THE OHIO STATE UNIVERSITY
COLLEGE OF ENGINEERING

Computer Architecture and Design

ECE 5362

Credit Hours:
3.00

Course Levels:
Undergraduate (1000-5000 level)
Graduate (5000-8000 level)

Course Components:
Lecture

Course Description:
Design of general purpose digital computers including arithmetic and control units, input/output, and memory subsystems.

Prerequisites and Co-requisites:
Prereq: 2560 and 3561, and undergraduate enrollment in ECE, CSE, or EngPhysics major; or Grad standing in Engineering.

Course Goals / Objectives:
- Be competent with typical assembly/machine instructions, as well as the key architecture design principles such as RISC vs. CISC.
- Master designing control unit systems to meet the requirements of the instruction set given the computer registers and hardware
- Be competent with CPU control design tools
- Master memory/cache system design algorithms such as cache mapping and replacement
- Be familiar with advanced architectural features such as pipelining, fast adder, and fast multiplication.
- Be exposed to embedded systems

Course Topics:

- Design of computer registers, buses, and control lines with timing considerations
- Instruction sets and their implementation in register transfers
- Hardwired and microprogrammed control units
- Simulation of control units using software to verify correctness of control unit design
- Memory units including cache memory
- Input/Output systems including polling, interrupt and DMA
- Fast multiplication and floating point operations
- Basic processing unit and pipelining
- Embedded systems

Designation:

Required
Elective