



UNIVERSITY OF
CENTRAL FLORIDA

CDA 5106: Advanced Computer Architecture

Department of Computer Science,
College of Engineering and Computer Science
3 Credit Hours

Course Syllabus

Instructor:	Prof. Jongouk Choi	Term:	Spring 2023
Office Location:	HEC 307	Class Meeting Days:	M/W
Office Hours:	11:30am-1pm (M/W)	Class Meeting Time:	1:30-2:50 pm
Phone:		Class Location:	CB2, 0206 PSY 108
Email:	jongouk.choi@ucf.edu	Course Modality:	P: Face to Face

GTA:	Noureldin Hassan	Email:	nurhassan@Knights.ucf.edu
Office Hours	11am-1pm (T/TH)	Location:	https://ucf.zoom.us/j/4406248780

Course Description

Prerequisites: EEL 4768C, CDA 3103, or equivalent undergraduate computer organization class. This class is a graduate course covering foundational concepts in microprocessor design. The catalog describes the course topic as "Modern processor design, instruction set architecture, pipelining, instruction-level parallelism, thread-level parallelism, data-level parallelism, memory hierarchy, and I/O."

Important Note: In this semester, as in Spring 2023, we will not cover thread-level, data-level parallelism, and I/O. Instead, we will focus on processor design, instruction-level parallelism, and memory hierarchy, and cover them in greater depth for performance, reliability, and security issues. This is necessary to provide in-depth coverage of the above-listed topics, which is what is expected by the industry. 3 credit hours.

Class Attendance

Required. Lectures will be in person. Instructors do not attempt to record lectures. However, we may provide online lectures in case of unexpected events. Students understand that the course modality is face to face (in person). Note, we make no guarantee to post every announcement to Webcourses.

Recommended Course Textbook

Hennessy and Patterson, "Computer Architecture: a Quantitative Approach", Morgan Kaufmann, 6th edition, 2017. The 5th edition is also acceptable.

John Paul Shen and Mikko Lipasti, "Modern Processor Design", Waveland Press Inc., 2013

Basis for Final Grade

Assessment	Percent of Final Grade
Attendance	6%
Quizzes	4%
Assignments	25%
Project	35%
Midterm 1	15%
Midterm 2	15%
	100%

Grading Scale (%)	
90 – 100	A
85 – 89	B+
80 - 84	B
75 – 79	C+
70 - 74	C
60 – 69	D
0 – 59	F

Curve

A grade curve may or may not be employed in this course. The application of a curve is dependent upon class performance on tests, projects and homework. The decision to utilize a curve rests entirely with the course instructors.

Assignments (programming or non-programming)

Five assignments are planned for this semester. These are likely to be assigned bi-weekly and may not overlap with exam weeks. Our focus will be on learning the material and solving practical problems. More information will be provided on the Webcourse.

Late assignments will be penalized 10% per day (24 hour period). This penalty will apply except in case of documented emergency (e.g., medical emergency), or by prior arrangement if doing the work in advance is impossible due to fault of the instructor (e.g., you have a travel commitment and ask to start a project early, but needed lab equipment hasn't arrived.)

Quizzes

Two online quizzes are planned for this semester. These are likely for mid-term exam practice. Each quiz will be offered only one time.

Exams

Two mid-term exams are planned for this semester (in-class). However, the type of exams is subject to change. Note that the second exam is not cumulative.

Course Project

A group course project will be assigned. A major focus of this course is the project. We prefer that you work in groups of seven or eight on the project (will be posted in Webcourses). The project is intended to be a scaled-down version of a real research project. The project must involve an experimental component-i.e., it is not simply a paper and pencil exercise. Project area will be given, and we encourage you to come up with your own idea for your project, although we can give you suggestions if you are stuck. You will have a roughly 14-week to work on the project. You will present your findings in a written report (the collected reports may be published as a technical report at the end of the semester), and also during presentation sessions in the last week of class. Start thinking about potential project ideas soon. The project will be evaluated by peers (group members), other groups, and instructors. More information will be provided on the Webcourses. Final project presentation is planned on the last week.

