

# CDA 5106 Section 0001: Advanced Computer Architecture

Department of Computer Science

College of Engineering and Computer Science

3 Credit Hours

## Course Information

- Term: Fall 2021
- Course Number & Section: CDA 5106-0001
- Course Name: Advanced Computer Architecture
- Credit Hours: 3
- Class Meeting
  - Monday and Wednesday, 13:30PM - 14:45PM
- Class Location: CB1 O120

## Instructor Information

- Instructor: Naveed UI Mustafa
- Office Location: HPA II-244
- Office Hours:
  - Tuesday 17:00 - 18:00
  - Wednesday 17:00 - 18:00
- Digital Contact: [unknown.naveedulmustafa@ucf.edu](mailto:unknown.naveedulmustafa@ucf.edu) or Webcourses@UCF messaging

## Teaching Assistants

- GTA 1: Sudarshan Devkota
  - Office Location: HEC 201
  - Office Hours:
    - Monday 10:00 - 11:00 am
    - Tuesday 10:00 - 11:00 am
  - Email: [sudarshan.devkota93@knights.ucf.edu](mailto:sudarshan.devkota93@knights.ucf.edu) or Webcourses@UCF messaging
- GTA 2: Muhammad Junaid Khan
  - Email: [junaid\\_k@knights.ucf.edu](mailto:junaid_k@knights.ucf.edu) or Webcourses@UCF messaging

## Enrollment Requirements

Course Prerequisites (if applicable): EEL 4768C or equivalent undergraduate computer organization class

Course Co-requisites (if applicable): N/A

## Course Description

This class is a graduate course covering foundational concepts in microprocessor design. The catalog describes the course topic as "*Modern processor design, instruction-level parallelism, thread-level parallelism, data-level parallelism, memory hierarchy, and I/O.*"

**Important Note:** We will not cover thread-level, data-level parallelism, and I/O. Instead, we will focus on instruction-level parallelism and memory hierarchy, and cover them in greater depth. This is necessary in order to provide in-depth coverage of the above-listed topics, which is what is expected by the industry. Consequently, there is a significant difference in the depth and breadth of topics covered in this course this semester vs. prior semesters.

## Course Materials and Resources

### Required Materials/Resources

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

### Optional Materials/Resources

- John Paul Shen and Mikko Lipasti, "Modern Processor Design", Waveland Press Inc., 2013
- Yan Solihin, "Fundamentals of Parallel Multicore Architecture", CRC Press, 2016

## Student Learning Outcomes

By the end of the course, you 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
- 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

## Course Activities

The overall grade for CDA 5106 students will be a weighted average of the following components:

- 7 homework assignments, primarily online quizzes, but may involve pencil & paper components
- 2 or 3 programming assignments
- 1 midterm exam
- 1 final exam

**Important note:** *All the above must be performed individually, without assistance from other students or from public code repositories. Submitting a portion of work or code copied or adapted from other sources is considered academic integrity violation.*

### **Activity Submissions**

Assignments should be submitted online through [Webcourses@UCF](mailto:Webcourses@UCF)

### **Attendance/Participation**

Attendance is encouraged for most meetings, and is required in some (if any) meetings in which you are scheduled to present. If you will not be able to be present in class for your presentation, you must request rescheduling as soon as possible and no later than two weeks prior to your absence, unless an unforeseen conflict.

### **Make-up Exams and Assignments**

Per university policy, you are allowed to submit make-up work (or an equivalent, alternate assignment) for authorized university-sponsored activities, religious observances, or legal obligations (such as jury duty). If this participation conflicts with your course assignments, I will offer a reasonable opportunity for you to complete missed assignments and/or exams. The make-up assignment and grading scale will be equivalent to the missed assignment and its grading scale. In the case of an authorized university activity, it is your responsibility to show me a signed copy of the Program Verification Form for which you will be absent, prior to the class in which the absence occurs. In any of these cases, please contact me ahead of time to notify me of upcoming needs.

## **Assessment and Grading Procedures**

<b>Assignment</b>	<b>Percentage of Grade</b>
Homeworks/quizzes	24% total
Programming assignments	24% total
Midterm exam	26%
Final exam	26%
Total	100%

<b>Letter Grade</b>	<b>Points</b>
A	93 – 100 points
A-	90 – 92 points
B+	87 – 89 points
B	83 – 86 points
B-	80 – 82 points
C+	77 – 79 points
C	73 – 76 points
C-	70 – 72 points
D+	67 – 69 points
D	63 – 66 points
D-	60 – 62 points
F	59 and below

I reserve the right to shift down the cut off points by at most 5 points based on class performance. A small rounding up or down may be employed. If such a shift down is applied, it will be applicable only for students who have not violated academic integrity in the entire semester.

An extra credit of 0.5% to 2% of overall course grade may be given if students show extraordinary contribution to the course, including but not limited to helping other students in the message board, participation in class, and alerting the instructor of violation of academic integrity by other students. This credit is entirely up to the discretion of the instructor.

