UMSL

Syllabus: CmpSci *2700*

Computer Organization and Architecture

Department of Mathematics and Computer Science

Semester: 20XX Spring/Fall

Semester

SP/SS/FS XXXX

Instructor Details

Name: *Put name*
Office Hours: *Put hours, 1.5 hrs/wk per course for FT faculty, 3 hours a week for adjunct*
Office Location: *Put location, can be in office, in class, online, etc.*

Submission and Communication

Your specific policies and procedures regarding submissions, late submissions, communication means, etc.

Scoring

List any additions/changes you want to make to the course details below, such as using quizzes, attendance requirements, etc. Keep in mind you cannot change the course details, you can only work within what it says. So if you want to add quizzes and they are not listed, scoring for quizzes has to be added to homework, tests, or another part. If the course detail gives ranges for grading, you have to provide specific values within these ranges.

Incremental Grading

Provide information if used.

Schedule

If the course detail does not state detailed timing or sections/topics, you may put them here. Keep in mind you cannot remove topics and if the course is coordinated you may have to follow topic allocations.

Course Details

General Policies

Students are given and are expected to sustain positive learning environment in class. This means positive conduct in class, no late walk-ins or early walk outs without a good explanation or a prior arrangement, and if on-line access is available in class - not using it for anything not class related. Students not meeting these standards may be asked to leave the classroom.

All in and out of class work for grade should be done independently (except for group projects). Homework can be discussed with others, but the final work (code, answer, etc.) should be independent. Programs may be discussed up to

design, but no code is allowed to be shared except for what is presented in class. Help can always be sought and received. However, help to assignments should be generic on the subject matter or very narrowly focused on specific problem not being the central point in the assignment.

Course Description

Prerequisite: CMP SCI 2250 (may be taken concurrently). This course introduces details of computer architecture and organization. It covers data representation, basic digital logic circuits, memory types and hierarchies, I/O and Storage devices, CPU architectures such as RISC, CISC, parallel, multi-core and GPGPU systems.

Text and Other Materials

Required texts: *Computer Organization and Architecture Designing for Performance*, William Stallings , 10th ed. Prentice Hall Publisher

Course Schedule

Week	*Topics to cover*	*Text Chapters*
week 1	Introduction, History, Ahmdahl's Law	Chap 1.1-1.5, 2.1-2.5
week 2	Number Systems, Computer Arithmetic	Chap 9, 10.1-10.4
week 3	Digital Logic	Chap 11.1-11.3
week 4	Bus Architecture	Chap 3.1-3.5
week 5	Cache Memory, Internal Memory	Chap 4.1-4.3, 5
week 6	External Memory, Input and Output Devices	Chap 6, 7.1-7.7
week 7	Review/MidTerm	
week 8	I/O, Operating System support	Chap 7.1-7.7, 8.1-8.3
week 9	Instruction Sets, Intro to Assembly Language	Chap 12.1-12.2,12.4
week 10	Addressing Modes, Processor Structure and Function	Chap 13.1, 13.3, 13.5, 14.1-14.4
week 11	CPU: RISC vs. CISC Architecture	Chap 14.1-14.4, 15.1-15.5, 15.8
week 12	RISC, Instruction Level Parallelism	Chap 15.1-15.5, 15.8, 16.1-16.2
week 13	Instruction Level Parallelism, Parallel Processing	Chap 16.1-16.2, 17.1-17.7
week 14	Parallel Processing, Multicore Computers	Chap 17.1-17.7, 18.1-18.3
week 15	GPGPU, Control Unit Operation	Chap 19.1-19.3, 20.1-20.2

Tests

- There will be one mid-term and one final.
- The final test will be comprehensive and will be taken during the finals week.
- If you have a special circumstance and are unable to take the test on the specified date and time, it must be individually discussed with the instructor and prearranged before the test.

Projects

- There will be at least 7 homework assignments.
- Each assignment will cover topics of about 2 to 3 chapter's worth of material.

- Projects will be graded 20% on style/standards and 80% on proper execution. Make sure to follow the Java coding convention used in your textbook.
- One of the homework assignments will be a short assembly language program based on a simplified instruction set.

Course Objectives and Learning Outcome

At the end of this course, students should be able to:
-Know many of the acronyms and terms related to computer hardware.
-Evaluate and compute mathematics related to low level system hardware.
-Design and simplify rudimentary digital electronics circuits.
-Perform elementary methods of error correcting coding.
-Compute the speedup of a parallel computing system.
-Understand computer components, CPU, Memory (Internal and External), Cache, IO, Operating System Support.
-Analyze and perform, via pencil and paper, how computer arithmetic is done.
-Analyze CPU Processor characteristics, addressing, structure. RISC vs. CISC.
-Be able to define major characteristics of multicore, and several types of parallel processing.
-Briefly cover other topics such as cloud computing and clusters.

Course Grading

We will use the standard 10% grading scale: 90% and above gives A, 80% and above B, 70% and above C, 60% and above D, else F.

Item	*Weight*
Midterm	30%
Final Exam	30%
Homeworks	30%
Assembly Language Program	10%

University Policies and Information

http://www.umsl.edu/~webdev/mathematics/files/pdfs/cs_umsl_syllabus_university.pdf