

Course Syllabus Winter semester, 2019

Course name: Microprocessors

No.: 31215

The scope of the course: Lecture 2 h/w, Exercise 1h/w, Laboratory 3h/w credit: 4 points.

Prerequisites: Introduction to Computers (31230).

Department: Electrical and Electronics.

Instructor: *Dr. Pinchas Zorea*

Title: *Lecturer*

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Office Hours: *Wednesday 9:00 – 11:00 (appointments in advance via Email).*

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Course objectives:

This course introduces microprocessor architecture of 16-bit processor (Intel 8086).

Principles of microprocessor programming in Machine Code, Assembly 8086 language and Modular programming. Principle operation of RISC and CISC processors.

Programing for Windows OS, based on DLL files.

Advanced architecture of modern processors “Intel 32bit”, Pentium4- dual core, Pentium – pro and inside architecture of "Intel 64", Itanium.

Fundamentals of development of a microprocessor based system, Pentium- Main Memory Organization, Virtual Memory, Paging Mechanism, Cache Memory Organization.

Principles of serial communication, RS-232, USB.

Computer's I/O and interrupts programing techniques, timers, parallel and serial interfaces.

Laboratory activities in ASM86 language programing include developing the hardware and software required to incorporate microprocessors into computers systems.

PC peripherals including - Keyboard, Screen, Drives and I/O.

Course description:

Course is based on lectures, classroom exercises and laboratory experiments.

Participation in the laboratory – compulsory.

Grading policy:

- Final course exam - 80% - 100%.
- Final laboratory exam – 20%.

Lectures program

Week	Lecture subject	Reading
1-2	Introduction to microprocessors, Fundamentals and structure of the 8086 microprocessor	[1] – Ch0, Ch1.1,1.2 [2] – Ch1,[3] – Ch1
3	Assembly-86 language, program structure and instructions	[1] – Ch1, Ch2 [2] – Ch1, Ch2, Ch3
4	Assembly-86: Subroutines	[1] – Ch2,Ch3 [2] – Ch4, Ch5, Ch6
5	Assembly-86: DOS ,BIOS Interrupts	[1] – Ch6.2,Ch4.1-4.3
6	Assembly-86 HW & SW Interrupts	[1] – Ch6.2 [2] – Ch7
7	Modular Assembly , Macro Assembly - 86	[1] – Ch5.1 [2] – Ch7
8-9	Hardware structure of 8086 and peripherals interface. Signals timing diagrams	[1] – Ch0, Ch1.1,1.2
10	Introduction to modern processors – RISC,CISC Pipeline fundamentals	[1] – Ch23.1; 23.2;23.3 [2] – Ch18 [3] – Ch12, Ch13
11	Structure and fundamentals of Pentium Pro and Pentium 4	[1] – Ch23.4 [2] – Ch18 [3] – Ch12,
12	Cache memory structure and fundamentals in modern processors	[1] – Ch22.3 [3] – Ch4 Internet
13	Multi Core Processors: Structure and fundamentals	Internet
13	Embedded Systems	Internet
	Final exam	


Laboratory program

Week	Lab subjective
1	First-hand view of Debugging Program Emulator EMU8086 ❖ Memory Access Program Running
2	Move Operations Program Running
3	Bubble Sorting Program
4	Arithmetic Operations and Stack Access Program
5	The String Primitive Instructions - Text Edit
6	BIOS /DOS Interrupts for I/O Device's Access (Macro Assembly)
7	Modular Assembly : Public Procedures and Library Building
8	External Interrupts to PC - Resident Program (TSR)
9	Resident Program (TSR) – Real Time Clock
10-11	Resident Program
12	WIN32 - Assembly Programming for Windows
13	Final Test

References:

1. "The 80x86 IBM PC & Compatible :Assembler Language ,Design and Interfacing" by M.A.Mazidi, J.G.Mazidi , Prentice Hall; 4 edition (Aug 31 2002)
2. "The Intel Microprocessors" by Barry B. Brey, ,Prentice Hall ; 6 edition (2002)
3. "Computer Orgaization & Atchitecture" by William Stalling ,Prentice Hall ; 7 edition (2006)

Instructor: Dr. Pini Zorea **Signature:**  **Date:** 15/10/2019

Head of department: Dr. Nissim Sabbag **Signature:**  **Date:** 15/10/2019