Introduction to Computer Organization

CDA3101 UF Online, Section 19G6, Class Number 1159
Class Periods: Online
Location: Online
Academic Term: Fall 2018

Instructor

Dr. Beverly Sanders
sanders@cise.ufl.edu
Online Office Hours: Monday evenings, time TBD

Course Description

3 credits, 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. (M)

Course Pre-Requisites / Co-Requisites

COP 3504 or COP 3503; and MAC 2233, MAC 2311 or MAC 3472.

Course Objectives

By the end of the course students will be able to:

- Compare the performance of different computers
- Create and execute a MIPS assembly language program
- Demonstrate algorithms for and hardware for arithmetic with binary numbers representing integers and floating point numbers
- Articulate the difference between single cycle, multi-cycle and pipelined data paths and reasons for choosing an implementation
- Understand memory hierarchy and the use of cache and virtual memory.

Professional Component (ABET):

(a) an ability to apply knowledge of mathematics, science, and engineering

(c) an ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability

(e) an ability to identify, formulate, and solve engineering problems

(k) an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.

Relation to Program Outcomes (ABET):

Outcome	Coverage*
a. Apply knowledge	High
b1. Conduct experiments	
b2. Statistical design of experiments	
c. Design	High
d. Function on teams	
e. Solve problems	High
f. Professional and ethical responsibility	Low
g. Communicate	
h1. Economic impact	Low
h2. Global, societal, and environmental impact	
i. Lifelong learning	
j. Contemporary issues	Low
k. Techniques, skills, and tools for degree program	High

Required Textbooks and Software

- Title: Computer Organization and Design: The Hardware/Software Interface
- Author: Patterson and J. Hennessy,
- Publication date and edition: 5e, 2014
- ISBN number: 978-0-12-4077263

Recommended Materials

- Title: MIPS Assembly Language Programming
- Author: Britton
- Publication date and edition: 2003
- ISBN number: 0131420445

Course Schedule

Week	*Topics and assignments*
1	Technology overview
2	Digital logic
3	Performance and benchmarking. Problem Set 1
4	Instruction set architectures and MIPS instruction format

5	MIPS memory model, program structure, and flow control. Problem Set 2
6	MIPS decision structures, procedure calls, Java strings, and datatypes and addressing
7	MIPS pointers and arrays. Programming Assignment 1
8	Number systems and conversion, MIPS ALU. Exam 1
9	Signed multiplication and division, floating point.
10	MIPS datapath
11	Finite state control, microprogrammed control, overview of pipelines
12	Pipeline with R and I format instructions, pipeline control. Programming Assignment 2
13	Pipeline hazards. Exam 2
14	Pipeline performance, pipeline scheduling, memory system, cache memory
15	Virtual memory
16	Input/Output, Parallelism. Problem Set 4
17	Final Exam

Attendance Policy, Class Expectations, and Make-Up Policy

Exams may be made up when student has an excused absence.

Excused absences must be consistent with university policies in the undergraduate catalog (https://catalog.ufl.edu/ugrad/current/regulations/info/attendance.aspx) and require appropriate documentation.

Problem Sets and Programming Assignments may be turned in late with a penalty of 5% of the maximum grade per 12 hours, for up to three days. After three days, late assignments will not be accepted.

Exam information

- Exams will be open book and open notes.
- Exams will be administered through ProctorU. Make sure to make an appointment ahead of time to avoid unnecessary fees.
- Exams will be available during the 48 hour window before the due date.
- Exam due dates (at 11:59pm):
    - Exam 1: Oct 9
    - Exam 2: Nov 13
    - Final: Dec 11
- The final exam will be cumulative and cover material from the entire semester.

