

CDA 3101 – Introduction to Computer Organization

(Summer 2009)

Catalog Description

Credits: 3; Pre-requisite: CIS 3020 or CIS 3023; MAC 2233, MAC 2311, or MAC 3472, basic knowledge of C Programming. Organization of computing systems. Logical basis of computer structure. Machine representation of instructions and data, flow of control, and basic machine instructions. Assembly language programming.

Accreditation

This course is used to assess program outcomes for these ABET criteria:

- a) apply math, science, engineering
- c) design system, etc. to meet needs
- e) identify, formulate, and solve engineering problems

Course Overview

This course serves as an introduction to the basics of computer organization and design, exploring the relationships between low-level data representation, instruction sets, system performance, and issues addressed by a few fundamental processor design concepts. The course will largely follow the required textbook and will use the MIPS RISC architecture and assembly language as a case study.

Course Objectives

By the end of the semester, successful students should be able to:

- intelligently discuss how certain fundamental programming language concepts are translated to the machine level,
- write small programs in assembly language and translate them to machine code,
- abstractly combine basic digital circuitry components to process subsets of machine code,
- discuss how pipelining works and how to implement it for an example datapath,
- understand the modern memory hierarchy found in computers and why it is critical for performance,
- properly analyze, compare, and contrast performance of computer systems.

Course Instructor and Teaching Assistant

Instructor: Joshua Horton
Location/Time for office hours: E309 / MWF 3:00 PM – 4:00 PM
E-mail: jhorton@cise.ufl.edu
Class website: <http://www.cise.ufl.edu/class/cda3101su09>

Teaching Assistant: Meizhu Liu
Location/Time for office hours: E309 / TR 3:30 PM – 4:45 PM
E-mail: mliu@cise.ufl.edu

Course Meeting Times & Locations

Lecture: MWF 7th period, CSE 220
(5:00 PM – 6:15 PM)

Discussions: W 3rd/4th period, CSE 221
(11:00 AM – 12:15 PM / 12:30 PM – 1:45 PM)

Textbooks

Required: Patterson, David A. and Hennessy, John L. *Computer Organization and Design*. 3rd ed. Morgan Kaufmann Publishers, San Francisco, CA.

Recommended: Britton, Robert L. *MIPS Assembly Language Programming*. Pearson Prentice Hall, Upper Saddle River, NJ. ISBN: 0-13-142044-5.

Course Outline

All information provided below is subject to change as the semester progresses.

Dates	Chapters	Topics
May 11 – 13	1.*	Introduction
May 15 – 20	2.1-2.3 2.5-2.7	Basic assembly language instructions
May 22 – 27	3.*	Arithmetic in Binary (Numerical Data Representation)
May 29 – June 5	-	Programming in MIPS
June 8 – 15	2.4, 2.9	Machine language instructions (Instruction Data Representation)
June 17	-	Midterm #1
June 19	-	TBD
June 22 – 26	-	No classes – Summer Break
June 29 – July 1	5.1-5.4	Single-cycle Datapaths
July 6 – 8	4.*	Performance
July 10 – 13	5.5	Multi-cycle Datapath
July 15 – July 22	6.*	Pipelining
July 24 - 27	7.1-7.3	Caching
July 29	-	TBD
July 31	-	Midterm #2
August 3	-	Presentations
August 5	-	Final Exam
August 7	-	Presentations

Grading

Homeworks	30%
Pop Quizzes (in class, unannounced)	10%
Midterm Exams (in class)	30%
Final Exam (comprehensive)	30%
Extra Credit – Presentation	+7%

Homeworks:

Homeworks will be assigned throughout the semester at a rate of at least one every three weeks, and no homework will have a deadline closer than three regular class periods after the date of its assignment. Unless otherwise specified, all homeworks are to be done individually. Any electronic components of assigned homeworks and projects will be turned in on the E-learning site.

Be aware that homeworks involving coding will look for the following criteria:

- Good commenting
- Coherent, well-written code
- Proper use of any conventions given in class
- Adherence to homework guidelines

Pop Quizzes:

Pop quizzes will be held during lectures and in discussion periods and will be unannounced. While these quizzes will be designed to take at most 15 minutes, it is strongly advised to be at least somewhat comfortable with all material presented in class through the previous lecture at all times. Depending on the number of such quizzes given during the class, one to two of them may be dropped.

Midterm Exams:

There will be two midterm exams, with each held toward the end of each summer session. The first will be held the last week of Summer A and the second will be held the second to last week of Summer B. Each will have equal weight and may have an extra credit question. Be aware that any such questions will be substantially more involved than the other questions on the test and while they will not require knowledge of material beyond the domain of the class, they will require significant thought that will not have been formally presented.

