# CISC-260: Machine Organization and Assembly Language

Fall 2010

INSTRUCTOR: Sandra Carberry	OFFICE HOURS:	Monday 3:00pm-4:00pm
OFFICE: 448 Smith		Wednesday 1:30pm-2:30pm
EMAIL: carberry@cis.udel.edu		
CLASS WEB SITE: www.cis.udel.edu/		
TA: Tim McClory	OFFICE HOURS:	Tuesday 4:30pm-5:30pm

Thursday 3:30pm-4:30pm

### 1 Course Description

OFFICE: 103 Smith

CISC-260 provides students with knowledge about basic machine organization and the low-level languages that tell the computer hardware what to do. The objectives of CISC-260 are: 1) knowledge of how information is represented in memory, 2) an understanding of machine and assembly language and the ability to write assembly language programs, 3) knowledge of how assembly language is translated into machine language, 4) an understanding of how the software (the program instructions) tells the hardware what to do and how the hardware carries out the software instructions, and 5) knowledge about the factors that influence performance and their impact on a machine's instruction set.

### 2 Prerequisites

CISC-181 (minimum grade of C-)

# 3 Textbooks

Computer Organization and Design: Fourth Edition by David Patterson and John Hennessy

# 4 Handouts

There will be three kinds of handouts in the course.

- Tutorials (listed on reading list): these will be available from the class web site.
- Homework assignments: if you miss class, you can get an extra copy of a homework assignment from the instructor or from the class web site.
- Outlines, definitions, examples, etc.: These handouts will often be used to help with lecture presentations and allow the instructor to use transparencies or Powerpoint presentations without worrying about the students having to copy everything. Since these handouts are just a substitute for student note-taking and keeping track of them would be very difficult, they will **ONLY** be available in class. I will not save extra handouts from class — if you miss class, copies of these handouts will **NOT** be available.

# 5 Cell Phones and Laptops

Please turn off your cell phones, pagers, etc. and refrain from using laptops during class.

# 6 Grading

ITEM	PERCENT OF GRADE
Midterm Exams	32%
Final Exam	33%
Homework Sets	35%
Class Participation	described below

#### Exams

In order to avoid a large buildup of material that must be mastered for each midterm exam, there will be more than one midterm exam during the semester.

- Your lowest midterm exam will be dropped.
- Unless a student is hospitalized, make-up exams will not be given. If you miss a midterm exam, that is the one you must drop. If there is a date that you would like me to work around in scheduling the midterms exams, please let me know right away (first week of class).
- It is unclear whether there will be a recurrence of the flu problem from last year. Allowing each student to drop a midterm exam addresses this issue, since each student can miss one exam during the semester. Thus you should take the first exam(s) so that you save the option of skipping an exam for a situation in which you are seriously ill.

#### Homework Sets

Homework sets are intended to give you an opportunity to work with the concepts discussed in class.

- Homework sets are due before class starts on the announced due date, and will be collected at that time. Once the homework has been collected and class begins, any homework sets turned in will be regarded as late. These include programming assignments.
- There is a grace period during which late homeworks will not be penalized. Students utilizing the grace period must put their late homework in the instructor's mailbox <u>at least 15 minutes prior</u> to the end of the grace period or give it directly to the instructor prior to the end of the grace period. The grace period for late homeworks is as follows:

DUE-DATE	END-OF-GRACE-PERIOD
9:05am Monday	9:05am on the following Wednesday
9:05am Wednesday	9:05am on the following Friday
9:05am Friday	9:05am on the following Monday

After the end of the grace period, late homework sets will be penalized 25% of the total points that the assignment is worth, for each day that the assignment is late (not including Saturday and Sunday). This penalty will be applied even if the homework is only a few minutes late.

- All work must be done independently. You may consult with others about conceptual problems with assignments and for debugging of programs. However, collaboration beyond this is not permitted; each student must do his or her homework and programming assignments independently.
- In the case of questions regarding the grading of homework assignments, you should first contact the teaching assistant. If you still have questions after meeting with the teaching assistant, contact the instructor.

#### Class Participation

Class participation is strongly encouraged and leads to a much more enjoyable and productive class. So please actively contribute to the class discussions and feel free to ask questions — I want to help you understand how computers are structured and get as much from the course as possible. Particularly good class contributions will positively affect borderline decisions on final grades in the course. Disruptive or distracting behavior hurts the whole class; such behavior will result in a reduction of up to two letter grades in the student's final grade in the course.

### Lectures and Readings

The following may be revised and/or extended as the semester progresses.

Topic	Reading
Introduction	
Get PCSpim	Handout
Computer Components	P&H: 2-9, 13-15, 17-19, 21-26
Hardware/Software Interface	P&H: 10-13, 20-21, B-3 thru B-10
MIPS and PCSpim	P&H: 76-79, Getting Started with PCSpim
Data Representation	
Number Systems	P&H: 87-89
Representing Integers	P&H: 89-93
Basic MIPS	
Machine Language Instructions	P&H: 94-101
Memory Organization	P&H: B-20 thru B-22, 84, 128-129, 140-141
Branch instructions	P&H: 105-111
Simple procedures	P&H: 112-118
Design of an ALU Boolean expressions and Gates	P&H: C1-8
Decoders and Multiplexors	P&H: C9-12
Basic Arithmetic-Logic Unit	P&H: C26-31
More MIPS	
Input and Output	P&H: B-43, B-44, Spim documentation
Character Data	P&H: 122-126
Addressing Modes	P&H: 128-136
More on Procedures	P&H: 112-122
A Sample MIPS Program	P&H: 149-155
Arrays versus Pointers	P&H: 157-161
Dynamic memory	P&H: 119-122
Computer Arithmetic	
Integer arithmetic	P&H: 224-242
Floating point representation	P&H: 242-250
Floating point arithmetic	P&H: 250-269
Translation and Performance	
Assemblers, Linkers, and Loaders	P&H: 139-145
Parallelism and Synchronization	P&H: 137-138
Performance Issues	P&H: 9,26-38