



Course Code ECE-221	Course Title Microprocessors Lab	ECTS Credits 2
Department Engineering	Semester Spring	Prerequisites ECE-111, ECE-211
Type of Course Required	Field Engineering	Language of Instruction English
Level of Course 1 st Cycle	Year of Study 2 nd	Lecturer(s) Andreas Serghiou
Mode of Delivery Face-to-face	Work Placement N/A	Co-requisites ECE-220

Objectives of the Course:

The main objectives of the course are to:

- Help the students bridge the gap between the idealized situations presented in the associated theoretical course and the real world of the laboratory by carrying out selected hardware/software experiments using 8088 and 80386 microprocessor circuit board trainers and a personal computer.
- Provide the student with practical experience that relate to microprocessor architecture, programming, and interfacing techniques in realistic applications.
- Develop the skills in measuring and analyzing bus signals and acquire hands on experience on the 8/32-bit microprocessors and associated chip sets.
- Provide the students with the fundamental knowledge on how to read and understand microprocessor's technical drawings and do fault finding.
- Enable the students to use the Microsoft Macro Assembler to develop assembly programs for the Intel family of microprocessors.

Learning Outcomes:

After completion of the course students are expected to be able to:

- Demonstrate in depth practical knowledge and understanding of the hardware architecture of INTEL microprocessor systems.
- Demonstrate knowledge and analyze the principles and practical applications of 8/32 bit microprocessors.
- Analyze bus signals.
- Demonstrate competency in troubleshooting circuit faults.
- Read and understand microprocessor's technical drawings and do fault finding.
- Use microprocessors to communicate with and control devices in the outside world.
- Demonstrate competency in developing software using Assembly language programming.

Course Contents:

- A. Introduction to BGC-8088 System Microengineer
- *Hardware architecture*: CPU and clock circuit, reset control logic, clock generator, memory, status port.
 - *Monitor commands*: numerical treatment commands, memory management commands, assembler commands, program control commands.
 - *Program examples*: Controlling the blinking of LED through status port, controlling the speaker through status port.
- B. Introduction to Lab-Volt 32-bit Microprocessor Trainer
- Trainer Familiarization
 - Bus Operation
 - Memory Interfacing
 - I/O Interfacing
 - Interrupt Processing
 - Programming: Addressing Modes
 - Programming: 80386 CPU Instructions
 - Troubleshooting
 - Microprocessor Applications (DC Motor Control, Temperature Control)
- C. Introduction to MASM
- Introduction to DOS commands
 - Using DEBUG
 - Introduction to the Programmers WorkBench and CodeView. Program example:
 - Decomposition and display of an ASCII coded character enter on the keyboard in hexadecimal format
 - Introduction to Assembly Language Programming. Program examples:
 - DOS functions 02H and 06H to display characters
 - DOS function 09H to display a string of characters
 - Changing Character and Screen Background Colour
 - BIOS INT 10H to access the video display (positioning the cursor)
 - Develop a program requesting a password

Learning Activities and Teaching Methods:

The student is given a direct contact with the instructor, and thus the advantages of close direction and personal discussion of ideas, experimental methods and techniques.

Assessment Methods:

Methodology and conduct during execution of the experiment, Lab reports, Computerized tests, Final exam.

Required Textbooks/Reading:

Authors	Title	Publisher	Year	ISBN
Microport Computer Electronics Inc	User's Guide and Experiments, Introduction to BGC-	Microport Computer Electronics	2001	

	8088 MicroengineerV3.0	Inc		
Lab-Volt Systems Inc	Lab-Volt 32-Bit Microprocessor Lab Manuals	Lab-Volt Systems Inc	1998	0866570896

Recommended Textbooks/Reading:

Authors	Title	Publisher	Year	ISBN
Barry B. Brey	Laboratory Manual to Accompany 8086/8088, 80186/80188, 80286, 80386, Pentium, and Pentium Pro Microprocessors	Prentice Hall	1995	023142545
Barry B. Brey	The Intel Microprocessors	Prentice Hall	2009	0137140940