CS 472 – Computer Architecture

Catalog Description: Computer architecture using processors, memories, and I/O devices as building blocks. Issues involved in the design of instruction set architecture, processor, pipelining and memory organization. Design philosophies and trade-offs involved in Reduced Instruction Set Computer (RISC) architectures. (Cross-listed as ECE 472, CS 572, ECE 572)

Credits: 4 Terms Offered: Fall, Spring

Prerequisites: ECE 375

Courses that require this as a prerequisite: None

Structure: Two 80-minute lectures and one 110-minute lab per week

Instructors: Patrick Chiang, Jennifer Parham-Mocello

Course Content:
- Performance measurements
- Instruction set design
- Computer arithmetic
- Processor: data path and control design, pipeline design, memory system, I/O design, parallel systems

Measurable Student Learning Outcomes:
At the completion of the course, students will be able to…
1. Use various metrics to calculate the performance of a computer system (Level 3; ABET Outcomes: A, j)
2. Identify the addressing mode of instructions (Level 2; ABET Outcomes: A)
3. Determine which hardware blocks and control lines are used for specific instructions (Level 4; ABET Outcomes: A, j)
4. Demonstrate how parallel programming and multi-core architectures can benefit/degrade system performance, depending on software applications. (Level 3; ABET Outcomes: A, j)
5. Analyze clock periods, performance, and instruction throughput of single-cycle, multi-cycle, and pipelined implementations of a simple instruction set (Level 4; ABET Outcomes: A)
6. Detect pipeline hazards and identify possible solutions to those hazards (Level 4; ABET Outcomes: A, j)
7. Show how cache design parameters affect cache hit rate (Level 3; ABET Outcomes: A, j)
8. Map a virtual address into a physical address (Level 3; ABET Outcomes: A)

Additional Student Learning Outcomes for CS/ECE 572:
9. Implement a parallel algorithm using CUDA

Learning Resources:
Evaluation of Student Learning:
- Lab assignments
- Homework sets
- Exams
- Project
- Extra project for CS/ECE 572

Students with Disabilities:
Accommodations are collaborative efforts between students, faculty and Disability Access Services (DAS). Students with accommodations approved through DAS are responsible for contacting the faculty member in charge of the course prior to or during the first week of the term to discuss accommodations. Students who believe they are eligible for accommodations but who have not yet obtained approval through DAS should contact DAS immediately at 737-4098.

Link to Statement of Expectations for Student Conduct, i.e., cheating policies http://oregonstate.edu/admin/stucon/achon.htm

Revised: 12/6/2011