Department of Electrical and Computer Engineering
The University of Texas at Austin

ECE 382N, Spring 2002
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Nominal Course Outline
January 14, 2002

January 14: **First class meeting**. Introduction to the course, administrative details. Focus of the course. Architecture and Microarchitecture: Sciences of Tradeoffs.

January 15: **First discussion meeting**. The logic design of a simple ALU. Introduction to the CAD tools we will be using in the course.

January 16: Quick review of basic concepts in architecture and microarchitecture. Critical path, Bread and Butter Design, Partitioning, Timing, Pipelining. Data Path, state machine, microsequencer, microinstruction definition, and microcode. Microprogramming (horizontal, vertical, two-level, dynamic microprogramming, bit steering). Extension to pipelining and pipelined control. Effective use of short pipelines, with some digressions into more effective use of long pipelines without blocking.

      January 20: Problem Set 1a due, 11:59pm.

January 21: Martin Luther King Day. No class.

January 22: Basic concepts in microarchitecture, continued.

January 23: The Intel Architecture 32 (nee x86), ISA and implementation issues.

January 28: The IA32 (continued).

January 29: Discussion section.

January 30: Architectural Choices.

      February 1: Problem Set 1b due, 11:59pm.

February 4: Discussion section (as needed).

February 5: Discussion section (as needed)

February 6: Architectural Choices (continued).

      February 8: Problem Set 2 due, 11:59pm.

February 11: Alternative approaches to concurrency. Vector Processing, SIMD, MIMD, Introduction to Multiprocessing. Data Flow.

February 12: Discussion section.

February 13: Alternative approaches, continued.

February 18: Discussion section.

February 19,20: High Performance Implementation in the next decade.

February 25: The Naysayers Respond!

February 26: Discussion section.

February 27: Measurement methodology and abuses.

March 1: Problem Set 4 due, 11:59pm.

March 4: Review

March 5: Discussion section.

March 6: Exam 1.

March 11-15: Spring Break.

March 18,19,20: Individual group meetings to define individual implementations.

March 25, 26, 27: First Design Review in 541a ENS, by appointment.
[Problem Set 5 is to be handed in at that time.]

March 25: Branch Prediction.

March 26: Discussion section.

March 27: Branch Prediction, continued.

April 1: Block Structured ISA.

April 2: The Trace Cache

April 3: Compiler influences.

April 8: IEEE Floating Point arithmetic, The IEEE Standard. Formats. Gradual underflow, NaNs, Exceptions, Round-off, Guard Digits and Sticky bits, Wobble.

April 9: Discussion section.

April 10: Floating point (continued).

April 15: Cache Coherency, Memory consistency models.

April 16: Discussion section.

April 17: Review

April 22: Exam 2.

April 23: Discussion section as needed.

April 24: Case Study I: The microarchitecture of a Current Microprocessor.

April 29: Case Study II: The microarchitecture of a Current Microprocessor.

April 30: Case Study III: The microarchitecture of a Current Microprocessor.

May 1: Last class meeting. Review of the course.

Final project design reviews in 541a, April 29,30, May 1, by appointment.

May 10: Final project report due in 541a, 10pm.