

**EE554 – Computer Architecture  
Electrical and Computer Engineering Dept.  
Colorado State University  
Fall 2005**

**Prerequisite:** EE452 or CS470 or equivalent senior computer architecture course  
**Course Credits:** 3

**Class hours:** Tuesday and Thursday: 9:30 to 10:45 a.m.

**Room:** Wagar 132

**Instructor:** Professor H. J. Siegel

**Office:** Engineering B115

**Phone:** 491-7982

**Email:** HJ@ColoState.edu

**Office hours:** Monday, Thursday, Friday: 2 p.m. to 3 p.m.

Tuesday: 1 p.m. to 2 p.m.

Wednesday: 9:30 a.m. to 10:30 a.m.

(please check [http://www.engr.colostate.edu/~hj/office\\_hours.html](http://www.engr.colostate.edu/~hj/office_hours.html)  
for the most recent information about any office hour changes)

**Teaching Assistant:** Ashish Mehta

**Office:** Engineering B5

**Phone:** 491-3148

**Email:** ammehta@engr.ColoState.edu

**Office hours:** Monday through Friday: 3 p.m. to 4 p.m.

**Description**

An introduction to the problems involved in designing and analyzing computer architectures. Major topics include fundamentals of computer design, multiprocessors and thread-level parallelism, storage systems, and interconnection networks and clusters. A quantitative approach is taken throughout the course.

**Course Text**

*Computer Architecture -- A Quantitative Approach*, John L. Hennessy and David A. Patterson, 3<sup>rd</sup> Edition, 2003, Morgan Kaufman Publishers, ISBN No.1-55860-596-7.

**Class Preparation for First Class on August 23, 2005**

Please be SURE to read Chapter 1 of the textbook before the first class.

**There will be evening exams.**

**Outline (approximate):**

<b>Topic</b>	<b>Weeks</b>
1. Fundamentals of computer design (Chapter 1)	2
2. Multiprocessors and thread-level parallelism (Chapter 6)	5
3. Storage Systems (Chapter 7)	3.5
4. Interconnection networks and clusters (Chapter 8)	3.5
5. Exams	1

**Course Objectives**

This course will enable the student to:

- understand techniques for measuring the performance of computer systems and the limitations of these techniques
- analyze the impact of a change made to a computer's architectural design
- evaluate the effectiveness of the use of parallel processing in different environments
- learn about methods for designing multiprocessor systems

**Reading List from the Course Text**

Please read relevant course material before class. The reading assignment for each class will be given in the preceding class. We plan to cover Chapters 1, 6, 7, and 8. We will do additional chapters if there is time. Before we begin Chapter 6, please read Chapter 5 ("Memory Hierarchy Design") on your own – your prerequisite course background should allow you to read and understand this chapter. You are also responsible for reading Appendix A ("Pipelining: Basic and Intermediate Concepts") on your own – your prerequisite course background should allow you to read and understand this appendix.

**Course Policies****1. Learning the Course Material**

The Instructor of this course wants you to learn the material. To accomplish this:

- please read the relevant material in the book before class as background;
- please attend class;
- please pay attention in class;
- please take notes in class;
- please ask questions in class when you do not understand the material;
- please talk to your classmates (outside of the class time) about the course material;
- please see the Instructor or the Teaching Assistant during our office hours when you need help (after following 1.a – f).

**2. Information**

You are responsible for all information given in class verbally and/or in writing. All information about the course (including but not limited to grading policy, exam dates, course syllabus, office hours, and course schedule) may be superseded at any time by information given in class.

**3. Grading**

- Your final course grade will be based on your homework (25%) and examinations (75%).  
Specifically:  
Total worth of ALL homework: 25%  
EACH test (there will be three): 25%

- b. Your letter course grade will be determined from the total points that you obtain from homework and tests (in the percentages described in 3.a), and will be based on a combination of a relative and an absolute scale. You determine your own grade by your performance on these items.
- c. There are *no* programming projects.
- d. There are *no* extra credit projects.
- e. Please first see the Teaching Assistant if you have questions about the grade you received on any of your homework assignments or exams. If you two cannot resolve your question, please see the Instructor.
- f. Graded homeworks and exams will be returned in class as soon as they are ready. If you miss a class where homeworks or exams are returned, please get them at the end of a later class (the Teaching Assistant will bring them to class).
- g. Please save all of your graded homework and exams until you receive your final grade and you decide you have no questions.
- h. Please see the Instructor if you feel your final grade was incorrect.

#### 4. Exams

- a. There will be three exams. Each exam will cover approximately one-third of the course; there will be no comprehensive final (i.e., no final exam that covers the entire course).
- b. The first and second exams will be given in the evening, and the third exam will be given in the final exam slot. The first exam will be Wednesday, October 5, 2005, from 7 p.m. to 9 p.m., in room Engineering E203. The second exam will be Tuesday, November 1, 2005, from 7 p.m. to 9 p.m., in room Engineering E203. The third exam will be Thursday, December 15, 2005, from 3:40 p.m. to 5:40 p.m., in room Wagar 132.
- c. Each exam will be designed to require only 50 minutes. Thus, each exam is officially only 50 minutes long. However, you will have the option to spend up to two hours on each exam, if you wish.
- d. All exams will be closed book, with no notes and no calculators. Cheating will not be tolerated. For exams, you should use only the information in your own brain. The use of any other information (e.g., reading the paper of the person next to you, accessing information stored in your electronic telephone directory wristwatch) is considered cheating. If one cheats on an exam, one's grade for that exam is zero. Other disciplinary action also may be taken.
- e. If you do not show up for an exam you will receive a zero, unless other arrangements have been made with the Instructor before the exam (see "Disclaimer" below).

#### 5. Homework

- a. The number and type of homework assignments will be at the discretion of the Instructor.
- b. The purpose of the homework is to help the students learn the course material. To achieve this goal, you may discuss homework problems with other people. However, the final homework solutions you turn in should be written by you independently and be your own work. Thus, you can interact with others to improve your understanding of the material, but you **cannot** copy someone else's work. If you do copy someone else's homework assignment, your grade for that homework assignment will be negative 100%. Other disciplinary action also may be taken.
- c. Homework is due at the *beginning* of class. Late homework is unacceptable unless other arrangements have been made with the Instructor before the due date (see "Disclaimer"

below). The reason for this rule is so that a student does not skip class to do the homework the day it is due.

**6. How To Maximize Your Ability To Get An “A” (and How Much You Learn!)**

- a. Read the relevant sections of the textbook before each class (reading will be assigned each class for the next class).
- b. Attend class (pay attention, take notes, and ask questions if you get lost).
- c. Talk to the Instructor, Teaching Assistant, and/or classmates if you need help understanding the material.
- d. Do all of the homework problems (start the homework the night you receive it, not the night before it is due; talk to the Instructor, Teaching Assistant, and/or classmates if you need help (also see item 5.b under Homework)).
- e. When you are confused by what a term “x” means, reread the definition, and, if necessary, reread the definition of each of the terms used in the definition of the term “x” (repeat this procedure recursively). Remember that the book has an index so you can find where most terms are explained.
- f. To prepare for each exam, review the class notes, review the homework problems and solutions, and reread the corresponding sections of the book (and follow item 6.c).

**7. Class Handouts**

If you miss a class where a handout is distributed, please get it at the beginning of the next class (the Teaching Assistant will bring left over copies to class).

**8. Disclaimer**

Whenever there are questions relating to the course policies, the Instructor will use his judgment to decide what is fair.