**EE 524 Advanced Computer Architecture** Fall 2006

**EE 524 Advanced Computer Architecture Fall 2012**

**CptS 561 Computer Architecture Tuesday/Thursday 10:35-11:50AM**

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Objectives: *To provide a background on advanced computer architecture. The main focus of this course is advanced processor design and evaluation using case studies. A number of architectural alternatives are described and evaluated using quantitative approaches.*

Pre-requisite: *EE334, CptS 260, or knowledge of digital and microprocessor design*

**1. Fundamentals of Quantitative Design** *(Chapter 1)*

* 1. Performance, Power, Energy
	2. Principles of Computer Design
	3. Performance and Cost

**2. Memory Hierarchy Design** *(Chapter 2)*

 2.1 Principle of locality

 2.2 Memory hierarchy and cache memory

 2.3 Cache performance optimizations

 2.4 Virtual Memory

**3. Instruction-Level Parallelism and its Limitations** *(Chapter 3)*

 3.1 Instruction-level parallelism (ILP)

 3.2 Dynamic scheduling

 3.3 Branch prediction and speculation

 3.4 Multiple instruction issue

 3.5 Case study: Intel Core i7

**4. Data-Level Parallelism** *(Chapter 4)*

 4.1 Vector and SIMD architectures

 4.2 Graphics Processing Units (GPU)

 4.3 Loop level parallelism

 4.4 Case study: NVIDIA and Intel Core i7

**5. Multiprocessors (Multi-core) and Thread Level Parallelism** *(Chapter 5)*

5.1 Centralized shared-memory architectures

 5.2 Distributed shared memory

 5.3 Coherence and synchronization

 5.4 Memory consistency

 5.5 Multicore processors

**Textbook:** J. L. Hennessy and D. A. Patterson, *Computer Architecture: A Quantitative Approach,* Fifth Edition. Morgan Kaufmann Publishers, 2012.

**Grade:** 2 Partial Exams (25% each) 50%

 Project 10%

 Homework 20%

 Final Exam 20%

**Instructor:** **Dr. José Delgado-Frias** Office: EME 502

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**Office Hours:** Wednesday 11am–12noon (or by appointment –please send an email)

**Course website:** **http://www.eecs.wsu.edu/~jdelgado/CompArch/**

**Academic Integrity**

WSU definitions and procedures for cases of academic dishonesty are given at the URL:

academicintegrity.wsu.edu. Please read the material at all links at this URL. These procedures will be followed rigorously. Academic dishonesty in this course results in a grade of “F” for the course. All work that you and your team submit for grading is to be your team’s own original work. If you wish to turn in material that is not original then you must cite the origin of that work.

**Students with Disabilities**

Reasonable accommodations are available for students with a documented disability. If you have a disability and may need accommodations to fully participate in this class, please visit the Disability Resource Center (DRC). All accommodations MUST be approved through the DRC (Washington Building, Room 217). Please stop by or call 509-335-3417 to make an appointment with a disability specialist. Additional information can be viewed at the URL http://drc.wsu.edu

Campus Safety Plan: Please become familiar with the material you will find at the URL:

http://safetyplan.wsu.edu