Introduction to Computer Organization

CDA 3101

Class Periods: Wednesday 830 am Zoom, Discussion Period on Zoom, Lectures asynchronous

Academic Term: Fall 2020

Instructor:
Cheryl Resch
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443-223-3562
Office Hours: Zoom, Monday 4pm, Tuesday 4pm,
Join link - https://ufl.zoom.us/j/94790157674?pwd=dlJ0YmpEdk9LbThPK09EYWpqOTVCZz09
Password - Resch

Peer Mentors:
Please contact through the Canvas website

- Yenessa Avalos-Moldonado
- Frank Camargo
- Nathaniel Edgar
- Broderick Golden
- Daniel Labes
- Benjamin Rheault
- Rachel Romaine
- Caleb Steinmetz
- Grant Wise

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.

Course Pre-Requisites / Co-Requisites
Prereq: COP 3504 or COP 3503; and MAC 2233, MAC 2311 or MAC 3472; COT 3100

Course Objectives
Students will be able to

- Calculate computer performance
- Represent simple high level language programs in ARM
- Represent ARM assembly language instructions in binary machine instructions
- Represent integers and floating-point numbers in binary
- Trace the execution of ARM instructions through simple single cycle and pipelined datapaths
- Distinguish between direct mapped, set associative, and fully associative cache designs

Relation to Program Outcomes (ABET):

Outcome	Coverage*
1. An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics	High
2. An ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare,	

as well as global, cultural, social, environmental, and economic factors	
3. An ability to communicate effectively with a range of audiences	
4. An ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts	
5. An ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives	
6. An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions	
7. An ability to acquire and apply new knowledge as needed, using appropriate learning strategies	

Required Textbooks and Software

- Computer Organization and Design
- Patterson and Hennessy
- Zybook Code UFLCDA3101ReschFall2020
- ISBN 978-1-394-01368-5

Course Schedule

Week	Module	Videos	Reading	Assignment Due
8/31-9/6	Introduction	Introduction	Zybooks 1.1 – 1.5	Quiz - What is this class about Due 9/6
9/7-9/13	Introduction	Computer Performance, ISAs, Benchmarking	Zybooks 1.6-1.8-1.11	Extra Credit – PreTest Due 9/6 Discussion – ISAs Due 9/13
9/14-9/20	Digital Logic	Digital Logic 1-4	Zybooks 7.1-7.3, 7.5, 7.7-7.8	Quiz – Digital Logic – in discussion 9/17 Zybooks Activities Due 9/20
9/21-9/27	ARM Instructions and Programming	ARM Arithmetic and Logic 1-2, ARM Data Transfer Instructions, ARM Decisions and Loops 1-2, Leg Reference Sheet	Zybooks 2.1-2.3, 2.5-2.7	Quiz – ARM Programming – in discussion 9/24

9/28-10/4	ARM Instructions and Programming	ARM Procedures 1-4, ARM Arrays and References	Zybooks 2.8-2.9, 2.14	Programming Assignment 0
10/5-10/11	Numbers and Arithmetic	Signed Integers, Building an ALU, Integer Multiplication, Floating Point	Zybooks 2.4, 3.1-3.5	Quiz – Floating Point and Integer Multiplication – in discussion 10/9 Zybooks Activities Due 10/11
10/12-10/18	Review and Midterm			
10/19-10/25	Single Cycle Datapath	Single Cycle Datapath 1-3	Zybooks 4.1-4.4	Programming Assignment 1 Due 10/25
10/26-11/1	Pipelined Datapath	Pipelined Datapath 1-3	Zybooks 4.5-4.6	Quiz – Single Cycle Datapath – in discussion 10/28
11/2-11/8	Pipelined Datapath	Pipelined Datapath 4-6	Zybooks 4.7-4.8	Quiz – Pipelining – in discussion 11/5 Zybooks Activities Due 11/8
11/9-11/15	Memory	Cache Memory 1-3	Zybooks 5.1-5.5	Programming Assignment 2 Due 11/15
11/16-11/22	Memory	4-5, Virtual Memory	Zybooks 5.7-5.8	Quiz – Memory – in discussion 11/19
11/23-11/29	Parallel Processing	Parallel Processing 1-3	Zybooks 4.10, 6.1-6.5	Zybooks Activities Due 11/29
11/30-12/6	Review and Final			

Make-Up Policy

Quizzes may not be made up. There is one dropped quiz. Programming assignments may be turned in up to four days late with a late penalty of 10% per day. The Reflection Assignment may not be turned in late. Mid Term and Final Exams will be administered in HonorLock. You will be given a testing window. These exams may be taken on an alternative day ONLY University approved excuse.

