

Computer Organization

CS230

Fall 2004

Class Time: 1:30 pm — 2:20 pm M.W.F.

Class Room: 19 Avery Hall

Instructor: Dr. Hong Jiang

Contact: 472-6747/jiang@cse

Teaching Assistant I: Mr. Sheng Zhang

Contact: 472-3485/szhang@cse

Office Hours(Jiang): 12:30 pm — 1:20 pm M.W.F.

Office: Rm 268, Avery Hall

Office Hours(Sheng): 11:00 am — 1:00 pm Thursday

Office: Rm 6, 501 Bldg

Lab(Sheng):

3:30 pm — 5:20 pm, Thursday, Rm 21, Avery Hall

Prerequisite:

CompSc 150 or 155, or permission.

Grading Policy:

- **Three exams** will be given during the course. The three exams will be equally weighted and equally spaced throughout the semester, approximately one for every 5-week period. All these exams will be taken in class during the 50-minute scheduled class hours. *There will not be a final exam for this class.*
- **A Term Project** will be assigned at around the midterm and will have students work in teams of two to design a *simple but real* one-cycle CPU.
- Approximately **6 homework assignments** will be given. Each is due in class on its specified due date. Late work is penalized 10% per working day. Once solutions are published, late work can *not* be accepted for credit.
- While collaboration on homework is permitted, blatant copying will not be tolerated. Violators, if caught, will subject to penalties ranging from a zero for the homework assignment in question to an **F** grade for the course, depending on the severity of the violation.
- **Final Grade** will be generated according to the weight associated with each component listed below:

Grading Policy		
Component	Weight	Comments
Examination I	20%	one hour, in class
Examination II	20%	one hour, in class
Examination III	20%	one hour, in class
Term Project	20%	Weeks 8-15
Home Work	20%	about 1 in every 2-3 weeks

Course Description: Introduction to computer organization with emphasis on hardware aspects of a computer system. The material in this course forms the basis for the more advanced courses in computer architecture (CSE 430), parallel processing (CSE 432), VLSI design (CSE 434), and communication networks (CSE 462).

An overview and tentative (and approximate) schedule of the course is listed below:

Main Topics	Readings Required	Lecture Time
1. Fundamentals —Abstractions & Technology	Chapters 1 1.1-1.7	Week 1 3 hours
2. Instructions —Operations and operands in hardware —Instructions and programs —Compiler optimizations and examples	Chapter 2 2.1-2.3 2.4-2.10 2.11-2.16	Weeks 2-3 1 hour 3 hours 2 hour
3. Arithmetic for Computers —Numbers, Basic Arithmetics, & Logic Operations — Arithmetic Logic Unit (ALU) —Multiplication —Division and Floating Point	Chapter 3 3.1-4.2 4.3 3.4 3.5-3.6	Weeks 4-6 3 hours 2 hours 2 hours 2 hour
4. Processor: Datapath and Control —Intoduction & Logic Design —Building A Datapath —Single-Cycle & Multiple-Cycle Implementations —Microprogramming Implementation & Real Stuff	Chapter 5 5.1-5.2 5.3 5.4-5.7 5.57, 5.9	Weeks 7-10 1 Hour 2 Hours 3 Hours 3 hours
5. Large & Fast: Memory Hierarchy —Basic Concepts —Basics of Caches —Virtual Memory —Common Framework for Memory Hierarchy —Real Stuff	Chapter 7 7.1 7.2-7.3 7.4-7.5 7.5 7.6	Weeks 11-13 1 Hour 4 Hours 2 Hours 1 Hour 1 Hour
6. Assessing & Understanding Performance —Introduction & CPU Performance —Evaluating Performance & Real Stuff	Chapter 4 4.1-4.2 4.3-4.4	Week 14 2 Hours 1 Hour
7. I/O Systems —Disk Storage & Dependability —Networks & Buses —Interfacing I/O Devices	Chapter 8 8.1-8.2 8.3-8.4 8.5	Week 15 1 Hour 1 Hour 1 Hour

Text Book: David A. Patterson and John L. Hennessy, *Computer Organization & Design, The Hardware/Software Interface, Third Edition*, Morgan Kaufmann Publishers Inc., 2004.