

CIS 655/CSE661
ADVANCED COMPUTER ARCHITECTURE

Course Description

Advanced computer architecture, including discussion of instruction set design (RISC and CISC), virtual memory system design, memory hierarchies, cache memories, pipelining, vector processing, I/O subsystems, coprocessors, and multiprocessor architectures. Case studies of current systems.

Credits: 3

Bibliography/Texts/Supplies—Required

Hennessy and Patterson. Computer Architecture: A Quantitative Approach, 6th ed. MKP.

The grade for this course will be assigned based on the following percentages:

The course grade will be based on the quality of your work and reports.

Item Number	%
Homework Assignment 1	10
Homework Assignment 2	20
Homework Assignment 3	10
Homework Assignment 4	15
Midterm	10
Final Paper	10
Participation	5
Final Study Report	10
Final Exam	10

Midterm Exam:

There is one midterm exam.

Late Policy

Check the course Policy.

Course Schedule

1. Fundamentals: History, performance analysis, roadmap. Ch. 1
2. Processor Design: Instructions, Datapath design. Apps. A, (K online)
3. Advanced Pipelining and I/O: Controller, storage, I/O design. App. C
4. Memory Hierarchy: Cache and main memory, virtual memory system. Ch. 2, App. B
5. Instruction-Level Parallelism: Static and dynamic scheduling. Ch. 3
6. Data-Level Parallelism: Vector, SIMD, and GPU architectures. Ch. 4
7. Thread-Level Parallelism: Multithreaded and multicore systems. Ch. 5
8. Shared-Memory Systems: Centralized and distributed memory systems. Ch. 5
9. Interconnection Networks: Shared and switched media and topologies. App. F online
10. Miscellaneous Computer Architecture Topics and Review. Research papers

Term Paper:

You are required to conduct a study on computer Architecture topic of your choice and submit one term paper describing your analysis, opinion, and conclusion. You will be graded on the completeness of your survey, the accuracy of your summaries, the supporting evidence for your opinions, and the quality of your report. Three parts for your paper: 1. Idea: A preliminary abstract. “What is the problem statement? Why is it interesting and challenging?” 2. Background: A detailed progress report. “What are your sources, initial findings, and comparisons?” 3. Analysis. “What is your opinion and conclusion?”

Course Grade:

Grades:

A 96-100

A- 90-96

B+ 87-90

B 84-87

B- 80-84

C+ 77-80

C 74-77

C- 70-74

Etc

Academic Integrity Policy

Students are expected to do their own work. Unless explicitly given permission, you should not work with other students on the programming of your assignments. Do not take code from the Internet or other sources. Code sharing is also a violation of this policy.

Violation of this policy is grounds for failure from the course and reporting to the Academic Integrity office. Recent changes in policy allow for expulsion from the University on the first offense.

University's academic integrity policy reflects the high value that we, as a university community, place on honesty in academic work. The policy defines our expectations for academic honesty and holds students accountable for the integrity of all work they submit. Students should understand that it is their responsibility to learn about coursespecific

expectations, as well as about university-wide academic integrity expectations. The university policy governs appropriate citation and use of sources, the integrity of work submitted in exams and assignments, and the veracity of signatures on attendance sheets and other verification of participation in class activities. The policy also prohibits students from submitting the same written work in more than one class without receiving written authorization in advance from both instructors. The presumptive penalty for a first instance of academic dishonesty by an undergraduate student is course failure, accompanied by a transcript notation indicating that the failure resulted from a violation of academic integrity policy. The presumptive penalty for a first instance of academic dishonesty by a graduate student is suspension or expulsion. SU students are required to read an online summary of the university's academic integrity expectations and provide an electronic signature agreeing to abide by them twice a year during pre-term check-in on MySlice. For more information and the complete policy, see

<http://academicintegrity.syr.edu/>.

Disability-Related Accommodations

If you believe that you need accommodations for a disability, please contact the Office of Disability Services (ODS), <http://disabilityservices.syr.edu/>, located in Room 309 of 804 University Avenue, or call (315) 443-4498, TDD: (315) 443-1371 for an appointment to discuss your needs and the process for requesting accommodations. ODS is responsible for coordinating disability-related accommodations and will issue students with documented Disabilities Accommodation Authorization Letters, as appropriate. Since accommodations may require early planning and generally are not provided retroactively, please contact ODS as soon as possible.

Syracuse University values diversity and inclusion; we are committed to a climate of mutual respect and full participation. My goal is to create learning environments that are useable, equitable, inclusive, and welcoming. If there are aspects of the instruction or design of this course that result in barriers to your inclusion or accurate assessment or achievement, I invite any student to meet with me to discuss additional strategies beyond accommodations that may be helpful to your success.

Religious Observances Notification and Policy

SU religious observances notification and policy, found at <http://hendricks.syr.edu/spiritual-life/index.html>, recognizes the diversity of faiths represented among the campus community and protects the rights of students, faculty, and staff to observe religious holidays according to their tradition. Under the policy, students are provided an opportunity to make up any examination, study, or work requirements that may be missed due to a religious observance provided they notify their instructors before the end of the second week of classes for regular session classes and by the submission deadline for flexibly formatted classes.

For fall and spring semesters, an online notification process is available for students in My Slice / StudentServices / Enrollment / MyReligiousObservances / Add a Notification.

Instructors may access a list of their students who have submitted a notification in My Slice Faculty Center.

Student Academic Work Policy

Student work prepared for University courses in any media may be used for educational purposes, if the course syllabus makes clear that such use may occur. You grant permission to have your work used in this manner by registering for, and by continuing to be enrolled in, courses where such use of student work is announced in the course syllabus.

Educational use of student work: I intend to use academic work that you complete this semester for educational purposes in this course during this semester. Your registration and continued enrollment constitute your permission