

University of Southern California, EE 457, Spring 2006

# Computer Systems Organization

Prof. Kai Hwang, EEB 212, Email: [kaihwang@usc.edu](mailto:kaihwang@usc.edu)

Office Hour: **Mon. Wed. 3 – 4 pm, Tu. 2 - 4 pm**

Morning Lecture Session: Lec. 30587R **Mon. Wed. 10 – 11:15 am, GFS 101**

Afternoon / DEN Lecture Session: Lec. 30591R / 014-30595R **Mon. Wed. 2 – 3:15 pm, OHE 136**

Lab Session: Dis.30589R **Friday 9:00 - 9:50 am, THH 116** by TA: Maryam Soltan, [soltan@usc.edu](mailto:soltan@usc.edu)

Lab Session: Dis.30593R/015-30594R **Fri. 1:00 – 1:50 pm, OHE 132** by TA: Wei-Jen Hsu, [weijenhs@usc.edu](mailto:weijenhs@usc.edu)

**Course Description:** This course covers the design of instructions, processor, memory hierarchy, I/O, and interconnect of modern computer systems. The lectures are taught by Prof. Hwang, covering the design principles of instruction set, CPU, digital arithmetic, cache, memory, and I/O subsystems and their hardware and software interfaces. The Lab sessions are taught by TAs, covering lab assignments using CAD and simulation tools. Both lectures and lab sessions are required by all students enrolled.

**Prerequisite:** **EE 102L** (Digital Circuits) and **EE 357** (Organization of Computer Systems) or equivalent courses

**Course Syllabus:** (30 Lectures except 3 holidays, 75 minutes each)

1. Computer Abstraction and Technology (Chap.1 in 1 lecture)
2. Machine Instructions and Hardware/Software Support (Chap. 2 in 3 lectures)
3. Digital Computer Arithmetic (Chap.3 in 3 lectures)
4. Performance Issues and Benchmarks (Chap. 4 in 1 lectures)
5. The Processor (CPU) Design (Chap.5 in 4 lectures)
6. **Mid-Term Exam on March 8, 2006 (Wed 2 - 4 pm)** (Room to be announced)
7. Pipelining and Performance Enhancement (Chap.6 in 4 lectures)
8. Cache Design and Memory Hierarchy (Chap.7 in 4 lecture)
9. Storage, Networks, and Peripherals (Chapter 8 in 3 lectures)
10. Multiprocessors, Clusters, and Grids (Chap.9 and handout material in 2 lectures)
11. **Final Exam on May 3, 2006, 8 – 10 am** (2 hours)

**Required Textbook:** David Patterson and John Hennessy, *Computer Organization and Design, Third Edition*, Morgan Kaufmann, 2005 (ISBN 1-55860-604-1),  
EE 457 *Lab Manual* by Gandhi Puvvada is required, available from USC Bookstore

## Grading Policy and Class Regulations:

1. Check the class web site: <http://den.usc.edu/> frequently about class handout, announcements, and grades. Even webcast lectures are available, you should *attend all life lectures* in class room except remote DEN students.
2. *Contact the TA first on all questions related to homework and grading records.* Check with Prof. Hwang only on lecture material and on things the TA cannot handle directly.
3. **Homework 15%, Class attendance: 5%, Mid-term Exam 25%, Lab Projects 25%, Final Exam 30%**
4. Homework must be done individually and collected at the beginning of class on the due day. Lab projects are done by teams to be assigned by TA. *No late homework or late lab design reports will be accepted.*
5. *No makeup exams* will be given in all exams missed. If you miss the mid-term exam, you should drop the class. If you miss the final exam, you will not earn the credit in this semester.
6. *Cheating caught in homework, lab reports, and all exams will receive a failing grade.*
7. **Class attendance will be recorded:** No penalty for the first two misses, 1 % penalty for missing 3 lectures, 3% for missing 4 lectures, and 5% for missing 5 or more lectures.
8. **Holidays : Jan.16, Feb.20, March 23 and Spring Recess: March 13-18, 2006** (No classes)