

CS 355: Computer Architecture

Spring 2012

Studying computer architecture helps in understanding the software/hardware interface, selecting hardware, and optimizing system designs and implementation. We will focus on topics of processors, I/O, memory, and performance. This will culminate in a study of an energy efficiency system, including reviewing scientific papers and considering the societal implications of this new technology.

Instructor: Susan J Lincke, Ph.D

Email: lincke@uwp.edu

Web Page: www.cs.uwp.edu/Classes/Cs355

Office Hours: Wed. 5-6 PM

Thurs. 1-4 PM or by appt.

Office Phone: (262) 595-2129

Office Location: MOLN 255

Class Hours: Wed. 6-8:45 PM

Class Location: MOLN 130

Text: *Computer Organization and Design, 4th Ed.*, D A Patterson, J L Hennessy

Prerequisites: CS 245 Assembly Language

Homework Assignments: There will be 3 group presentations on hardware topics, and one paper.

Grading:

- In-class lab/homework: 10%
- Presentations (3@6%): 18%
- Paper: 12%
- Three exams @ 20% each: 60%

Grading Scale: A= 90% B=80% C=70% D=60% F<60%

Plus grades are assigned for grades within 2% of the next higher grade.

Minus grades are assigned for grades with in 2% of the next lower grade.

Course Outline:

1. Introduction (Chapter 1 except 1.4)
2. Performance Improvement (Chapter 1.4)
3. The Processor: Datapath & Control (Chapter 4-4.4)
4. Pipelining (Chapters 4.5-4.11)
5. Cache (Chapters 5-5.3, 5.8)
6. Disk Systems & RAID (Chapter 6-6.5, 6.9)
7. I/O and Interfacing (Chapter 6.5-6.8)
8. Multicore & Multiprocessors (Chapter 7-7.7)
9. Memory Management, Virtual Memory & Virtual Machines (Chapter 5.4-5.6)
10. Energy Efficiency

Due Dates: Exam dates and homework due dates are posted on my web page.

Graded Assignments:

Presentations: The three group presentations will be on: 1) a diverse assembly or hardware language, 2) advanced processors or peripherals, and 3) energy efficiency. Grading will be on technical concepts, presentation organization, and presentation style.

Paper: The paper will be written on a comparison of methods of energy efficiency, and their impact. The paper has three goals:

- **Technology:** The energy efficiency topic will enable students to consider computer architecture as a system, including the interrelationship between multiple hardware components.
- **Continuing Professional Development:** Students will evaluate four professional papers as part of this assignment. This will entail observing how the scientific method was used.
- **Social Impact:** Students will also investigate the social and environmental implications of energy efficiency, including increased competitiveness through lower costs. This has implications on a local and global scale.

Course Regulations:

Academic Honesty: Any indication of copying project work or any behavior during exams that could be considered copying or cheating will result in an immediate zero on the assignment or exam for all parties involved. In addition, the student's advisor/department will be notified. Cheating on assignments is defined to be copying from someone else or providing someone else copies of your answers. Do not show your assignments to anyone else! You may answer questions on labs or project homework asked by other students.

Exam Make-Ups: Prior notice must be given to me when an exam must be missed. No make-up exams will be granted unless satisfactory documentation is produced to show an extenuating circumstance.

Students with a Disability: Any student with a documented disability who needs academic adjustments or accommodations is requested to speak with me during the first two weeks of class. Please bring your letter of verification from the Disability Services Office (WLLC D175 at 595-2372). All discussions will remain confidential.

Accommodation for Religious Observances: UW-Parkside policy requires that reasonable accommodation for a student's religious beliefs. Please notify your instructor within the first two weeks of classes about any scheduled class date that conflicts with a religious observance.