THE OHIO STATE UNIVERSITY

COLLEGE OF ENGINEERING

Introduction to Computer Architecture

CSE 5421

Credit Hours:
2.00

Course Levels:
Undergraduate (1000-5000 level)
Graduate

Course Components:
Lecture

Course Description:
Organization of hardware and software in modern computer systems, including instruction set design, processor control, ALU design, pipelining, multicores and accelerators, and memory subsystem design.

Prerequisites and Co-requisites:
Prereq: 2231 or 321, and 2421 (360) or ECE 2560 (265), and 2000 or 261.

Course Goals / Objectives:
- Be competent with performance tradeoffs in computer architecture, especially as they relate to processor and memory design
- Be competent with the architectural components of a computer, especially the memory hierarchy and processor
- Be familiar with the design principles underlying modern instruction sets
- Be familiar with the RISC/MIPS programming
- Be exposed to the structure of a processor cache
- Be exposed to the design of multicore processors and the tradeoffs presented by different memory technology
- Be exposed to the architectural design and implementation of modern computer systems

Course Topics:
- State of the art in computer architecture, Moore's law, and the power wall
- Quantifying performance and power tradeoffs
- Design and architecture for reduced instruction set computers
- Digital logic and circuit design
- Architecture and design of memory, such as SRAM and DRAM
- Design of integer arithmetic logic unit (ALU)
- Floating point representation and arithmetic
- Processor control and pipelining
- Advanced topics in memory hierarchy, such as cache lines, associativity, and cache coherence
- Multicores and multiprocessors with an introduction to accelerators and interconnects
- Realization of architecture concepts in real systems

Designation:
Elective