



## Course Syllabus

<b>Course Code</b>	<b>Course Title</b>	<b>ECTS Credits</b>
COMP-335	Computer Organization and Architecture	6
<b>Prerequisites</b>	<b>Department</b>	<b>Semester</b>
ECE-110 and COMP-111	Computer Science	Fall, Spring
<b>Type of Course</b>	<b>Field</b>	<b>Language of Instruction</b>
Required	Computer Science	English
<b>Level of Course</b>	<b>Lecturer(s)</b>	<b>Year of Study</b>
1 <sup>st</sup> Cycle	Dr Charalambos Christou	3 <sup>rd</sup>
<b>Mode of Delivery</b>	<b>Work Placement</b>	<b>Corequisites</b>
Face-to-face	N/A	None

### Course Objectives:

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:

1. Apply performance metrics.
2. 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).
3. Utilize the various classes of instructions: data movement, arithmetic, logical, and flow control.

4. Demonstrate the way in which subroutines are called and returns made.
5. Design a basic ALU
6. Implement in hardware several Instructions like Addition, Subtraction, Multiplication and Division
7. Explain how conditional operations are implemented at the machine level.
8. Appreciate how a lack of resources in ISPs has an impact on high-level languages and the design of compilers.
9. Know, at the assembly language level, how parameters are passed to subroutines and how local workplace is created and accessed.
10. Know pipelining and memory hierarchy

**Course Content:**

- 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 / Readings:**

Title	Author(s)	Publisher	Year	ISBN
Computer organization and design: the hardware/software interface	David A. Patterson and John L. Hennessy	Morgan Kaufmann	2014	ISBN: 978-0-12-407726-3 ISBN 978-0-12-407726-3 (pbk.)

**Recommended Textbooks / Readings:**

<b>Title</b>	<b>Author(s)</b>	<b>Publisher</b>	<b>Year</b>	<b>ISBN</b>
Computer Architecture and Organization	Miles Murdocca and Vincent Heuring	Wiley	2007	ISBN-13: 978-0471733881 ISBN-10: 0471733881