Eastern

Faculty of Engineering
Department of Electrical and Electronic Engineering
EENG410 - Microprocessors I

Year and Semester : 3/4, Fall/Spring
Credit Hour : (4,1) 4
Pre/Co-requisite(s) : EENG115 (Introduction to Digital Logic**)**
Catalog Description:
Basic computer organization and introductory microprocessor architecture. Introduction to assembly language programming: basic instructions, program segments, registers and memory. Control transfer instructions; arithmetic, logic instructions; rotate instructions and bitwise operations in assembly language. Basic computer architecture: pin definitions and supporting chips. Memory and memory interfacing. Basic I/O and device interfacing: I/O programming in assembly and programmable peripheral interface (PPI). Interfacing the parallel and serial ports.

Prerequisite by Topic:
Detailed knowledge about digital logic circuits and experience on at least one programming language.

Instructor:
Hasan Demirel
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Textbook:

The 80x86 IBM PC and Compatible Computers,Assembly Language, Design, and Interfacing M.A. Mazidi and J.G. Mazidi, , 4th edition, Prentice Hall, 2003

References:

1.The 80x86 Family, Design, Programming and Interfacing, 3rd edition,Prentice Hall, 2002.
2.The Intel Microprocessors, Architecture, Programming and Interfacing, Barry B. Brey, Prentice Hall, 1994.

Course Objectives :
At the end of this course, students will be able to:

1. understand the main components and working principals of the Intel 80x86 microprocessor
2. program and debug in assembly language
3. understand the basic computer architecture
4. understand the memory organization and memory interfacing
5. perform input/output device programming in assembly
6. understand the hardware and software interrupts and their applications.
7. understand the properties and interfacing of the parallel and serial ports

COURSE OUTLINE & ORGANIZATION

WK #	D E S C R I P T I O N
1-2	**Introduction and the 80x86 Microprocessor**: Numbering and coding systems; internal organization of computers; data bus and address bus; brief history of the CPU; evolution of the 80x86 family; pipelining and registers; introduction to assembly programming; program segments; logical and physical addresses; data segments, code segments and stack segments; memory map of the IBM PC; pushing and popping operations; flag registers and bit fields; 80x86 addressing modes.
3-5	**Assembly Language Programming:** Directives and sample programs; assemble, link and run a program; control transfer instructions; CALL statement and subroutines; data types and data definition; simplified segment definition; arithmetic and logic instructions; BCD and ASCII operands and instructions; rotate instructions and bitwise operations.
6	**BIOS and DOS Programming in Assembly**: Interrupts and interrupt programming; BIOS 10H interrupt; DOS 21H interrupt; INT 16H and keyboard programming; macros and the mouse programming.
7	**Midterm Examination**
8	**Basic Computer Architecture**: 80x86 microprocessor PIN definitions and supporting chips; bus structure; data, address & control busses.
9	**Memory and Memory Interfacing**: Memory organization and memory types; ROM, PROM and EPROM; RAM memories, SRAM and DRAM; address decoding; IBM PC memory map; memory interfacing and timing.
10-11	**Input/Output and Device Interfacing**: Input/Output instructions; I/O interface; programmable peripheral interfacing (PPI); I/O programming in assembly.
12	**Interrupts and Interrupt Controllers**: Interrupts and Intel architecture; hardware interrupts and software interrupts; interrupt programming; interrupt service routines.
13	**Interfacing the** : Standard parallel port (SPP); port addresses; software registers and programming; bi-directional ports; using parallel port's IRQ; enhanced parallel port (EPP) and Extended capabilities port (ECP).
14	**Interfacing the** : Hardware properties; asynchronous serial communication and data framing; RS232 serial I/O standard; serial port's registers; programming with polling and interrupt driven.

Design Component:

Engineering Science Credit: 2
Engineering Design Credit: 2

Computer Usage: Personal Computers are used for the Assembling, linking and executing/debugging the programs written in Assembly language.

Laboratory Work: Laboratory sessions are organized in parallel to the coursework. Students are asked to perform 6 different experiments. For each experiment the students are asked to prepare and submit a lab report.

GRADING POLICY

Midterm Exam:25%, Project+Quiz + HW: 15%, Lab.: 20%, Final Exam: 40%.

NG Policy:

Students who do not attend more than 70% of the course lecture hours and miss two exams will be given **NG** grade.

Make-Up Policy:

Students missing an examination should provide a valid excuse **within three days** following the examination they missed. No separate make-up exams are administered for midterm and final exams. Re-sit examination is to be used as make-up examinations, instead.