QUINCY COLLEGE
COURSE SYLLABUS

FALL SEMESTER, 1998
CSI 235: COMPUTER ARCHITECTURE
TUESDAY, 6:00 – 9:00P.M., C206

Instructor name: Kai-Ming Lo
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Course Description

This course deals with the structure and organization of the major hardware components of computers. Topic include basic logic design, CPU construction, and information transfer and control within a computer system.

Required Textbook

Stallings, W. , *Computer Organization and Architecture: Design for Performance*, 4th Ed. , Upper Saddle River, NJ: Prentice Hall, 1996.

The College Bookstore

Location: The Bookstore is located at 1357 Hancock Street in Quincy Center, near City Hall.
Telephone: (617) 773-4849 and (617) 984-1365

Hours of Operation		New Regular Bookstore Hours	
Mon. August 31 – Thurs. September 3	8am–8pm	Monday – Wednesday	9am–5:30pm
Fri. September 4	8am–4pm	Thursday	9am–6:30pm
Sat. September 5	9am–1pm	Friday	9am–4pm
Tues. Sept. 8 – Thurs. Sept. 10	8am–7pm		
Fri. September 11	8am–4pm		
Sat. September 12	9am–1pm		

Recommended Learning Materials

- Abadir, M., and Reghbati, H. “Functional Testing of Semiconductor Random Access Memories.” *Computing Surveys*, September 1983.
- Alexandridis, N., *Design of Microprocessor-Based Systems.* Englewood Cliffs, NJ: Prentice Hall, 1993.
- Anderson, D., and Shanley, T. *Pentium Processor System Architecture*. Richardson, TX: Computer Science Press, 1980.
- Goor, A. *Computer Architecture and Design.* Reading, MA: Addison-Wesley, 1989.
- Koren, I. *Computer Arithmetic Algorithms*. Englewood Cliffs, NJ: Prentice Hall,1993.

Course Learning Outcomes

At the completion of this course, the student should be able to:
- Explain the concepts of interconnected structures and digital logic.
- Discuss computer design trends.
- Demonstrate the Pentiums CISC instruction set and the RISC instruction set used by today's PowerPCs.
- List the performance characteristics of Two-Level-Memories.
- Explain Hardwired Implementation and Truth Tables.
- Describe CPU Structure and Function.

Instructional Methodologies

Lecture, class discussions, written problem assignments, projects, and handouts will serve as the primary instructional methodologies. Distance educational techniques such as Internet and e-mail will also be used.

Attendance Policy

If you are, or expect to be, absent for an extended period, due to illness or other reason, it is your responsibility to notify the College and your instructors. Students are expected to attend all classes with the exception of illness or emergency.

To maintained a 85% attendance policy, a student is allowed to have 2(two) unexcused absences in a class meeting. Failure to maintain 85% unexcused attendance will result in an automatic final grade of "F". Missed quizzes or examinations must be made up on the first day that a student returns to College.

Grading Policy

Project(s)	25%
Quizzes	25%
Midterm Examination	25%
Final Examination	25%

Final grades are assigned based on class rank according to the above weights. Quizzes in short questions will be held at the beginning of selected classes. Project turned in late will automatically be reduced by one letter grade, unless there is a very compelling reason for the tardiness. As always, when in doubt, ask.

Homework will be assigned but it will not be graded. Solutions to selected homework problems will be provided. The homework is excellent preparation for the quizzes and examinations which will contain problems of similar difficulty.

Make-Up Policy

Two days during the intersession have been reserved as make-up days for any missed classes due to inclement weather. If you miss any quizzes / examinations, contact me as soon as possible to discuss making up the work.

Cheating / Plagiarism Policy

Although working collaboratively is encouraged, any work you turn in should be yours and yours alone. Cheating and/or plagiarism will result in receiving a failing grade.