Consult the latest Undergraduate or Graduate [catalog](#) for regulations and procedures regarding grading such as Incomplete grades, grade changes, and grade forgiveness.

## **Course Schedule**

Please refer to the Course Schedule Page.

## **University Services and Resources**

### **Academic Services and Resources**

A list of available academic support and learning services is available at [UCF Student Services](#). Click on "Academic Support and Learning Services" on the right-hand side to filter.

### **Non-Academic Services and Resources**

A list of non-academic support and services is also available at [UCF Student Services](#). Click on "Support" on the right-hand side to filter.

If you are a UCF Online student, please consult the [UCF Online Student Guidelines](#) for more information about your access to non-academic services.

## Policy Statements

### Academic Integrity

Students should familiarize themselves with [UCF's Rules of Conduct](#). According to Section 1, "Academic Misconduct," students are prohibited from engaging in:

- *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.
- *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.
- *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.
- *Falsifying or misrepresenting* the student's own academic work.
- *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.
- *Multiple Submissions*: Submitting the same academic work for credit more than once without the express written permission of the instructor.
- *Helping another violate* academic behavior standards.

For more information about Academic Integrity, students may consult [The Center for Academic Integrity](#).

For more information about plagiarism and misuse of sources, see "[Defining and Avoiding Plagiarism: The WPA Statement on Best Practices](#)".

### 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](#). UCF faculty members have a responsibility for students' education and the value of a UCF degree, and so seek to prevent unethical behavior and when necessary respond to academic misconduct. Penalties can include a failing grade in an assignment or in the course, suspension or expulsion from the university, and/or a "Z"

Designation" on a student's official transcript indicating academic dishonesty, where the final grade for this course will be preceded by the letter Z. For more information about the Z Designation, see [The Golden Rules](#).

### **Additional Note:**

*Receiving work product (e.g. homework paper or code submitted in response to an assignment) from other individuals (other students in the course, former students, tutors, etc.) are considered "Unauthorized assistance". Giving work product to other individuals, either willfully or through negligence, is considered "Helping another violate academic behavior standards". Copying work product from submissions from past semesters, or copying from an online repository is considered "Plagiarism". You are allowed to discuss class materials and high level concepts related to the assignment with others. However, you must work individually when creating the work product. For programming assignments, you must design algorithms, data structures, and develop code individually. Any violation to the above is considered Academic Integrity Violation. Students found to be in violation of academic integrity will be reported to the Office of Integrity and Ethics Development, in addition to receiving zero grade on their assignments. Following the report, The Office may conduct hearing, and if found in violation, a student may receive penalties, such as dismissal from the university.*

*Unless stated explicitly as team/group assignments, students should assume that assignments are to be performed individually, or ask the instructor for explicit clarification.*

### **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 disability-related access in this course should contact the professor as soon as possible. Students should also connect with [Student Accessibility Services](#) (Ferrell Commons 185, [sas@ucf.edu](mailto:sas@ucf.edu), phone (407) 823-2371). Through Student Accessibility Services, a Course Accessibility Letter may be created and sent to professors, which informs faculty of potential access and accommodations that might be 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.

### **Campus Safety Statement**

Emergencies on campus are rare, but if one should arise in our class, everyone needs to work together. Students should be aware of the 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. Please make a note of the guide's physical location and consider reviewing the online version at [UCF Emergency Information](#).
- 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, we may need to access a first aid kit or AED (Automated External Defibrillator). To learn where those items are located in this building, see <http://www.ehs.ucf.edu/workplacesafety.html> (click on link from menu on left).
- To stay informed about emergency situations, sign up to receive UCF text alerts by going to [my.ucf.edu](http://my.ucf.edu) and logging in. Click on "Student Self Service" located on the left side of the screen in the tool bar, scroll down to the blue "Personal Information" heading on your Student Center screen, click on "UCF Alert," fill out the information, including your 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. [You CAN Survive an Active Shooter](#)

## **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.

## **Copyright**

This course may contain copyright protected materials such as audio or video clips, images, text materials, etc. These items are being used with regard to the Fair Use doctrine in order to enhance the learning environment. Please do not copy, duplicate, download or distribute these items. The use of these materials is strictly reserved for this online classroom environment and your use only. All copyright materials are credited to the copyright holder.

## **Third-Party Software and FERPA**

During this course you might have the opportunity to use public online services and/or software applications sometimes called third-party software such as a blog or wiki. While some of these could be required assignments, you need not make any personally identifying information on a public site. Do not post or provide any private information about yourself or your classmates. Where appropriate you may use a pseudonym or nickname. Some written assignments posted publicly may require personal reflection/comments, but the assignments will not require you to disclose any personally identity-sensitive information. If you have any concerns about this, please contact your instructor.

## **Third-Party Accessibility and Privacy Statements**

TBD