



## Course Syllabus

<b>Course Code</b>	<b>Course Title</b>	<b>ECTS Credits</b>
COMP-435	Advanced Computer Architecture	6
<b>Prerequisites</b>	<b>Department</b>	<b>Semester</b>
COMP-335	Computer Science	Fall, Spring
<b>Type of Course</b>	<b>Field</b>	<b>Language of Instruction</b>
Elective	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	4 <sup>th</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:  
Provide the student with the opportunity to study high-performance and supercomputer architectures used to solve very large-scale problems and computationally intensive applications, which are not realistically solvable on typical computers.

### Learning Outcomes:

- After completion of the course students are expected to be able to:
1. Assess parallel computers and scalability
  2. Compare multiprocessors interconnect (bus systems)
  3. Assess shared memory and message passing computer
  4. Compare vector and SIMD computers
  5. Explain massively parallel processing
  6. Explain granularity and dependencies
  7. Apply performance issues; Amdahl's and Gustaffson's laws
  8. Assess memory systems for parallel processors
  9. Discuss examples of supercomputers
  10. Explain software parallelism

**Course Content:**

- Parallel computers and scalability.
- Multiprocessor interconnects and bus systems
- Shared memory and message passing computers.
- Vector and SIMD computers.
- Massively parallel processing.
- Granularity and dependencies.
- Performance issues; Amdahl's and Gustaffson's laws.
- Memory Systems for parallel processors.
- Examples of supercomputers.
- Software parallelism

**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
Advanced Computer Architecture: Parallelism. Scalability. Programmability	Kai Hwang	McGraw Hill	2008	ISBN-13: 978-0-07-053070-6 ISBN-10: 0-07-053070-X

**Recommended Textbooks / Readings:**

Title	Author(s)	Publisher	Year	ISBN
Scalable Parallel Computing:	Kai Hwang, Zhiwei Xu	McGraw Hill	1998	ISBN-13: 978-0070317987 ISBN-10: 0070317984

Technology, Architecture, Programming				
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