

Basic Course Information CS 525

I Catalog Description

Architecture and organization of high performance computers. Principles of instruction sets. Pipelining, instruction level parallelism and multiprocessor. Memory, storage, and interconnection. Quantitative analysis and evaluation of design alternatives. Historical developments. Architectural tradeoffs and innovations.

II Required Coursework and Background

Pre-requisite(s): CS 365 or consent of instructor

III Expected Outcomes

On successful completion of this course, students will be able to:

1. Recognize the fundamental computer organization and architectural issues, and of the inherent limitations of the traditional approaches.
2. Learn the principles and the terminology involved in computer architecture, organization, and design.
3. Explain the methods of specification, description, measurement, and evaluation of processors and systems.
4. Appreciate the historical developments in computer architecture, and an acquaintance with many of the current innovative designs.
5. Build a basis for understanding the new computer architectures that are on the horizon.

Outcomes of this course will build student capacity in each of the following areas as defined by programmatic objectives for the computer science major.

P-SLO 2. An ability to comprehend and apply the state-of-the-art concepts and design principles in advanced computer architecture.

IV Instructional Materials

Texts may vary with instructor and over time. Examples of possible texts include:

Hennessy, J. L. and Patterson, D. A., Computer Architecture - A Quantitative Approach, Morgan Kaufmann Publishers Inc., 5th edition, 2012, ISBN: 978-0-12-383872-8.

V Minimum Student Material

Course textbooks

VI Minimum College Facilities

Computer laboratories, library, Blackboard, classroom with a projection system

VII Course Outline

Architecture, Organization, Implementation and Performance Issues

Uniprocessor Architectures

Instruction sets and compilation, Pipelining

Cache organization and Optimization

Multiprocessor Architectures

Parallelism and Interconnection networks

Current issues such as Virtualization.

VIII Instructional Methods

Lecture
Problem-solving
Discussion
Project-based learning

IX Evaluation of Outcomes

A. Student Assessment

i homework assignments and projects
ii mid-term
iii final
iv quizzes

B. Meaningful Writing Assignment

Students shall produce written solutions or proofs or programs to problems that are assigned as homework and/or programming projects and explain their reasoning.

Short answer essay questions on exams will require students to explain and justify their response in writing.

C. A Matrix of Course Student Learning Outcomes vs Methods of Assessment

If the course is being evaluated for accreditation purposes, approved department accreditation assessment tools will additionally be utilized.

Course Learning Outcomes	Method of Assessment			
	Assignments	Projects	Quizzes	Exams
Recognize the fundamental computer organization and architectural issues, and of the inherent limitations of the traditional approaches.	x	x	x	x
Learn the principles and the terminology involved in computer architecture, organization, and design.	x	x	x	x
Explain the methods of specification, description, measurement, and evaluation of processors and systems.	x		x	x
Appreciate the historical developments in computer architecture, and an acquaintance with many of the current innovative designs.	x			x
Build a basis for understanding the new computer architectures that are on the horizon.	x	x	x	x