Hardware/Software Technology Requirements

Hardware: Students will be expected to have access to a computer frequently, as well as a stable internet connection. If you do not own a computer, there are computers accessible to you in all of UCF's student computer labs. For further information on computer labs, please see the following website: <http://guides.ucf.edu/c.php?g=78577&p=517810>.

Software: A Coding Editor and UNIX-based Terminal

The semester project will need to be typed and tested using a combination of a coding text editor and terminal. There will be instructions for how to download and setup this software on the webcourse.

Student Learning Outcomes

After completing this course, students should understand following concepts and be able to discuss design aspects that affect their performance:

- Microprocessor design process
- Microprocessor evaluation methodology and metrics
- Memory hierarchy organization and memory consistency
- Instruction set architecture
- Exploiting Instruction-level Parallelism: Pipelining
- Exploiting Instruction-level Parallelism: Superscalar Execution
- Exploiting Instruction-level Parallelism: Speculation and Prediction
- Interaction of software (compiler, OS, and applications) and hardware
- Security/Reliability Issues

Policy Statements

Contact: I prefer that you contact me by sending an email; please include CDA 5106 and **your last name** in the subject line. Please allow 2 business days for a response.

Unexpected Closures: In the event that campus is closed unexpectedly (e.g.: hurricanes and tropical storms) no deadlines will be enforced during the closure. The course schedule and relevant deadlines will be re-evaluated when campus reopens.

Academic Integrity

Students should familiarize themselves with UCF's Rules of Conduct at <https://scai.sdes.ucf.edu/student-rules-of-conduct/>. According to Section 1, "Academic Misconduct," students are prohibited from engaging in

1. Unauthorized assistance: Using or attempting to use unauthorized materials, information or study aids in any academic exercise unless specifically authorized by the instructor of record. The unauthorized possession of examination or course-related material also constitutes cheating.
2. Communication to another through written, visual, electronic, or oral means: The presentation of material which has not been studied or learned, but rather was obtained through someone else's efforts and used as part of an examination, course assignment, or project.
3. Commercial Use of Academic Material: Selling of course material to another person, student, and/or uploading course material to a third-party vendor without authorization or without the express written permission of the university and the instructor. Course materials include but are not limited to class notes, Instructor's PowerPoints, course syllabi, tests, quizzes, labs, instruction sheets, homework, study guides, handouts, etc.
4. Falsifying or misrepresenting the student's own academic work.
5. Plagiarism: Using or appropriating another's work without any indication of the source, thereby attempting to convey the impression that such work is the student's own.
6. Multiple Submissions: Submitting the same academic work for credit more than once without the express written permission of the instructor.
7. Helping another violate academic behavior standards.
8. Soliciting assistance with academic coursework and/or degree requirements.

Responses to Academic Dishonesty, Plagiarism, or Cheating

Students should also familiarize themselves with the procedures for academic misconduct in UCF's student handbook, *The Golden Rule* <https://goldenrule.sdes.ucf.edu/>. UCF faculty members have a responsibility for students' education and the value of a UCF degree, and so seek to prevent unethical behavior and respond to academic misconduct when necessary. Penalties for violating rules, policies, and instructions within this course can range from a zero on the exercise to an "F" letter grade in the course. In addition, an Academic Misconduct report could be filed with the Office of Student Conduct, which could lead to disciplinary warning, disciplinary probation, or deferred suspension or separation from the University through suspension, dismissal, or expulsion with the addition of a "Z" designation on one's transcript.

Being found in violation of academic conduct standards could result in a student having to disclose such behavior on a graduate school application, being removed from a leadership position within a student organization, the recipient of scholarships, participation in University activities such as study abroad, internships, etc.

Let's avoid all of this by demonstrating values of honesty, trust, and integrity. No grade is worth compromising your integrity and moving your moral compass. Stay true to doing the right thing: take the zero, not a shortcut.

