FLORIDA POLYTECHNIC UNIVERSITY

Syllabus: Computer Architecture and Organization

Semester _Spring 2026___

Note:

- The course description, course objectives, and learning outcomes are under review and may be changed during the semester.

Course Information

- **Course Number and Title**: CDA 3100 Computer Architecture and Organization
- **Section**: 03
- **Credit Hours:** 3
- **Academic Term:** Spring 2026

Instructor Information

- **Instructor:** Sarker Monojit Asish
- **Office Location:** BARC-1187
- **Office Hours**: MWF 9 to 10 AM
- **Other Ways to Contact You**: Appointment through email sasish@floridapoly.edu

Course Details

- **Official Catalog Course Description**: This course takes a broader and more holistic view of the system as both hardware and systems software, covering such topics as data representation, machine language, processor architecture, memory hierarchy, linking, loading, processes, signals, performance optimization, virtual memory, I/O, and network and concurrent programming.
- **Course Pre-Requisites**: CDA2108
- **Required Texts:** Yes
    1. **Textbook:** Computer Systems: A Programmer's Perspective, 3/E (CS:APP3e) ISBN13: 9780134092669 by Randal E. Bryant and David R. O'Hallaron.
    2. **Equipment and Materials**:
        - **Hardware**: A recent computer with Windows 10/11
        - **Software**: Virtual Box + Ubuntu LTS 22.04 VM
- **Course Objectives**:
  After the course, students will be able to
    1. Describe computer architecture and organization from a holistic view
    2. Explain processor architecture, memory hierarchy and virtual memory
    3. Apply data representation and machine language in optimization of high-level programming languages
- **PLOs (Program learning outcomes) of CS**:
    1. **Analyze** a complex computing problem and to apply principles of computing and other relevant disciplines to identify solutions.
    2. **Design, implement, and evaluate** a computing-based solution to meet a given set of computing requirements in the context of the program's discipline.
    3. **Communicate** effectively in a variety of professional contexts.
    4. **Recognize** professional responsibilities and make informed judgments in computing practice based on legal and ethical principles.
    5. **Function** effectively as a member or leader of a team engaged in activities appropriate to the program's discipline.
    6. **Apply** computer science theory and software development fundamentals to produce computing-based solutions
- **Course Learning Outcomes and Alignment with Program Outcomes**:
    1. (CLO: 1, 2) => (**PLO: 3**)
    2. (CLO: 3) => (**PLO: 6**)

Academic Support Resources

- **Library**: Students can access the Florida Polytechnic University Library through the University website and Canvas, on and off campus. Students may direct questions to Academic Success Center success@floridapoly.edu or by email, library@floridapoly.edu.
- **Peer Learning Strategists**: These are specially trained student leaders who help their peers strategize approaches to course content and work through solution methods. PLS students work in collaboration with the courses they support so the content and methods are aligned with your instructors' expectations. The PLS room is located on the first floor of the IST in the center hallway.
- **Writing Center**: Located on the second floor of the IST (2059/2061), the Writing Center helps students to develop their writing and presentation skills. Consultations are available in person and virtually. For more detail, visit https://floridapolytechnic.libguides.com/writingservices.

Course Schedule

Week	Topic	Chapter covered Labs and exams
1	Programs, processors, caches and storage devices	Ch1: Tour of systems Lab1: C Programming
2	OS manages the hardware, system communication, Amdahl's Law and Concurrency and Parallelism	
3	Information storage, integer representation and algorithms	Ch2: Representing and Manipulating Information Lab2: Data
4	Floating point number representation and algorithms	
5	Program Encodings, Data Formats, Accessing Information, Arithmetic and Logical Operations	Ch3: Machine-Level Representation of Programs Lab3 : TBD
6	Control, Procedures, Array Allocation and Access	
7	Heterogeneous Data Structures, Combining Control and Data in Machine-Level Programs, Floating-Point Code	
8	Reviews and Midterm exam	Midterm exam
9	---- SPRING BREAK -----	
10	The Y86-64 Instruction Set Architecture, Logic Design and the Hardware Control Language HCL	Ch4: Processor Architecture Lab4: Pipeline
11	General Principles of Pipelining, Pipelined Y86-64 Implementations	
12	Storage Technologies, Locality, The Memozry Hierarchy	Ch6: The Memory Hierarchy Lab5: Cache

