Introduction to Computer Organization
CDA 3101
Class Periods: MWF Period 9
Location: Turlington 7
Academic Term: Spring 2025

Instructor:
Prof. Cheryl Resch
Cheryl.resch@ufl.edu
Office Hours: M, Th 1:30-2:30 Mala 4110

Peer Mentors:

Tressler, Christopher c.tressler@ufl.edu
Wong, Tony tony.wong@ufl.edu
Ferrell, Shane E. shaneferrell@ufl.edu
Hassan, Adam adamhassan@ufl.edu
Islam, Aayesha M. aayeshaislam@ufl.edu
King, Ethan H. kinge1@ufl.edu
Jain, Aarushi aarushijain@ufl.edu
Wang, Jackie jackiewang@ufl.edu
Magnan, Jaiden C. jaiden.magnan@ufl.edu
Adireddy, Shreyas shreyas.adireddy@ufl.edu
Benali, Adam adam.benali@ufl.edu
Albertelli, Anna aalbertelli@ufl.edu
Kubinsky, Joel joelkubinsky@ufl.edu
Zhuang, Dylan dylan.zhuang@ufl.edu
Hiral, Shukla hiralshukla@ufl.edu
Jain, Aarushi aarushijain@ufl.edu

Course Description
This course focuses on the organization of computing systems. In this course, you will learn about:
- 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
To take this course, you must have completed the following courses:
- COP 3504 or COP 3503
- MAC 2233, MAC 2311 or MAC 3472
- COT 3100

Course Student Learning Outcomes
By the end of this course, you will be able to:
1. Calculate computer performance.
2. Represent simple high level language programs in ARM.
3. Represent ARM assembly language instructions in binary machine instructions.

4. Describe and demonstrate the use of stack frames for saving local variables.
5. Represent integers and floating-point numbers in binary.
6. Trace the execution of ARM instructions through simple single cycle and pipelined datapaths.
7. Distinguish between direct mapped, set associative, and fully associative cache designs.

Materials and Supply Fees
None

Required Textbooks and Software
- Dive Into Systems
  - Suzanne J. Matthews, Ph.D. — West Point
    suzanne.matthews@westpoint.edu
  - Tia Newhall, Ph.D. — Swarthmore College
    newhall@cs.swarthmore.edu
  - Kevin C. Webb, Ph.D. — Swarthmore College
    kwebb@cs.swarthmore.edu
  - https://diveintosystems.org/book/index.html
- qemu
- iClicker
- GradeScope

Recommended Materials
- None

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	Low
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	High
7. An ability to acquire and apply new knowledge as needed, using appropriate learning strategies	High

*Coverage is given as high, medium, or low. An empty box indicates that this outcome is not covered or assessed in the course.

Weekly Course Schedule
Week 1 – Introduction, ISAs, Performance Equation
Week 2 – Performance Equation, Benchmarking
Week 3 – Introduction to the Emulator, Signed Integers
Week 4 – Instruction basics, arithmetic instructions, data transfer instructions
Week 5 – Loops, arrays, ARM procedures
Week 6 – Recursion, buffer overflow
Week 7 – Floating point, multiplication
Week 8 – Digital logic, circuit basics
Week 9 – Machine code, building a datapath
Week 10 - Pipelining
Week 11 – Cache
Week 12 – Cache Coherence, virtual memory
Week 13 – Flynn's Taxonomy
Week 14 – Review

Attendance Policy, Class Expectations, and Make-Up Policy
Exams and Final Exam
Exams are taken in Carleton. Students may use one printed or hand written reference sheet.
Exams are taken on paper and uploaded to GradeScope
Students with accommodations allowing them extra time should schedule their exam in the DRC.
The make up for any missed exam is the cumulative make up exam given on April 23.

Participation Grade
There are ~40 iClicker participation activities. For full points, you must participate in 27 participation activities. "Excused absences" do not apply to participation activities. You have 40 chances to get 27 points. If you're out, even if it is "excused", you do not get credit. It's your responsibility to be someplace with reliable internet during class. I can't give you credit for iClicker if your internet access was behaving badly. Bottom line: you have to do 27. No excuses, no make ups.
Even after doing your required 27, you are welcomed and *encouraged* to do more. I provide them because I think they are helpful to your learning.
Homeworks
Homeworks must be turned in on paper in discussion period.

