Instructor Rakesh Kumar
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TA Jose Rodrigo Sanchez Vicarte
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Office Hours: 2:00-3:00 PM Wed in ECE3036, and by appointment.

Textbook
Dubois, Annavaram and Stenstrom. Parallel Computer Organization and Design (1st Ed.),
Cambridge Univ. Press, ISBN: 978-0521886758

Supplementary Textbooks
Shen and Lipasti. Modern Processor Design: Fundamentals of Superscalar Processors (1st Ed.),
The Morgan Kaufmann, ISBN: 978-0123838728

Prerequisites
ECE411 or CS433
UNIX commands
C/C++ Programming
System Verilog

Homework
Homework assignments will be based on the GEM5 architectural simulator, and will require Linux competency.
Please get an early start on the assignments, as many of them will require a significant amount of time to simulate.
Each student will be allowed a late submission, of up to one week, of a single assignment.

Course Objectives
Advanced concepts in computer architecture: design, management, and modeling of memory hierarchies;
pipelined computers; and multiple processor systems. Emphasis on hardware alternatives in detail and
their relation to system performance and cost. Course Information: Same as CSE 521. Prerequisite:
ECE 411 or CS 433. More specifically, assuming knowledge of pipelined processors with cache memories,
as studied in depth in ECE 411, we continue with advanced techniques for extracting greater levels of
instruction-level parallelism and memory-level parallelism in ECE 511. The former exploits opportunities
for parallel execution of instructions from an inherently serial instruction stream, while the latter attempts
to overlap increasing memory access latency with other useful work. We will study the memory hierarchy
as well as virtual memory, and will also cover processor chips that with multiple cores, where concurrency
is extracted from multiple sequential threads of execution.

Grading Policy
Course Outline and Important Dates

15% Assignments  Assignment 1, 2%; Assignment 2, 5%; Assignment 3 Checkpoint, 3%; Assignment 3, 5%

20% Midterm Exam

25% Final Exam

40% Project  Proposal, 5%; Proposal Presentation, 5%; Project Status Report 1, 7%; Project Status Report 2, 8%; Project Presentation, 10%; Final Project Report, 5%

Course Introduction ................................................................. August 29th
GEM5 Tutorial Assignment 1 ......................................................... August 31st
Lecture .................................................................................... September 5
Lecture Assignment 1 Due, Assignment 2 ........................................ September 7
Lecture .................................................................................... September 12
Lecture .................................................................................... September 14
Lecture .................................................................................... September 19
Lecture .................................................................................... September 21
Lecture Assignment 2 Due, Assignment 3 ........................................ September 26
Lecture .................................................................................... September 28
Lecture .................................................................................... October 3
Lecture Assignment 3 Checkpoint Due ........................................... October 5
Lecture .................................................................................... October 10
Midterm ................................................................. October 10, 7pm-10pm
Lecture Project Proposal Due ..................................................... October 12
Project Proposal Presentations .................................................. October 17, 2:00pm-4:30pm
Lecture .................................................................................... October 19
Lecture .................................................................................... October 24
Lecture Assignment 3 Due ........................................................... October 26
Lecture .................................................................................... October 31
Lecture .................................................................................... November 2
Lecture Project Progress Report 1 Due ......................................... November 7
Lecture .................................................................................... November 9
Lecture .................................................................................... November 14
Lecture .................................................................................... November 16
Final Exam ................................................................. November 16, 7pm-10pm
Thanksgiving Break ................................................................. November 21
Thanksgiving Break ................................................................. November 23
Extra Office Hours ................................................................. November 28
Extra Office Hours Project Progress Report 2 Due ......................... November 30
Extra Office Hours ................................................................... December 5
Project Presentations ............................................................... December 7
Project Presentations ............................................................... December 12
Project Report Due ................................................................. December 14