CSE 341 Computer Organization Spring 2012

Course Description

Computer organization deals with the components of a modern digital computer, their architecture, design and implementation, their operational details and performance issues. In this course we will study the basic components of components of a computer, their functions, mechanisms, policies and techniques used in their implementation and examples MIPS (Microprocessor without Interlocked Pipeline Stages**)** architecture. The components, which will be discussed, include: (i) Components of RISC processor (ii) instruction set architecture (ISA) , (iii) arithmetic logic unit design (iv) datapath design (v) control unit design (vi) parallelism at all levels of the processor (vii) performance evaluation, (viii) advanced computer arithmetic, (ix) pipelining, (x) memory hierarchy, (xi) multi-core processors and (xii) graphics processor units (GPU).

Hands on practical assembly language projects in MIPS will support concepts discussed during the lecture. We will also use Verilog to design the hardware components. On completion of this course students will be able to understand the components and working of a computer and the design and implement various components of a computer. Students will be able to analyze the hardware and software issues related to the components of a central processing unit and design efficient circuits for these components.

Course Information

Website:	http://www.cse.buffalo.edu/~bina/cse341/spring2012
Instructor:	Bina Ramamurthy (bina@buffalo.edu)
Lecture Time:	MWF: 2.00-2.50PM
Lecture Location:	Talbert 107
Office:	345 Davis Hall
Office Hours:	MWF: 11.00 – 11.50AM

Textbook and other material

- The primary textbook for this course is:

D.A. Patterson and J.L. Hennessy, .Computer Organization and Design: The Hardware/Software Interface,. 4th edition, Morgan Kaufmann, 2008

- We will use online reference material for MIPS assembly language and Verilog.

Pre-requisites

CSE241 Digital systems or equivalent

TENTATIVE Grading Distribution:

Grades will consist of the following components:

Component (Quantity)	Percentage
Labs (3): 18% each(best 2 of 3 labs: all labs weighed equal)	36%
Exam1	20%
Exam 2	30%
Homework (1 per week)	15%

Point distribution guideline will be as follows and may be curved at the end:

Point Range	Letter Grade
95.00-100	A
90.00-94.99	A-
85.00-89.99	B+
80.00-84.99	B
75.00-79.99	B-
70.00-74.99	C+

65.00-69.99	C
60.00-64.99	C-
55.00-59.99	D+
50.00-54.99	D
0-49.99	F

Homework

I plan assign a homework every week; this model of homework/week helps you keep up with the study and more importantly gives me feedback my lecture pace and coverage. It also helps you prepare well for the exam, since you are studying some material every week instead of piling it up for the midterm exam.

Labs

Lab assignments constitute a major portion of the course.
All due dates will be clearly printed on the top of each assignment. Late assignments will not be accepted **for any reason**. ***Remember, it is better to submit your solution every so often before the due date!***

Develop your code using the ***Incremental Development technique.*** Do not try to sit down and code the entire assignment in one sitting. Instead, take one section at a time, implement, test it, back up the code, and move on to the next section. You will turn in each lab before 11:59 PM on the due date via the departmental ***submit*** command. You must also include appropriate testing programs to show the validity of your solution. In addition, you must include external documentation discussing the "how's and why's" of your design and implementation. **You will be required to demonstrate your lab to your TA**. Dates and times for this will be announced online and in class. The TA will also run test examples against your code to check your solution's overall correctness. The TA will provide a demo schedule. It is your responsibility to demo your project, or you will receive a zero for that portion of the grade.

When your grade is assigned for the lab, the TA will indicate critical areas that must be fixed in order to solve the next assignment. In general, solutions are not provided for the lab. It is not that we do not have them, or am unwilling to distribute them, it's that there is no one answer to any project solution.

Exams

There will be a midterm (Exam 1) that will be administered and graded before the resign date. Midterm material will cover all lecture and reading assignments before the exam, as well as concepts from the lab assignments. Midterms are closed book, closed notes, and closed neighbor.
The second exam (Exam 2) is a comprehensive exam, covering all lecture, lab, and homework areas. This exam is closed book, closed notes, and closed neighbor. Please see the additional handout for exam taking policies for this course. We do not give make up exams for any reason. If you miss an exam, you will receive a zero for that portion of the grade.

Attendance Policy

You are responsible for the contents of all lectures and recitations (your assigned section). If you know that you are going to miss a lecture or a recitation, have a reliable friend take notes for you. Of course, there is no excuse for missing due dates or exam days. We do, however, reserve the right to take attendance in both lecture and recitation. During lectures, we will be covering material from the textbook. We will also work out several of the problems from the text. Lecture will also consist of the exploration of several real world Operating System problems not covered in the book. You will be given a reading assignment at the end of each lecture for the next class.

Recitations are designed to review difficult concepts in the class and to spend additional time discussing the lab work required for the course. The recitation is your time to communicate with your TA about the course. Use the opportunity to the fullest.

Office Hour Policy

If you can't meet during these hours, you will have to communicate with us via Email. Office hours are intended to resolve questions about the material that could not be answered in lecture or recitation. Come to office hours prepared!

Grading Policy

All assignments will be graded and returned in a timely manner. When an assignment is returned, you will have a period of one week to contest any portion of the grade. The TA who graded your assignment will be the first person to resolve a grading conflict. If the conflict cannot be resolved, the instructor will mediate the dispute. The judgment of the instructor will be final in all such cases. When contesting a grade, you must be able to demonstrate how your particular solution is correct. Also, when contesting a grade, the instructor or TA reserves the right to re-evaluate the entire lab or exam, not just the portion in dispute.

Incomplete Policy

We only grant incompletes in this course under the direst of circumstances. By definition, an incomplete is warranted if the student is capable of completing the course satisfactorily, but some traumatic event has interfered with their capability to finish within the timeframe of the semester. Incompletes are not designed as stalling tactic to defer a poor performance in a class.

Academic Integrity Policy

UB's definition of Academic Integrity in part is, "Students are responsible for the honest completion and representation of their work". It is required as part of this course that you read and understand the departmental academic integrity policy located at the following location:
http://www.cse.buffalo.edu/undergrad/policy.php

There is a very fine line separating conversation pertaining to concepts and academic dishonesty. You are allowed to converse about general concepts, but in no way are you allowed to share code or have one person do the work for others. You must abide by the UB and Departmental Academic Integrity policy at all times. **NOTE:** Remember that items taken from the Internet are also covered by the academic integrity policy! If you are unsure if a particular action violates the academic integrity policy, assume that it does until you receive clarification from the instructor.

This semester, all projects will be checked using an electronic cheat checking system. We reserve the right to check or question <u>any portion</u> of <u>any work</u> submitted at <u>any time</u> during the semester or afterwards. If you are caught violating the academic integrity policy, you will minimally receive a ZERO in the course.

Web Site

The course website should be checked frequently for important news. Course assignments, slides and general hints and tips will be posted on the website. We will use Ublearns for posting the grades.

Students with Disabilities

If you have special needs due to a disability, you must be registered with the Office of Disability Services (ODS). If you are registered with ODS please let your instructors know about this so that they can make special arrangements for you.