Evaluation of Grades

Assignment	Total Points	Percentage of Final Grade
Homework Sets (4)	50 each = 200	20%
Programming Assignments (2)	50 each = 100	10%
Midterm Exam 1	150	15%
Midterm Exam 2	150	15%
Final Exam	400	40%
Total	1000	100%

Grading Policy

Percent	Grade
93 - 100	A
90.0 – 92.9	A-
87 - 89.9	B+
83 - 86.9	B
80.0 – 82.9	B-
77 - 79.9	C+
73 - 76.9	C
70.0 – 72.9	C-
67 - 69.9	D+
63 - 66.9	D
60.0 – 62.9	D-
0 - 59.9	E

More information on UF grading policy may be found at:
https://catalog.ufl.edu/ugrad/current/regulations/info/grades.aspx

Students Requiring Accommodations

Students with disabilities requesting accommodations should first register with the Disability Resource Center (352-392-8565, https://www.dso.ufl.edu/drc) by providing appropriate documentation. Once registered, students will receive an accommodation letter which must be

presented to the instructor when requesting accommodation. Students with disabilities should follow this procedure as early as possible in the semester.

Course Evaluation

Students are expected to provide feedback on the quality of instruction in this course by completing online evaluations at https://evaluations.ufl.edu/evals. Evaluations are typically open during the last two or three weeks of the semester, but students will be given specific times when they are open. Summary results of these assessments are available to students at https://evaluations.ufl.edu/results/

University Honesty Policy

UF students are bound by The Honor Pledge which states, "We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honor and integrity by abiding by the Honor Code. On all work submitted for credit by students at the University of Florida, the following pledge is either required or implied: "On my honor, I have neither given nor received unauthorized aid in doing this assignment." The Honor Code (https://www.dso.ufl.edu/sccr/process/student-conduct-honor-code/) specifies a number of behaviors that are in violation of this code and the possible sanctions. Furthermore, you are obligated to report any condition that facilitates academic misconduct to appropriate personnel. If you have any questions or concerns, please consult with the instructor or TAs in this class.

Software Use

All faculty, staff, and students 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.

Student Privacy

There are federal laws protecting your privacy with regards to grades earned in courses and on individual assignments. For more information, please see: http://registrar.ufl.edu/catalog0910/policies/regulationferpa.html

Campus Resources

Health and Wellness

U Matter, We Care:

Your well-being is important to the University of Florida. The U Matter, We Care initiative is committed to creating a culture of care on our campus by encouraging members of our

community to look out for one another and to reach out for help if a member of our community is in need. If you or a friend is in distress, please contact umatter@ufl.edu so that the U Matter, We Care Team can reach out to the student in distress. A nighttime and weekend crisis counselor is available by phone at 352-392-1575. The U Matter, We Care Team can help connect students to the many other helping resources available including, but not limited to, Victim Advocates, Housing staff, and the Counseling and Wellness Center. Please remember that asking for help is a sign of strength. In case of emergency, call 9-1-1.

Counseling and Wellness Center: http://www.counseling.ufl.edu/cwc, and 392-1575; and the University Police Department: 392-1111 or 9-1-1 for emergencies.

Sexual Assault Recovery Services (SARS) Student Health Care Center, 392-1161.

University Police Department at 392-1111 (or 9-1-1 for emergencies), or http://www.police.ufl.edu/.

Academic Resources

E-learning technical suppor*t*, 352-392-4357 (select option 2) or e-mail to Learning-support@ufl.edu. https://lss.at.ufl.edu/help.shtml.

Career Resource Center, Reitz Union, 392-1601. Career assistance and counseling. https://www.crc.ufl.edu/.

Library Support, http://cms.uflib.ufl.edu/ask. Various ways to receive assistance with respect to using the libraries or finding resources.

Teaching Center, Broward Hall, 392-2010 or 392-6420. General study skills and tutoring. https://teachingcenter.ufl.edu/.

Writing Studio, 302 Tigert Hall*,* 846-1138. Help brainstorming, formatting, and writing papers. https://writing.ufl.edu/writing-studio/.

Student Complaints Campus*:* https://www.dso.ufl.edu/documents/UF_Complaints_policy.pdf.

On-Line Students Complaints*:* http://www.distance.ufl.edu/student-complaint-process.