Unauthorized Use of Websites and Internet Resources

There are many websites claiming to offer study aids to students, but in using such websites, students could find themselves in violation of academic conduct guidelines. These websites include (but are not limited to) Quizlet, Course Hero, Chegg Study, and Clutch Prep. UCF does not endorse the use of these products in an unethical manner, which could lead to a violation of our University's Rules of Conduct. They encourage students to upload course materials, such as test questions, individual assignments, and examples of graded material. Such materials are the intellectual property of instructors, the university, or publishers and may not be distributed without prior authorization. Students who engage in such activity could be found in violation of academic conduct standards and could face course and/or University penalties. Please let me know if you are uncertain about the use of a website so I can determine its legitimacy.

Unauthorized Distribution of Class Notes

Third parties may attempt to connect with you to sell your notes and other course information from this class. Distributing course materials to a third party without my authorization is a violation of our University's Rules of Conduct. Please be aware that such class materials that may have already been given to such third parties may contain errors, which could affect your performance or grade. Recommendations for success in this course include coming to class on a routine basis, visiting me during my office hours, connecting with the Teaching Assistant (TA), and making use of the Student Academic Resource Center (SARC), the University Writing Center (UWC), the Math Lab, etc. If a third party should contact you regarding such an offer, I would appreciate your bringing this to my attention. We all play a part in creating a course climate of integrity.

In-Class Recording

Students may, without prior notice, record video or audio of a class lecture for a class in which the student is enrolled for their own personal educational use. A class lecture is defined as a formal or methodical oral presentation as part of a university course intended to present information or teach enrolled students about a particular subject. Recording class activities other than class lectures, including but not limited to lab sessions, student presentations (whether individually or part of a group), class discussion (except when incidental to and incorporated within a class lecture), clinical presentations such as patient history, academic exercises involving student participation, test or examination administrations, field trips, private conversations between students in the class or between a student and the faculty member, and invited guest speakers is prohibited. Recordings may not be used as a substitute for class participation and class attendance, and may not be published or shared without the written consent of the faculty member. Failure to adhere to these requirements may constitute a violation of the University's Student Code of Conduct as described in the Golden Rule.

Course Accessibility Statement

The University of Central Florida is committed to providing access and inclusion for all persons with disabilities. Students with disabilities who need access to course content due to course design limitations should contact the professor as soon as possible. Students should also connect with Student Accessibility Services (SAS) <<http://sas.sdes.ucf.edu/>> (Ferrell Commons 185, sas@ucf.edu, phone 407-823-2371). For students connected with SAS, a Course Accessibility Letter may be created and sent to professors, which informs faculty of potential course access and accommodations that might be necessary and reasonable. Determining reasonable access and

accommodations requires consideration of the course design, course learning objectives and the individual academic and course barriers experienced by the student. Further conversation with SAS, faculty and the student may be warranted to ensure an accessible course experience.

Campus Safety Statement

Emergencies on campus are rare, but if one should arise during class, everyone needs to work together. Students should be aware of their surroundings and familiar with some basic safety and security concepts.

- In case of an emergency, dial 911 for assistance.
- Every UCF classroom contains an emergency procedure guide posted on a wall near the door. Students should make a note of the guide's physical location and review the online version at <<https://centralflorida-prod.modolabs.net/student/safety/index>>.
- Students should know the evacuation routes from each of their classrooms and have a plan for finding safety in case of an emergency.
- If there is a medical emergency during class, students may need to access a first-aid kit or AED (Automated External Defibrillator). To learn where those are located, see <<https://ehs.ucf.edu/automated-external-defibrillator-aed-locations>>.
- To stay informed about emergency situations, students can sign up to receive UCF text alerts by going to <<https://my.ucf.edu>> and logging in. Click on "Student Self Service" located on the left side of the screen in the toolbar, scroll down to the blue "Personal Information" heading on the Student Center screen, click on "UCF Alert", fill out the information, including e-mail address, cell phone number, and cell phone provider, click "Apply" to save the changes, and then click "OK."
- Students with special needs related to emergency situations should speak with their instructors outside of class.
- To learn about how to manage an active-shooter situation on campus or elsewhere, consider viewing this video (<<https://youtu.be/NIKYajEx4pk>>).

Deployed Active Duty Military Students

If you are a deployed active duty military student and feel that you may need a special accommodation due to that unique status, please contact your instructor to discuss your circumstances.