02/04	Interrupt interfacing and management I	Lab#2
07	05/03–09/04	Interrupt interfacing and management II	Quiz#3
08	12/04–16/04	Device driver design	Lab#3
09	19/04–23/04	Keypad, ADC/DAC and display device interfacing	Quiz#4
10	26/04–30/04	Serial interfacing: asynchronous protocols	Lab#4
11	03/05–07/05	Serial interfacing: synchronous protocols	Quiz#5
12	17/05–21/05	Sensor Interfacing: protocols and physical layer	Lab#5
13	24/05–28/05	DC Motor interfacing.	Quiz#6

General Rules

- Homework and lab assignments are announced one week before the deadline.
- Submission deadlines and exams are never postponed.
- Quizzes will be held during class hours.
- Cheating and late submissions are severely penalized.

Grading: Quizzes 50%; Lab work & Project 35%; HWs 5%; Final 10%.