

Computer Architecture

Course # COMP 3021

Credits 6

Prerequisites and/or Corequisites: Digital Logic and Design

Course Description

This course focuses on the basic architecture of computer systems including fundamental concepts such as components of the processor, interfacing with memory and I/O devices, organization of peripherals, and machine-level operations. The course presents detailed deliberation on various system design considerations along with associated challenges commonly employed in computer architecture such as pipelining, branch prediction, caching, etc., This course provides the students with an understanding of the various levels of abstraction in computer architecture, with emphasis on instruction set level and register transfer level through practical examples using the language MIPS.

Course Learning Outcomes

Upon the completion of this course, students will be able to:

- Describe the key components of the computer system along with their functionalities and limitations
- Explain the internal working of processor underneath the software layer and how decisions made in hardware affect the software/programmer
- Examine Instruction Set Architecture (ISA) designs and associated trade-offs
- Analyze factors effecting CPU performance e.g., pipelining and instruction-level parallelism
- Explain the I/O subsystems and memory modules of the computer
- Evaluate design and optimization decisions across the boundaries of different layers and system components.

Course Assessments and Grading

| Item | Weight |
|-----------------------|--------|
| Quizzes | 25 % |
| Midterm | 25 % |
| Homeworks/Assignments | 20 % |
| Final exam | 30 % |