



University of Nicosia, Cyprus

Course Code ECE-522	Course Title Advanced Computer Architecture	ECTS 8
Department Engineering	Semester Fall, Spring	Prerequisites ECE-322
Type of Course Elective	Field Engineering	Language of Instruction English
Level of Course 2 nd Cycle	Year of Study 1 st	Lecturer(s) Dr Charalambos Christou
Mode of Delivery Face-to-face	Work Placement N/A	Co-requisites None

Objectives of the Course:

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:

- Assess parallel computers and scalability
- Compare multiprocessors interconnect (bus systems)
- Assess shared memory and message passing computer
- Compare vector and SIMD computers
- Explain massively parallel processing
- Explain granularity and dependencies
- Apply performance issues; Amdahl's and Gustaffson's laws
- Assess memory systems for parallel processors
- Discuss examples of supercomputers
- Explain software parallelism

Course Contents:

- 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, Mid-Term, Final Exam, Design Project, Research literature review and presentation.

Required Textbooks/Reading:

Authors	Title	Publisher	Year	ISBN
J. L. Hennessy, D. A. Patterson	Computer Architecture: A Quantitative Approach, Fifth Edition.	Morgan Kaufmann	2011	978- 0123838728

Recommended Textbooks/Reading:

Authors	Title	Publisher	Year	ISBN
Kai Hwang	Advanced Computer Architecture	McGraw-Hill	1993	
Kai Hwang, Zhiwei Xu	Scalable Parallel Computing: Technology, Architecture, Programming	McGraw-Hill	1998	