

Computer Systems Organization

Prof. Kai Hwang, EEB 212, Email: kaihwang@usc.edu
Office Hour: Mon. Wed. 9-10:20 am and 12:40 – 1:50 pm

Lecture Number: 305917R for on-campus, 30595R for off-campus DEN students

Class Time and Room : Mon. Wed. 2:00 p - 3:20 pm, OHE 136 (DEN Studio)

Discussion Session : Friday, 12-12:50 pm OHE 136, (TA yet to be announced)

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. He covers the design principles of instruction set, pipelining and instruction-level parallelism in processor design, digital arithmetic, cache, memory, and I/O subsystems and their hardware and software interfaces. The Lab sessions are taught by the TA, covering lab assignments using CAD and simulation tools. All students are required to enroll in both lecture, discussion, and laboratory sessions

Prerequisite: EE 102L (Digital Circuits) and EE 357 (Organization of Computer Systems)

Course Syllabus: (28 lectures, 2 holidays, 1 mid-term exam, plus one week Spring Recess)

1. Computer Abstraction and Technology (2 lectures)
2. Machine Instructions and HW/SW Support (3 lectures)
3. Digital Computer Arithmetic (4 lectures)
4. Performance Issues and Benchmarks (2 lecture)
5. Pipelining in MIPS Processor Design (4 lectures)
6. **Mid-Term Exam:** (date and place to be announced)
7. Instruction-Level Parallelism in Processors (4 lectures)
8. Cache Design and Memory Hierarchy (4 lectures)
9. Storage, Networks, and Peripherals (3 lectures)
10. **Final Exam:** (Date and place to be announced)

Required Textbook: David Patterson and John Hennessy, *Computer Organization and Design, Fourth Edition*, Morgan Kaufmann, 2009 (ISBN 1-55860-604-1),
EE 457 *Lab Manual* by Gandhi Puvvada, available at USC Bookstore

Grading Policy and Class Regulations :

1. Check the class web site: <http://www.uscdcn.net/webapps/login> frequently about handout, announcements, and grades. Even webcast lectures are available, All on-campus students should *attend life lectures in class room*. DEN students are encouraged to *participate in life lectures with discussions on-line*.
2. **Contact the TA first** on all questions related to homework assignments, quizzes, exams, grading matters, Lab projects and Lab grading records.
3. **Check with Prof. Hwang** only on lecture material and things that the TA cannot handle directly.
4. **Homework 15%, Mid-term Exam 25%, Lab Projects 25%, and Final Exam 35%**
5. Homework must be done individually and collected at the beginning of class on due day. Lab projects are assigned and collected by TA. *No late homework or late lab design reports will be accepted*, no exceptions
6. *No makeup exams* will be given under any circumstances. All missed exams will receive zero scores. If you miss the mid-term exam, *drop the class*. If you miss the final exam, you *will not earn the credit* in this semester.
7. *Cheating caught* in homework, lab reports, and exams will receive a *failing grade* of the course.