

ECSE 425 Course Outline

Fall 2011

<http://www.info425.ece.mcgill.ca>

Computer architecture is the science and art of selecting and interconnecting hardware components to create a computer that meets myriad goals, including functionality, performance, cost, power and reliability requirements. In this course, we will cover the principles of computer design, pipelining, superscalar and out-of-order execution, memory hierarchy, and multiprocessor architecture. Students will be exposed to the importance of locality, parallelism and techniques for exploiting it at different levels, and various design trade-offs, including cost, power and reliability will be considered. The goal of this course is to familiarize students with these architectural concepts and techniques and give students the tools to quantitatively compare the performance of computers that employ them.

Staff

Instructor Professor Brett H. Meyer, brett dot meyer at mcgill.ca, x4210
OH: M 14-15, R 11-12, or by appointment, MC525

TA Alexandre Raymond, alexandre dot raymond at mail.mcgill.ca

Hours and location

Lectures MWF 10h35-11h25 WONG 1030
Tutorials F 15h35-16h25 ENGTR 0060

Prerequisites

ECSE 322: Computer Engineering, ECSE 323: Digital System Design

Text

J. Hennessy and D. Patterson, *Computer Architecture: A Quantitative Approach*, 4th edition, Morgan Kaufmann, 2006.

The text is on reserve at Schulich Library, and can be purchased at Paragraphe.

Supplemental Text

J. Shen and M. Lipasti, *Modern Processor Design*, McGraw-Hill, 2004.

The supplemental text is not required, but is also on reserve at Schulich Library.

Topics

1. Trends in computer technology and design; performance measurement
2. Pipelining
3. Exposing and exploiting instruction-level parallelism
4. Memory hierarchy
5. Multiprocessor architecture and thread-level parallelism

Grading

McGill University values academic integrity. Therefore all students must understand the meaning and consequences of cheating, plagiarism and other academic offences under the Code of Student Conduct and Disciplinary Procedures (see www.mcgill.ca/students/srr/honest for more information).

In accord with McGill University's Charter of Students' Rights, students in this course have the right to submit in English or in French any written work that is to be graded.

If you have a disability please contact the instructor to arrange a time to discuss your situation. It would be helpful if you contact the Office for Students with Disabilities (www.mcgill.ca/osd) at 514-398-6009 before you do this.

There are approximately six homework assignments, two midterm exams, a final project and a final exam. The approximate grading breakdown is:

- Homework 10%
- Midterm 1 15%
- Midterm 2 15%
- Project 30%
- Final 30%

We reserve the right to change these weights based on class performance.

Homework: Homework sets are due at the start of class on their due date. No credit will be given for late work without prior permission.

Exams: Midterm exams will be held in class, on October 12, and November 16. The final will be a 3-hour exam, administered according to the University's calendar.

Project: The final project will be to develop, simulate and evaluate an architectural element discussed in or related to material in the class. This project will require you to work in pairs to modify a large C program (a processor simulator), and run experiments with the purpose of measuring the performance effect of architectural changes.

Course Website

Consult the course website for updates to this outline, the course schedule, as well as to download lecture notes, assignments, and project files. You can find the website at:

<http://www.info425.ece.mcgill.ca>