13	Cache Memories, Writing Cache-Friendly Code	
14	Physical and Virtual Addressing, Address Spaces, VM as a Tool for Caching, VM as a Tool for Memory Management, VM as a Tool for Memory Protection	Ch9: Virtual Memory
15	Address Translation, Memory Mapping, Dynamic Memory Allocation, Garbage Collection	
16	Final review	
	Final exam	

Course Policies

Attendance

- This class is a Face-to-Face mode. It means students have to attend all class meetings in-person. It means it is a traditional class teaching like. (Please read Basic rules in following university policies section). Exceptions to any attendance requirements may be made on a case-by-case basis, only on medical ground. (University Policy, FPU-5.0010AP).
- Attendance will be taken in class using Access code on Canvas – shown by instructor in each class. Students ask and/or verify his/her attendance with Instructor and can see that on Canvas. Please see detail general university level and CS department level attendance policy below.

Students Feeling Sick

Students should not come to class if they are feeling ill, particularly if experiencing symptoms of COVID-19, or if you have been directed by a health professional to quarantine. Students who are experiencing an emergency situation that aligns with an academic exercise of consequence (e.g./a Common Exam) should work with CARE Services at care@floridapoly.edu

Late Work/Make-up work

- To make up an exam and project presentation, signed document from authority (such as doctor, clinic, law enforcement officers, etc.) is needed.
- Late work not accepted with exceptions of documented excuses.
- Other makeup work need approval from the instructor and request in advance.

Grading Scale

(See also University Grading Policy).

A : above 93%
A− : 90% - 92%
B+ : 87% - 89%
B : 83% - 86%
B− : 80% - 82%
C+ : 77% - 79%
C : 73% - 76%
C− : 70% - 72%
D+ : 67% - 69%
D : 63% - 66%
D− : 60% - 62%
F : below 60%

Assignment/Evaluation Methods

Assignment/Evaluation methods	Weight
Labs/Projects	35
Attendance	5
Mid exam	20
Final Exam	20
Assignments/Quizzes	20
Total	**100%**

Rubric is specific to each lab/project. An example rubric could be:

Lab Design:

90-100%: The lab design is clearly defined and all objectives are clearly stated. The hypotheses and predictions are well-formed and the methods used to test them are appropriate.

80-89%: The lab design is generally well-defined, but there may be some minor weaknesses in the hypotheses or methods.

70-79%: The lab design is somewhat unclear or poorly defined, and may benefit from additional refinement.

0-69%: The lab design is poorly defined and may not effectively test the stated objectives.

Data Collection:

90-100%: Data is collected accurately and in a thorough manner, with appropriate attention paid to controlling variables. All necessary data is collected and recorded.

80-89%: Data is generally accurate, but there may be some minor errors or omissions.

70-79%: Data is somewhat inaccurate or incomplete, and may require additional analysis or interpretation to be useful.

0-69%: Data is significantly inaccurate or incomplete, and may not be reliable for analysis.

Data Analysis:

90-100%: Data is analyzed in a thorough and accurate manner, and all relevant conclusions are drawn. Statistical tests, if applicable, are used appropriately and all assumptions are checked.

80-89%: Data is generally analyzed accurately, but there may be some minor errors or omissions in the statistical analysis or interpretation of results.

70-79%: Data is analyzed, but some important information may be missing or incorrect, and the interpretation of results may be somewhat flawed.

0-69%: Data is not analyzed accurately or thoroughly, and the interpretation of results is unreliable.

Conclusion:

90-100%: The conclusion accurately and effectively summarizes the results of the lab, and all relevant implications are discussed. The conclusion demonstrates a deep understanding of the material.

80-89%: The conclusion accurately summarizes the results, but may be somewhat brief or lacking in detail. The implications of the results may not be fully explored.

