ECE 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 CS 472)

Credits: 4   **Terms Offered:** Fall, Spring

Prerequisites: ECE 375

Courses that require this as a prerequisite: None

Structure: Two 110-minute lectures per week

Instructors: Patrick Chiang, Kevin McGrath

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 (ABET Outcomes: A, n)
2. **Identify** the addressing mode of instructions (ABET Outcomes: A)
3. **Determine** which hardware blocks and control lines are used for specific instructions (ABET Outcomes: A, n)
4. **Demonstrate** how to add and multiply integers and floating-point numbers using two's complement and IEEE floating point representation (LABET Outcomes: A, n)
5. **Analyze** clock periods, performance, and instruction throughput of single-cycle, multi-cycle, and pipelined implementations of a simple instruction set (ABET Outcomes: A)
6. **Detect** pipeline hazards and identify possible solutions to those hazards (ABET Outcomes: A, n)
7. **Show** how cache design parameters affect cache hit rate (ABET Outcomes: A, n)
8. **Map** a virtual address into a physical address (ABET Outcomes: A)

ECE 572 has additional requirements in the project.

Learning Resources:
- D. Patterson and J. Hennessy, *Computer Organization and Design: The Hardware / Software Interface*, Morgan and Kaufman, Second Edition, 1997 (required)

Students with Disabilities:
Accommodations are collaborative efforts between students, faculty and Services for Students with Disabilities (SSD). Students with accommodations approved through SSD 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 SSD should contact SSD immediately at 737-4098.

Link to Statement of Expectations for Student Conduct:
http://oregonstate.edu/admin/stucon/achon.htm

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