

Study Guide

Computer Architecture

1. Arithmetic Logic Unit: Design: analysis of arithmetic operations and design of arithmetic units (adders, multipliers, dividers, etc.); floating point representations and operations; and fast arithmetic operations.
2. CPU Design: datapath design and busing structures; pipelined datapath; data and control hazards; and control unit design.
3. Processor Design: instruction sets; addressing modes; performance metrics.
4. Memory Systems: memory hierarchy and memory types; cache memory designs; interleaved memory; and architectural support for virtual memories.
5. I/O Systems: types and characteristics of I/O devices; I/O device interfacing (I/O buses, interrupts, DMA, etc.)
6. Concurrency; Different approaches to concurrency and their architectural characteristics.

The following Missouri S&T course is recommended as providing a minimal background in the above topics: CS 301 (**Introduction to High Performance Computer Architecture**).

Suggested references:

1. *Computer Architecture and Organization and Design* (Murdocca & Heuring).
2. *Computer Organization and Design: The Hardware/Software Interface*, (Patterson and Hennessy).
3. *Computer Organization*, Hamacher et. al.
4. *Computer Arithmetic; Algorithms and Hardware Design*, (Parhami (Ch 5, 6, 7, 9, 11, 12, 13, 14, 16))
5. *Introduction to Arithmetic for Digital Systems* (Waser & Flynn)