



# UNIVERSITY OF NICOSIA

## ΠΑΝΕΠΙΣΤΗΜΙΟ ΛΕΥΚΩΣΙΑΣ

University of Nicosia, Cyprus

<b>Course Code</b> ECE-322	<b>Course Title</b> Computer Organization and Architecture	<b>ECTS</b> 6
<b>Department</b> Engineering	<b>Semester</b> Fall, Spring	<b>Prerequisites</b> ECE-110, COMP-111
<b>Type of Course</b> Required	<b>Field</b> Engineering	<b>Language of Instruction</b> English
<b>Level of Course</b> 1 <sup>st</sup> Cycle	<b>Year of Study</b> 3 <sup>rd</sup>	<b>Lecturer(s)</b> Dr Charalambos Christou
<b>Mode of Delivery</b> Face-to-face	<b>Work Placement</b> N/A	<b>Co-requisites</b> None

### Objectives of the Course:

The main objectives of the course are to:

- Understand performance metrics
- Be introduced to an instruction set architecture
- Understand instruction types, register sets, addressing modes
- Understand flow-of-control, subroutine call and return mechanisms
- Understand the Structure of machine-level programs
- Be introduced to Arithmetic of Computers
- Construct an ALU
- Implement in hardware several Instructions like Addition, Subtraction, Multiplication and Division
- Be introduced to pipelining and memory hierarchy

### Learning Outcomes:

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

- Apply performance metrics
- Apply the concept of an instruction set architecture, ISA, and the nature of a machine-level instruction in terms of its functionality and use of resources (registers and memory).
- Utilize the various classes of instructions: data movement, arithmetic, logical, and flow control.
- Demonstrate the way in which subroutines are called and returns made.
- Design a basic ALU
- Implement in hardware several Instructions like Addition, Subtraction, Multiplication and Division
- Explain how conditional operations are implemented at the machine level.
- Appreciate how a lack of resources in ISPs has an impact on high-level languages

- and the design of compilers.
- Know, at the assembly language level, how parameters are passed to subroutines and how local workplace is created and accessed.
  - Know pipelining and memory hierarchy

**Course Contents:**

- Role of Performance
- Instructions: Language of the Machine
- Arithmetic of Computers
- Constructing an Arithmetic Logic Unit
- Implementing Instructions on the ALU
- Pipelining
- Memory Hierarchy

**Learning Activities and Teaching Methods:**

Lectures, In-class exercises, directed reading and homework, Learning through the project and project presentations

**Assessment Methods:**

Homework, Quizzes, Mid-Term, Final Exam, Project

**Required Textbooks/Reading:**

Authors	Title	Publisher	Year	ISBN
David A. Patterson and John L. Hennessy	Computer Organization & Design	Morgan Kaufmann	2005	

**Recommended Textbooks/Reading:**

Authors	Title	Publisher	Year	ISBN
Miles Murdocca and Vincent Heuring	Computer Architecture and Organization	Wiley	2007	