WEEK #1: July 6

Course Introduction.

Computer design fundamentals; principle of quantitative analysis; instruction set architectures.

WEEK #2: July 11-13

Pipelining: review of basic concepts; implementation issues; multi-cycle operations. Case study: MIPS R4000.

Instruction-Level Parallelism: dynamic scheduling; scoreboard.

WEEK #3: July 18-20


Memory-Hierarchy Design: virtual memory; Case study: Intel Pentium 4 vs. AMD Opteron.


WEEK #4: July 25-27

Instruction-Level Parallelism: branch prediction and speculation. Case study: Alpha 21264.


WEEK #5: August 1-3

Parallel Architectures: memory consistency model & cache coherency.

Parallel Architectures: data-level parallelism and GPUs.

WEEK #6: August 8-10

FINAL EXAM: time & location to be announced.

Multi-Core Architectures: embedded and mobile computing. Case Studies: ARM-based architectures.

Perspective: “The Emergence of Heterogeneous Systems-on-Chip: Opportunities and Challenges.”