

UCF

School of Computer Science

CDA 4150 Computer Architecture

Fall 2005

Syllabus

Professor : Euripides Montagne Tele.: 823-2684 email: eurip@cs.ucf.edu

Lecture meetings:

TuTh 1:30 p.m. – 2:45 p.m. (ENG2 105)

Office hours: MTW from 2:00 a.m. to 4:00 a.m (CSB 239)

TA : Hongliang Gao Tele.: 823-3228 email: hgao@cs.ucf.edu

Office hours: Wednesday, 3:00 p.m. - 5:00 p.m. (CSB 107)

Website: <http://www.cs.ucf.edu/courses/cda4150/fall05/>

Course Outline: This course is intended to provide students an understanding in the fundamental concepts and design principles of computer architecture. The students will gain a sufficient understanding of the relationships between higher-level programming languages and machine language.

Course Topics: Organization and architecture of computer systems hardware; register transfer notation; Instruction set architecture (ISA); addressing modes; computer arithmetic; processor design for sequential execution, pipelining and superscalars; memory systems; virtual memory; I/O system; interrupt handling; introduction to multiprocessors.

Prerequisites:

- CDA 3103 – Computer Organization

Required textbook:

The textbook for this course is: J. Hennessy and D. Patterson, Computer Architecture: A Quantitative Approach”, Morgan Kaufman, 3rd edition, 2002.

Style of Class Meetings:

Class meetings will not consist of traditional lectures, with the instructor doing most of the talking and the student doing most of the listening. Rather, meetings will consist of discussions on each topic and the instructor will help guide the discussion by asking questions.

Grading Policy:

- (20%) **Midterm exam** – closed book, closed notes exam given in class..
- (25%) **Final Exam** – closed book, closed notes comprehensive exam given during final exam week.
- (25%) Design Assignments in Verilog (Teams of two)
- (25%) Final project using Verilog (Teams of two)
- (5%) Homework

Letter grades: 90% - 100% = A ; 80% - 89% = B; 70% - 79% = C

Note: Any academic dishonesty (including, but not limited to, Cheating, copying and/or plagiarism) with respect to any exam or assignment in this class will result in a grade of **F**, following by the usual procedures for dealing with such behavior, as describe in the *UCF Golden Rule : a handbook for students*.

The Semester Plan: Tentative.

Week 1- Logistics, team organization. Introduction to computer architecture.

- Flynn's Taxonomy

Week 2 – SISD architecture, register transfer notation.

- Cost of a Die, Performance, Amdahl's Law

Week 3 – ISA, instruction encodings , addressing modes. Interrupt handling(Case Studies: IBM 360, B5000, MIPS)

- Computer Arithmetic, Floating point arithmetic, Pipelining in the ALU.

Week 4 - Vector processing, Memory Interleaving(Cray-1).

- Chaining, loop unrolling, skewed matrix representation.

Week 5 – Review

- **First Midterm Exam**

Week 6 – The Processor Data Path and Control Unit.

- Pipeleined Execution. Pipeline data path.

Week 7 - Pipeline Data Hazards.

- Control Hazards. Exception Handling.

Week 8 - ILP:Superscalars. Scoreboarding(CDC6600), Tomasulo's Algorithm.

- MIPS and IA-64 Architectures.

Week 9 – Systolic Arrays and Data Flow Architectures.

Week 10 - Review

- **Second Midterm Exam.**

Week 11 - Cache Memory

- Virtual Memory

Week 12 - I/O Devices and Performance Measures.

- RAID

Week 13 – Detecting Parallelism in Programs.

- Multiprocessors.

Week 14 – Interconnection Networks

- Review

Final Exam December 6th, 2005

Important Dates:

- **Classes Begin August 22nd.**
- **Withdrawal Deadline is October 14th.**
- **Classes End December 3th.**
- **Summer Holidays are:**
 - **Labor Day Sept. 5.**
 - **Veteran's November 11.**
 - **Thanksgiving Nov. 24 – 26.**