

ECE 452 – Advanced Computer Architecture - I

Syllabus

Web Page

<http://www.ece.northwestern.edu/~memik/courses/452/index.html>

Instructor

Professor Gokhan Memik
Room: L475 Technological Institute
Phone: (847) 467-1168
E-mail: memik@eecs.northwestern.edu
URL: <http://www.ece.northwestern.edu/~memik>
Office Hours: Friday 2-3pm, Tech L475

Location and Time

MG28: TuTh 2:00pm – 3:20pm

Prerequisites

1. EECS 361
2. Programming expertise in C

If you haven't taken EECS 361 or equivalent, discuss it with the instructor before enrolling in the class.

Textbook

J. Hennessy and D. Patterson, *Computer Architecture: A Quantitative Approach*, Morgan Kaufmann, 3rd edition
(It is fine if you have the 2nd edition)

Other Material

Related conference papers (Most of the lectures will be based on these articles).

Objectives and Philosophy

When a student completes this course, he/she should be able to:

1. Understand the architecture of state-of-the-art high performance processors,
2. Understand instruction level parallelism and speculative execution,
3. Understand out-of-order execution and ways to achieve OOO execution,
4. Understand the memory system of current high performance processors,
5. Know the most important bottlenecks in current high-performance microprocessors and some important solutions to these bottlenecks,
6. Understand predicated execution, software pipelining, and trace scheduling,
7. Be able to understand the effects of different components of a simple pipelined ILP processor and to implement and simulate modifications.

Homeworks

There will be 4 homework assignments related to the topics covered in the class.

Project

This is probably the most important part of the course. You will be required to propose and perform some “original” research in computer architecture. Although topic suggestions will be provided, you are strongly encouraged to propose your own. This will be a group project with groups sizes of 2 (or 3 in unique cases).

Final Exam

There will be a final exam scheduled in the last week of classes.

Grading

Homeworks – 20 %

Project – 50 %

Final Exam – 25%

Participation – 5%

Late Policy

For each calendar day after the due date for the homework or the project, there is a 10% penalty. For example, after 1 day, the maximum score is 90%, after 2 days it is 80%, etc. No homeworks will be accepted after the solutions are posted.