CSE 471 Computer Design and Organization

Credits

4.0 (3 hrs lecture, 1 hr section)

Lead Instructor

Susan Eggers

Textbook

- *Computer Architecture*, Hennessy

Course Description

CPU instruction addressing models, CPU structure and functions, computer arithmetic and logic unit, register transfer level design, hardware and micro-program control, memory hierarchy design and organization, I/O and system components interconnection. Laboratory project involves design and simulation of an instruction set processor.

Prerequisites

either CSE 352 or CSE 378.

CE Major Status

Selected Elective

Course Objectives

Teach the design and architecture of major components of the structure of the central processing unit and memory hierarchy of modern microprocessor systems. Use a cycle by cycle simulator to illustrate logic complexities.

ABET Outcomes

(a) an ability to apply knowledge of mathematics, science, and engineering
(b) an ability to design and conduct experiments, as well as to analyze and interpret data
(c) an ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability
(e) an ability to identify, formulate, and solve engineering problems
(i) a recognition of the need for, and an ability to engage in life-long learning
(k) an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice

Course Topics

- Pipelining
- Branch prediction
- Exceptions
- Examples of CPU's in modern microprocessors
- Exploiting Instruction Level Parallelism
- Scoreboard and Tomasulo's algorithm
- Superscalars
- Caches and cache assists
- Hardware assists for paging systems
- TLB's
- Symmetric MultiProcessors
- Cache coherence
- Synchronization