

# COS 335 Computer Organization and Architecture Spring 2011

## Instructor:

Curtis Meadow  
230 Neville Hall

Office Hours: 10:00 to 10:45AM TT  
E-Mail: [curtis.meadow@umit.maine.edu](mailto:curtis.meadow@umit.maine.edu)

## Class Meetings

Regular classes:  
Assembler:

206 Neville Hall 11:00AM to 12:15PM TT  
320 Shibles Hall, 2:00PM - 3:00 PM Thursday

**Text:** *Computer Organization and Architecture (8th ed.)*. William Stallings, Prentice Hall, 2009, ISBN 0-13-608860-0. For the assembler portion of the course download *PC Assembly Language* in .pdf format from <http://www.drpaulcarter.com/pcasm/>. Lecture notes and handouts will be posted on the web and /or First Class.

## General Course Objectives:

- To understand how computers are constructed out of a set of functional units
- To understand how these functional units operate, interact and communicate
- To understand the factors and trade-offs that affect computer performance
- To understand concrete representation of data at the machine level
- To understand how computations are actually performed at the machine level
- To understand how problems expressed by humans are expressed as binary strings in a machine.

## Architecture and Assembler

The computer organization and architecture class is a broad study of computers and computer components (processor, memory, input and output) that does not focus on any one particular hardware implementation. You will gain a general understanding of the principles used to design computers, ranging from mainframes ("big iron") and supercomputers to microcomputers to 4-bit embedded microcontrollers. By contrast the assembler portion of the course will focus on one particular architecture (Intel x86), so that you can understand how problems expressed in English (or any other human language) ultimately are expressed as bit strings in computer memory. It will also help understand why an understanding of computer architecture is essential to the production of robust and error-free programs.

This is a four-credit course. Roughly three credits will be devoted to computer organization and architecture (COA) while one credit will be devoted to assembly language. Exams and assignments will reflect the 75%/25% split.

**Exams:** Two prelims and a final exam. One hand-written 8½ x 11 sheet of notes, both sides, will be allowed. No electronic devices of any type are allowed to be used during exams.

**Grading:** Plus/minus grading will be used for final submitted grades. The final grading scale will be announced as the semester progresses. Final grades are a weighted average:

Homework	25%
Attendance/Quizzes	10%
Prelims	20% each
Final Exam	25%

Homework will be graded on a scale of 0-10 (in increments of 0.25) as follows:

0	Not submitted
1-3	Attempt made in spite of complete lack of understanding or knowledge
4-5	Incomplete or sloppy work; indicates substantial deficiency of understanding
6-7	Incomplete or sloppy work; incorrect logic or answers, indicating partial understanding
8	Work is mostly correct, indicating a reasonable understanding of material
9	Work is correct and <u>above average</u> , indicating complete understanding and/or extra effort
10	Exceptional work

**Homework Assignments.** Homework assignments will include exercises from the textbook, brief written research reports, and assembler programs. Correct grammar and spelling are considered when grading. If writing problems are a significant factor in assigning a grade, you will have the option of resubmitting after consulting with the Writing Lab.

**Attendance and Quizzes.** Regular attendance is expected. We will be covering a great deal of extremely detailed material. There will normally be a surprise quiz every class meeting. Quizzes are graded with A-10 (all answers correct), B-9 (majority of answers correct) , C-8 (needs some work) and 0 for not present. Answers are discussed immediately after the quiz or if necessary, at the start of next class.

### **Academic Honesty**

As a student in the university community, it is important that you understand the University of Maine policy on academic integrity. Violations of student academic integrity include any actions that attempt to promote or enhance the academic standing of any student by dishonest means (ex. cheating, plagiarism, fabrication or academic misconduct). Instances of academic dishonesty will incur a minimum penalty of a 0 for the assignment or exam in question. Additional penalties range from a failing grade for the course to referral to a University disciplinary body. While the internet is an excellent resource for this class, you must be very careful not to copy or plagiarize material found on the internet.

This policy is not meant to discourage legitimate and useful collaboration, or use of the Internet, in learning the material. It is often helpful to discuss problems and concepts with other students. However, ultimately you are responsible for your own work. If you feel that ideas or reasoning involved in part of an assignment are attributable to another student or source, you should note this fact in the assignment without fear of penalty. If you are unsure where the line is between doing your own work and plagiarism, please see me.

**Electronic Devices** are not allowed for exams; including but not limited to laptop computers, calculators, telephones and music players.

### **Classroom Behavior**

Please arrive on time, be reasonably quiet, and do not leave the classroom before the period is over. Cellphones must be turned off while in class. Laptop computers should be used only for taking notes.

### **Website and First Class Conference**

The website for this class is <http://umcs.maine.edu/~cmeadow/courses/cos335/index.html>.

A First Class conference has been set up for this course. See Student Resources > Academics > Spring Courses > COS 335(Meadow). Lecture notes, handouts, assignments, corrections and other course materials will be posted in both locations. Private material, such as grades will be posted to First Class only. All students will be granted FC contributor permissions and you are welcome to use the conference to post questions and start discussions related to the class.

I do not plan to distribute items on paper in class; please monitor the web site or conference on a regular basis, especially just before class meetings.

**ADA Notice:** If you wish to request an accommodation for a disability, please contact me or Anne Smith, Coordinator of Services for Students with Disabilities (East Annex, 581-2319) as early as possible.

## An Optimistic Schedule

Prelim dates are tentative but not fixed in stone. We will discuss in class and move or change dates if desirable. The assembler course is in revision and topics are not yet available.

Week	Architecture Topic	Text	Assembler
Jan 11-13	COA Intro Computer Evolution and Performance	Ch 1 Ch2	Integer Number Systems (App A)
Jan 18-20	Computer Evolution and Performance  Computer Function and Interconnection	Ch 2 Ch 3	Integer Number Systems Rational Numbers
Jan 27-29	Computer function and Interconnection Cache Memory	Ch 3 Ch 4	Floating point representations
Feb 1-3	Cache Memory Internal Memory	Ch 4 Ch 5	Intel x86 Architecture (16,32, 64 bit)
Feb 8-10	External Memory	Ch 6	Intel x86 Architecture (16,32, 64 bit)
Feb 15-17	<b>Feb 15 Prelim 1</b> Input/Output	Ch 7	To Be Determined
Feb 22-24	Input/Output	Ch 7	To Be Determined
to Mar 13	SPRING BREAK		
Mar 15-17	Operating System Support / Memory Management	Ch 8	To Be Determined
Mar 22-24	Computer Arithmetic	Ch 9	To Be Determined
Mar 29	End of 2nd 3rd of semester for withdrawals		
Mar 29-31	Instruction Set Characteristics	Ch 10	To Be Determined
Apr 5-7	Addressing Modes <b>Apr 7 Prelim 2</b>	Ch 11	To Be Determined
Apr 12-14	Processor Structure and Function	Ch 12	To Be Determined
Apr 19-21	RISC	Ch 13	To Be Determined
Apr 26-28	Superscalar Processors	Ch 14	To Be Determined
May 2-6	FINAL EXAM WEEK		