

EECS 322: *Computer Architecture*

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■ **Outline**

1. **Introduction**

Introduction to architecture. Turing machine computation model. Basic principles of machine design. Computer evolution. Technology impact on architecture.

2. **Instruction Set Design**

Instruction set architecture. Cost and performance measurements. Classification of instruction sets. Examples of instruction set machines. Quantitative comparisons. Reduced Instruction set design (RISC).

3. **Computer System Design**

Computer design methodology. Design levels. Review of gate-level design. Register level components and design. Design CAD systems.

4. **Data Path Design**

Basic processor datapath design. Design of Arithmetic Logic Unit (ALU). Design of Fast ALUs. Multipliers and Dividers. Floating Point Units.

5. **Instruction Sequencing and Control**

Instruction control steps and sequencing. State machine controllers. Hardwired control. Microprogrammed control. PLA controllers. Microsequencers. Examples.

6. **Pipeline Design**

Fundamental principles. Arithmetic pipeline structures. Instruction pipeline techniques. RISC instruction pipelines. Pipeline sequencing and control. Floating-point pipelines.

7. **Memory Systems**

Memory technologies. RAM design. Memory hierarchies. Cache memories. Memory allocation techniques and memory management.

8. **Input - Output and Communications**

Communication methods. Bus control and timing. More about buses. Interrupts and DMA.