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Concepts, Learning Activities and Evaluation Methods**

Week	Concept / Topic	Required Learning Activities	Evaluation Methods
1	Overview of course. The fundamental concepts of Organization and Architecture, Structure and Function, Computer Interconnection Structures, Digital Logic and Truth Tables.	Attend Lecture; Read Chapters 1 and 3.3 and Appendix A; Do homework and check with solution.	Quiz; Midterm examination questions.
2	Computer Evolution and Performance, Microprocessor Speed, Using Branch Prediction enhancements, Pentium and PowerPC evolution.	Read Chapter 2; Attend Lecture; Do homework and check with solution.	Quiz; Midterm examination questions.
3	System Buses, The Fetch and Execute functions, Classes of Interrupts, Interconnection Structures and Hierarchies, Futurebus+ Arbitration logic.	Read Chapter 3; Attend Lecture; Do homework and check with solution.	Quiz; Midterm examination questions.
4	Internal Memory, Characteristics of Memory Systems, Memory Hierarchy, Types of Random-Access Semiconductor Memory, Chip Packaging, Error Correction, Cache Memory, Mapping.	Read Chapter 4; Attend Lecture; Do homework and check with solution.	Quiz; Midterm examination questions.
5	Performance Characteristics of Two-Level Memories, External Memory, Data Organization and Formatting, Disk Access Time, RAID levels 0-5, Optical Memory, CD-ROM.	Read Appendix 4A and Chapter 5; Attend Lecture; Do homework and check with solution.	Quiz; Midterm examination questions.
6	Input / Output, External Devices, Interrupt-Driven I / O and Processing, The Intel 8259A Interrupt controller, Peripheral Interface, Small Computer System Interface(SCSI).	Read Chapter 6; Attend Lecture; Do homework and check with solution.	Quiz; Midterm examination questions.
7	Operating System Support, Memory Management, Page Table Structure, Segmentation, Paging.	Read Chapter 7; Attend Lecture; Do homework and check with solution.	Midterm examination questions.
8	Review of concepts learned, Review for Midterm Examination, **Midterm Examination**, Question and answer period to review midterm.	Study materials of Weeks 1–7; Attend Review.	Midterm examination questions.

Week	Concept / Topic	Required Learning Activities	Evaluation Methods
9	The Central Processing Unit, Computer Arithmetic, Converting Between Different Bit Lengths, Floating Point Representation.	Read Chapter 8 and Appendix 8A; Attend Lecture; Do homework and check with solution.	Quiz; Final examination questions.
10	Instruction Sets: Characteristics and Functions, Instruction Set Design, Types of operands, System controls, PowerPC Operation Types.	Read Chapter 9; Attend Lecture; Do homework and check with solution.	Quiz; Final examination questions.
11	Stack Implementation, Expression Evaluation, Bit Ordering, Addressing Modes	Read Appendix 9A and 9B and Chapter 10; Attend Lecture; Do homework and check with solution.	Quiz; Final examination questions.
12	CPU Structure and Function, Processor Organization, Register Organization, Data Flow, Instruction Pipelining, Prefetch Branch Target, Branch Prediction, Interrupt Processing.	Read Chapter 11; Attend Lecture; Do homework and check with solution.	Quiz; Final examination questions.
13	Reduced Instruction Set Computers (RISC), Characteristics and Implications, Large Register File Versus Cache, RISC Pipelining, RISC vs. CICS controversy, Superscalar Processors, Machine Parallelism.	Read Chapters 12 and 13; Attend Lecture; Do homework and check with solution.	Quiz; Final examination questions.
14	The Control Unit, Cycles, Hardwired Implementation.	Read Chapter 14; Attend Lecture; Do homework and check with solution.	Final examination questions.
15	Review of concepts and methodologies learned, Review for Final Examination, **Final Examination**.	Study materials of Weeks 9–14; Attend Review.	Final examination questions.

** There may be times when content may vary based upon sequence and length of time allocated to individual class and instructor needs.