Late Policy
Programming Assignments, Cache Analysis Assignment, and Buffer Overflow Assignment may be turned in up to four days late with a late penalty of 10 points per day.
Honesty Policy

Your code for your Programming Assignments and the Analysis Assignments must be your own. You may discuss assignments with others, but **copy/pasting code from other students or online resources is strictly prohibited**. We will be using TurnItIn to check for plagiarism.

Your writing and graphs for the Cache Analysis Assignment must be your own. **Copy/pasting writing and/or graphs from other students is strictly prohibited.**

You may discuss and draw out algorithms for the assignments with other students. You may not copy code from another student. You may not copy AI generated output. You may not copy code from the internet.

A sanction of an E in the course will be imposed if a student is found to have violated the honesty policy.

Discussion of Grades

Grades on any assignment may be discussed with me via email or in office hours up to **seven days after the grade was released**.

Extra Credit

Up to two extra credit assignments may be completed. Each assignment will be worth 1% of your grade.

Etiquette Expectations

Please communicate in a professional manner in email, on Discord, and in Canvas Discussions.

Evaluation of Grades

We will make every effort to have each assignment graded and posted within one week of the due date.

Course Grading Policy

Assignment	Points
Exams (3)	30%
Final Exam	15%
Programming Assignments	21%
Buffer Overflow Assignment	10%
Cache Analysis Assignment	10%
Participation Activities (40 with 13 drops)	7%
Homeworks (12 with 2 drops)	7%
Total	**100%**

Grading Scale

Percent	Grade	Grade Points
93 - 100	A	4.00
90.0 - 92.99	A-	3.7
87 - 89.99	B+	3.3
83 - 86.99	B	3.00
80.0 - 82.99	B-	2.7
77 - 79.99	C+	2.3
73 - 76.99	C	2.00
70.0 - 72.99	C-	1.7

Percent	Grade	Grade Points
67 - 69.99	D+	1.3
63 - 66.99	D	1.00
60.0 - 63.99	D-	0.7
0 - 59.99	E	0.00

More information on UF grading policy may be found at:
https://catalog.ufl.edu/UGRD/academic-regulations/grades-grading-policies/

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/.

In-Class Recording
Students are allowed to record video or audio of class lectures. However, the purposes for which these recordings may be used are strictly controlled. The only allowable purposes are (1) for personal educational use, (2) in connection with a complaint to the university, or (3) as evidence in, or in preparation for, a criminal or civil proceeding. All other purposes are prohibited. Specifically, students may not publish recorded lectures without the written consent of the instructor.

A "class lecture" is an educational presentation intended to inform or teach enrolled students about a particular subject, including any instructor-led discussions that form part of the presentation, and delivered by any instructor hired or appointed by the University, or by a guest instructor, as part of a University of Florida course. A class lecture does not include lab sessions, student presentations, clinical presentations such as patient history, academic exercises involving solely student participation, assessments (quizzes, tests, exams), field trips, private conversations between students in the class or between a student and the faculty or lecturer during a class session.

Publication without permission of the instructor is prohibited. To "publish" means to share, transmit, circulate, distribute, or provide access to a recording, regardless of format or medium, to another person (or persons), including but not limited to another student within the same class section. Additionally, a recording, or transcript of a recording, is considered published if it is posted on or uploaded to, in whole or in part, any media platform, including but not limited to social media, book, magazine, newspaper, leaflet, or third party note/tutoring services. A student who publishes a recording without written consent may be subject to a civil cause of action instituted by a person injured by the publication and/or discipline under UF Regulation 4.040 Student Honor Code and Student Conduct Code.

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/process/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 varied perspectives and lived experiences within our community and is committed to supporting the University's core values, including the elimination of discrimination. It is expected that every person in this class will treat one another with dignity and respect regardless of race, creed, color, religion, age, disability, sex, sexual orientation, gender identity and expression, marital status, national origin, political opinions or affiliations, genetic information, and veteran status.

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
• HWCOE Human Resources, 352-392-0904, student-support-hr@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: https://counseling.ufl.edu, 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 Connections Center, Reitz Union, 392-1601. Career assistance and counseling; https://career.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://sccr.dso.ufl.edu/policies/student-honor-code-student-conduct-code/;https://care.dso.ufl.edu.

On-Line Students Complaints*:* https://distance.ufl.edu/getting-help/; *https://distance.ufl.edu/state-authorization-status/#student-complaint*.