Final Exam:

There will be a comprehensive final exam held the last week of the Summer B session. It will be of similar form to the midterms, but will not have extra credit questions available. The final exam will be optional for students who have a cumulative grade of an A leading into it and who give a presentation as outlined below.

Presentation:

Each student will have the option of giving a presentation in class between the dates of the last midterm exam and final. The presentation topic should cover material either presented in the course or closely related to the course and must be approved first by the instructor.

+5% for giving a presentation

+2% for attending presentations (+1% per day, max of 2 days)

Grading Scale

Your final grade in the class will be computed using the above percentages and will not be rounded off. The grading system will, at its harshest, be as follows:

Letter Grade	Minimum % required
A	92.0
A-	88.0
B+	85.0
B	80.0
B-	78.0
C+	75.0
C	70.0
C-	68.0
D+	65.0
D	60.0
D-	58.0

It is possible that grades will be curved at the end of the semester, but do not count on this – it is solely dependent upon the instructor’s discretion. Any curve that may be applied will never cause your grade to be lower than that which would be assigned by the above table.

- Note that effective with the Summer 2009 term, UF's grading scale has been changed to include minus grades. The intent is to provide instructors with more options for assigning grades. Please see www.registrar.ufl.edu/DDD.doc for details.

Course Policies

- Course website + E-learning: Both websites will be used concurrently throughout the course. While announcements and course notes will be posted in both places, note that grades and groups for assignments, should they occur, will be posted only on E-learning to preserve student-teacher confidentiality.
- E-mail: Please direct all online correspondence through the provided CISE email addresses. While E-learning provides e-mail capacities through its system, be aware that these e-mails do not get forwarded to standard email clients and may go unread by accident.
- Electronic devices:
 - *Cell phones*: All cell phones should either be turned off or set to vibrate or silent at all times. No phone calls or text messages may be sent within the classroom – if it is important to take a call or text, please leave the classroom to do so, and be prepared to make up the missed material outside of class.
 - *PDAs/Laptops*: Please limit your activities on such devices to those which aid in your studies. It is your responsibility to maintain proper focus on the material being presented, as not all course material will be in electronic form.
 - *Other devices*: Unless otherwise permitted by the instructor, please keep other devices turned off during classroom activities.
- Missed Lectures: It is the student's responsibility to be as current as possible with the course material at any given time. Students should contact others in the course to obtain necessary notes and should visit the instructor and/or the TA during office hours as time permits.
- Makeup Exams: No makeup exams will be given unless there are extenuating circumstances, such as a significant illness, family emergency, or the wedding of a relative. If possible, please notify the instructor at least two weeks BEFORE a missed exam. Please submit written or printed documentation of the reason for your absence, regardless of whether the instructor has been notified. (Bring a doctor's note, wedding program, or the like.)
- Makeup Quizzes: There will be no makeup quizzes provided – this is the reason that one or two may be dropped by the end.
- Late Homework/Projects: Any homeworks and projects turned in after the given deadlines will be penalized by 10% of the maximum grade for each day late unless there are extenuating circumstances as outlined for makeup exams. In such cases, a new deadline will be established on a case-by-case basis.
- Re-grading: Re-grades may be requested on any project, homework, quiz, or midterm exam up to one week after the grades are made available, or up to the date of the final exam, whichever is earlier. The reason for the re-grade should be formally presented in writing. Be aware that a re-grade *could* result in *loss* of points if a re-examination of the work in question finds that too many points were awarded the first time.

Honesty Policy – All students admitted to the University of Florida have signed a statement of academic honesty committing themselves to be honest in all academic work and understanding that failure to comply with this commitment will result in disciplinary action. This statement is a reminder to uphold your obligation as a UF student and to be honest in all work submitted and exams taken in this course and all others.

Accommodation for Students with Disabilities – Students Requesting classroom accommodation must first register with the Dean of Students Office. That office will provide the student with documentation that he/she must provide to the course instructor when requesting accommodation.

UF Counseling Services – Resources are available on-campus for students having personal problems or lacking clear career and academic goals. The resources include:

- University Counseling Center, 301 Peabody Hall, 392-1575, Personal and Career Counseling.
- SHCC mental Health, Student Health Care Center, 392-1171, Personal and Counseling.
- Center for Sexual Assault/Abuse Recovery and Education (CARE), Student Health Care Center, 392-1161, sexual assault counseling.
- Career Resource Center, Reitz Union, 392-1601, career development assistance and counseling.

Software Use – All faculty, staff and student of the University are required and expected to obey the laws and legal agreements governing software use. Failure to do so can lead to monetary damages and/or criminal penalties for the individual violator. Because such violations are also against University policies and rules, disciplinary action will be taken as appropriate. We, the members of the University of Florida community, pledge to uphold ourselves and our peers to the highest standards of honesty and integrity.