70-79%: The conclusion accurately summarizes the results, but may include some minor errors or omissions. The implications of the results may be somewhat unclear.

0-69%: The conclusion does not accurately summarize the results of the lab and does not effectively discuss the implications of the results.

Presentation:

90-100%: The presentation is well-organized, visually appealing, and easy to follow. The presenter effectively communicates the key points and engages the audience.

80-89%: The presentation is generally well-organized and easy to follow, but may have a few minor errors or omissions. The presenter may struggle to engage the audience at times.

70-79%: The presentation is somewhat disorganized and may be difficult to follow. The presenter may have difficulty effectively communicating the key points.

0-69%: The presentation is poorly organized and difficult to follow. The presenter struggles to communicate the key points and fails to engage the audience.

University Policies

Reasonable Accommodations

The University is committed to ensuring equal access to all educational opportunities. The University, through the Office of Disability Services (ODS), facilitates reasonable accommodations for students with disabilities and documented eligibility. It is the student's responsibility to self-identify as a student with disabilities and register with ODS to request accommodations.

If you have already registered with ODS, please ensure that you have requested an accommodation letter for this course through the ODS student portal and communicate with your instructor about your approved accommodations as soon as possible. Arrangements for testing accommodations must be made in advance. Accommodations are not retroactive.
If you are not registered with ODS but believe you have a temporary health condition or permanent disability requiring an accommodation, please contact ODS as soon as possible.

The Office of Disability Services (ODS):
DisabilityServices@floridapoly.edu
(863)874-8770
The Access Point
ODS website: www.floridapoly.edu > Student Affairs > Health Wellness > Disability Services

Accommodations for Religious Observances, Practices and Beliefs

The University will reasonably accommodate the religious observances, practices, and beliefs of individuals in regard to admissions, class attendance, and the scheduling of examinations and work assignments. (See University Policy.)

Title IX

Florida Polytechnic University is committed to ensuring a safe, productive learning environment on our campus that prohibits sex discrimination and sexual misconduct, including sexual harassment, sexual assault, dating violence, domestic violence and stalking. It is important for you to know that there are resources available if you or someone you know needs assistance. You may speak to your professor, but your professors have an obligation to report the incident to the Title IX Coordinator. It is an educational goal that you feel able to share information related to your life experiences in classroom discussions and in one-on-one meetings. However, it is requirement for university employees to share information with the Title IX Coordinator regarding disclosure. However, please know that your information will be kept private to the greatest extent possible. You will not be required to share your experience. If you want to speak to someone who is permitted to keep your disclosure confidential, please seek assistance from the Florida Polytechnic University Ombuds Office, BayCare's Student Assistance Program, 1-800-878-5470 and locally within the community at Peace River Center, 863-413-2707 (24-hour hotline) or 863-413-2708 to schedule an appointment.

Academic Integrity

All students are expected to adhere to the highest standards of academic integrity. Violations of academic integrity include actions such as cheating, plagiarism, use of unauthorized resources, illegal use of intellectual property, and inappropriately aiding other students. Such actions undermine the central mission of the university and negatively impact the value of your Florida Poly degree. It is critical that students take a professional approach to their academic work. The faculty and administration take academic integrity very seriously. Suspected violations will be fully investigated, possibly resulting in an academic integrity hearing and sanctions against the accused student if found in violation. Sanctions range from receiving a zero on the exam or assignment, to expulsion from the university. Repeat offenders are subject to more severe sanctions and penalties. Do not compromise your integrity for a perceived short-term gain. More information about Florida Poly's academic integrity policies and procedures can be found here: https://floridapoly.edu/wp-content/uploads/2017/07/FPU-5.005-Academic-Integrity-7.29.14.pdf#search=academic%20integrity

Recording Lectures

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.

Recordings may not be used as a substitute for class participation or class attendance. Recordings may not be published or shared in any way, either intentionally or accidently, without the written consent of the faculty member. Failure to adhere to these requirements is a violation of state law (subject to civil penalty) and the student code of conduct (subject to disciplinary action).

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), and invited guest speakers ***is prohibited****.*