

CS-320: Computer Systems III - Advanced Computer Organization Fall 2012

Course Syllabus

Class meeting times:

Lectures: MWF, 1:10pm – 2:10pm, Room SW 021.

Lab sessions: Tuesday, 1:15pm to 2:40p, Room G7, ENGB. Lab attendance mandatory!

Instructor:

Dr. Dmitry Ponomarev, Office: T-20, Office Hours: MW 11:00 am - 12:00 (Noon) and by appointment.
Phone: 777-4023; e-mail: dima@cs.binghamton.edu

Teaching Assistant: Mr. Jesse Elwell (jelwell1@binghamton.edu)

Office: T-5 Office hours: Tuesday 3:00pm - 5:00 pm and by appointment

Class web page: All class materials are available at <http://blackboard.binghamton.edu>

Text: Computer Organization and Design. The Hardware/Software Interface by David A. Patterson and John L. Hennessy, Fourth Edition

Course Description: This course offers a comprehensive introduction to the field of computer architecture and the internals of computer systems. We will learn and understand the operations of modern microprocessors, memory subsystems and input/output devices as well as the interaction mechanisms among these components. We will also learn how hardware and software components – such as the specific algorithm, programming language, compiler, instruction set architecture, and processor implementation – impact program performance. You will also get experience of working with a realistic cycle-accurate simulator of modern microprocessor and memory subsystem.

Topics to be covered:

Computer system performance measures and analysis; instruction set design; high performance computer arithmetic; CPU organization - datapath and control, single-cycle datapath, multi-cycle datapath, pipelined datapath, dynamic instruction scheduling with out-of-order execution and register renaming, branch handling techniques, supporting precise interrupts in out-of-order pipelines, introduction to superscalar architectures; memory systems - caches, virtual memory, TLBs; input-output systems; storage systems, introduction to multicore and multithreading processors; introduction to graphics processors.

Grading

Midterm Exam I - 15%

Midterm Exam II – 20%

Final Exam - 20%

Homework Assignments - 20%

Lab components: projects – 15%, quizzes – 10%

Homework submission policy: All homework assignments will have to be turned in at the beginning of the class on the due date. No late submissions will be accepted.

Project details: Two projects based on the use of cycle-accurate processor simulator will be assigned in the second half of the course. Details of these projects will be provided later.

This course is also offered under the articulation agreement between Binghamton University and SUNYIT. It is available to qualified students at Binghamton University via the distance learning system Enginet.