

AU11727
COMPUTER SCIENCE 11727
Advanced Computer Architecture

PART I.

Catalog Description:

Parallel computer models, program and network properties. Principles of scalable performance, processors and memory hierarchy, cache and shared memory. Pipelining, Multi-processors and Multi-computers. SIMD and MIMD architectures.

PART II.

Major, Measurable Learning Objectives

Having successfully completed this course, the student will be able to:

- Describe computer performance metrics.
- Compare state-of-the-art computer architectures based on relevant performance metrics.
- Model and analyze interconnection network designs for parallel computer architectures.
- Analyze applications programs, formulate approaches for implementing the programs on advanced architectures, and select the most appropriate architecture to achieve a desired level of performance.

PART III. Texts and Special Teaching Aids

D. E. Culler and J. P. Singh, *Parallel Computer Architecture, A Hardware/Software Approach*, Morgan Kaufmann Publishers, 1999.

K. Hwang, *Advanced Computer Architecture, Parallelism, Scalability, Programmability*, McGraw Hill, 1993.

PART IV. Topics

- Computer architectures, taxonomies, performance models
- Principles of scalable performance
- Performance metrics
- Pipelining, vector processing, superscalar architectures
- Interconnection networks and performance comparisons
- SIMD systems: system case studies and applications
- MIMD systems: system case studies and applications
- Software support for massively parallel architectures

PART V. Tentative Grading

Type	Percentage %
Home Work	10%
Mid Term	20%
Essays and Presentations	20%
Project	20%
Final-Exam	30%

Part VI: Honor Code

The Alexandria University honor code will be strictly enforced.