CSci 360 Computer Architecture 3
Essentials: Course Communications, Content, and Structure

Communications

Class Meetings: Tuesday, Friday 11:10 A.M. - 12:25 P.M., HW207
Office: HN 1090J
Office Hours: Monday 11:30 A.M. - 12:30 P.M., Friday 12:45 - 1:45 P.M.
Email: stewart.weiss@hunter.cuny.edu
Telephone: (212) 772-5469 or (212) 772-5213 (department office)

Resources

Textbooks: *Computer Organization & Design: The Hardware/Software Interface*. David A. Patterson and John L. Hennessy. Fourth Edition. Morgan Kaufmann Publishers. 2008. ISBN-13: 978-0-12-374493-7.

Computing Facilities: Although there are no programming assignments, registered students will be given user accounts on the UNIX hosts in the 1000G lab of the Computer Science Department, located on the tenth floor of Hunter North. This lab is open 24 hours a day, 7 days a week and access to it is limited to students enrolled in selected courses. In addition, students will be able to use a secure remote login service such as *ssh* to access these accounts.

Website: All course materials, including lecture notes, slides, assignments, syllabi, and other resources, including this document, are posted on my website, at http://www.compsci.hunter.cuny.edu/~sweiss/course_materials/csci360/csci360_spr10.php

Prerequisites

Enrolled students must have successfully completed MATH 155 and either CSci 260 or CSci 245.

Learning Objectives

Material in this course supports the following *departmental learning goals*: 1a: (understanding the basic foundations and relevant applications of mathematics and statistics, particularly those branches related to computer science) through performance analysis of various architectural design choices; 1b: (understanding the relationship between computer architecture and software systems) by discussing how hardware supports various software tasks; 3a: (ability to communicate ideas effectively) by requiring homework that is graded in part on clarity and proper use of the English language; 3c: (ability to perform competitively on the Computer Science GRE) by exposing them to some of the material on that exam. This course fulfills GER 3/B requirement.

Specific learning objectives of the course are that, after completing the course successfully, the student should be able to:

1. Appreciate the use of buffers to control data-flow.
2. Identify the memory technologies found in a computer and be aware of the way in which memory technology is changing.
3. Describe the various ways of organizing cache memory and appreciate the cost-performance trade-offs for each arrangement.
4. Appreciate the need for cache coherency in multiprocessor systems.
5. Understand the various technologies of storage, including disks and flash storage.
6. Understand the methods of interfacing I/O devices to memory and the processor.
7. Discuss the concept of parallel processing and the relationship between parallelism and performance.
8. Understand how performance can be increased by incorporating multiple processors on a single chip.
9. Appreciate the need to express algorithms in a form suitable for execution on parallel processors.
10. Explain what a GPU is and how it can be used for massively parallel computation.
11. Understand how to program GPUs using CUDA.

Course Content

This course covers chapters 5, 6, and 7 and Appendix A of the *fourth edition* of the Patterson-Hennessy book. Specifically the topics are: the memory hierarchy, storage and I/O, multicores and multiprocessors, and GPUs. There are several major changes to the coverage in this version of the course. There is more extensive treatment of multicore processors and multiprocessing, elimination of all coverage of bus technology, and inclusion of major coverage of GPUs and GPU programming, a cutting edge direction in computer science.

Expectations, Tests, Assignments, and Grading

Your grade will be based on two midterm exams, a final exam, and a single written assignment of at least 500 words. You are responsible for all subject matter covered in class whether it is listed in this syllabus or not, as well as all textbook readings. The exams are 30% each and the assignment is 10%.

Exam Schedule

Midterm 1	*Tuesday, March 2*
Midterm 2	*Tuesday, April 13*
Final Exam	*Tuesday, May 25, 9:00 - 11:00 A.M.*

Course Materials, the Web, and Blackboard

As noted above, all lecture notes will be posted on my website, which, unlike *Blackboard,* does not require privilege to access. I rely on *Blackboard* only for communicating to all students, for posting grades and for the use of the *Discussion Board*, which is enabled so that students can have a free exchange of ideas. Therefore, you should check *Blackboard* before each class in case there are announcements.

I require that you use the following protocol if you have a question:

1. Check whether the question you want to ask has been asked and answered in the *Discussion Board*.
2. If it has been answered, you are finished. If not, post the question in the *Discussion Board* and
3. Send an email message to me asking me to look at the question on the *Discussion Board* and answer it there.
4. I will answer the question and send you an email message when I have answered it, so that you do not have to "poll" it waiting for an answer.

If you do not post your question, I will ignore it. I do this to save time for all of us.

Programming and System Access

There will be no required programming projects in the course, but there will be an option to do programming in lieu of an exam, which will be explained in class.

Lateness, Make-up Policy, and Incomplete Grades

All assignments must be handed in on their due dates. There will be no extensions. Failure to take an exam counts as a zero grade on that exam, unless you have a legitimate medical or personal *emergency* that prevents your timely completion of homework or sitting for an exam. I will schedule a make-up exam or allow a homework extension only in that case. I do not give incomplete (IN) grades except for those students who were unable to complete the work because of legitimate, documented medical or personal problems, and this is entirely at my discretion.

Academic Honesty

Hunter College regards acts of academic dishonesty (e.g., plagiarism, cheating on examinations, obtaining unfair advantage, and falsification of records and official documents) as serious offenses against the values of intellectual honesty. The college is committed to enforcing the CUNY Policy on Academic Integrity and will pursue cases of academic dishonesty according to the Hunter College Academic Integrity Procedures. In this class, I will enforce the University's Policy on Academic Integrity and bring any violations that I discover to the attention of the Dean of Students' Office.