Evaluation of Grades

Assignment	Percentage of Final Grade
Quizzes	20%
Programming Assignments	22%
Reflection Assignment	5%
Zybooks Activities	8%
Midterm Exam	20%
Final Exam	25%

	100%

Grading Policy

Percent	Grade	Grade Points
93.4 - 100	A	4.0
90.0 - 93.3	A-	3.7
86.7 - 89.9	B+	3.3
83.4 - 86.6	B	3.00
80.0 - 83.3	B-	2.7
76.7 - 79.9	C+	2.3
73.4 - 76.6	C	2.0
70.0 - 73.3	C-	1.7
66.7 - 69.9	D+	1.3
63.4 - 66.6	D	1.0
60.0 - 63.3	D-	0.7
0 - 59.9	E	0.0

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

Our class sessions may be audio visually recorded for students in the class to refer back and for enrolled students who are unable to attend live. Students who participate with their camera engaged or utilize a profile image are agreeing to have their video or image recorded. If you are unwilling to consent to have your profile or video image recorded, be sure to keep your camera off and do not use a profile image. Likewise, students who un-mute during class and participate orally are agreeing to have their voices recorded. If you are not willing to consent to have your voice recorded during class, you will need to keep your mute button activated and communicate exclusively using the "chat" feature, which allows students to type questions and comments live. The chat will not be recorded or shared. As in all courses, unauthorized recording and unauthorized sharing of recorded materials is prohibited.

Students Requiring Accommodations
Students with disabilities who experience learning barriers and would like to request academic accommodations should connect with the disability Resource Center by visiting https://disability.ufl.edu/students/get-started/. It is important for students to share their accommodation letter with their instructor and discuss their access needs, as early as possible in the semester.

Course Evaluation
Students are expected to provide professional and respectful feedback on the quality of instruction in this course by completing course evaluations online via GatorEvals. Guidance on how to give feedback in a professional and respectful manner is available at https://gatorevals.aa.ufl.edu/students/. Students will be notified when the evaluation period opens, and can complete evaluations through the email they receive from GatorEvals, in their

Canvas course menu under GatorEvals, or via https://ufl.bluera.com/ufl/. Summaries of course evaluation results are available to students at https://gatorevals.aa.ufl.edu/public-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://sccr.dso.ufl.edu/policies/student-honor-code-student-conduct-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.

Commitment to a Safe and Inclusive Learning Environment

The Herbert Wertheim College of Engineering values broad diversity within our community and is committed to individual and group empowerment, inclusion, and the elimination of discrimination. It is expected that every person in this class will treat one another with dignity and respect regardless of gender, sexuality, disability, age, socioeconomic status, ethnicity, race, and culture.

If you feel like your performance in class is being impacted by discrimination or harassment of any kind, please contact your instructor or any of the following:

- Your academic advisor or Graduate Program Coordinator
- Robin Bielling, Director of Human Resources, 352-392-0903, rbielling@eng.ufl.edu
- Curtis Taylor, Associate Dean of Student Affairs, 352-392-2177, taylor@eng.ufl.edu
- Toshikazu Nishida, Associate Dean of Academic Affairs, 352-392-0943, nishida@eng.ufl.edu

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: https://registrar.ufl.edu/ferpa.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 Discrimination, Harassment, Assault, or Violence
If you or a friend has been subjected to sexual discrimination, sexual harassment, sexual assault, or violence contact the **Office of Title IX Compliance**, located at Yon Hall Room 427, 1908 Stadium Road, (352) 273-1094, title-ix@ufl.edu

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://care.dso.ufl.edu.

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