

CPE432: Computer Architecture and Organization (2)

Course Introduction

Prof. Gheith Abandah
أ.د. غيث علي عبدة

Outline

- Course Information
- Video: Advanced CPU Designs
- Textbook and References
- Course Objectives and Outcomes
- Course Topics
- Policies
- Grading
- Important Dates

Course Information

- Instructor: **Prof. Gheith Abandah**
- Email: **abandah@ju.edu.jo**
- Office: **CPE 406**
- Home page: **<http://www.abandah.com/gheith>**
- Platform: **[MS Teams](#)**
- Prerequisites: **CPE 335: Computer Architecture and Organization (1)**
- Office hours: **Sun Tue Thu 10:00–11:00**
Mon 12:00–13:00
Wed 8:30–9:30

Professor Gheith Abandah

1. **Academic Career:** Full Professor of Computer Engineering at the University of Jordan.
2. **Education:** PhD and MSE from the University of Michigan; BSc from the University of Jordan.
3. **Leadership:** First President of Aqaba University of Technology and General Coordinator of the Erasmus+ DeCAIR project.
4. **Research & Publications:** 78 publications, 1400+ citations, h-index of 22, specializing in Computer Architecture, Arabic NLP, and machine learning.
5. **Industry Experience:** 15+ years in localization, military electronics, and product/project development, holding roles like VP Development and General Manager.
6. **IEEE Involvement:** Senior Member, co-founder and three-term chair of IEEE Jordan Section, leads IEEE Region 8 DEI Committee, Distinguished Visitor/IEEE Computer Society.
7. **Conference Leadership:** Established AEECT and JEEIT conferences, highlighting commitment to innovation and service.



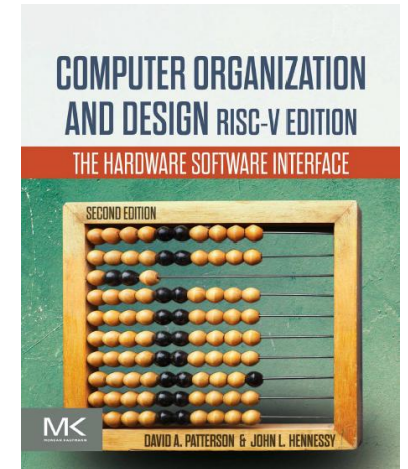
Advanced CPU Designs

- From CrashCourse

<https://youtu.be/rtAlC5J1U40>

Textbook and References

- **Patterson and Hennessy. Computer Organization & Design RISC-V Edition: The Hardware/Software Interface, 2nd ed., Morgan Kaufmann, Elsevier Inc., 2021.**
- **References:**
 - Hennessy and Patterson, Computer Architecture: A Quantitative Approach, 7th ed., Morgan Kaufmann, Elsevier Inc., 2025.
 - J. P. Shen and M. H. Lipasti. Modern Processor Design: Fundamentals of Superscalar Processors, Mc Graw Hill, 2005.
 - D. Culler and J.P. Singh with A. Gupta. Parallel Computer Architecture: A Hardware/Software Approach, Morgan Kaufmann, 1998.
 - J. Hayes. Computer Architecture and Organization, 3rd ed., McGraw-Hill, 1998.
- Course slides at: https://www.abandah.com/gheith/?page_id=3332



Course Objectives

- Introduce students to the **technological changes** in designing and building processors and computers.
- Introduce students to the **advanced techniques used in modern processors** including pipelining, branch prediction, dynamic and speculative execution, multiple issue, and software optimizations.
- Introduce the students to the basic concepts and technologies used in **designing memory and storage systems** including cache, main memory, virtual memory, and secondary memory.

Course Outcomes

- Understand and analyze the **performance of single-processor architectures** [1].
- Understand and analyze the **performance of memory hierarchy** levels [1].
- Understand the **technological improvements** and the **effect** of these improvements on modern computers [4].
- **Survey research papers** that describe **contemporary issues** in computer design [3, 4, 7].

Course Topics

- Introduction
- Computer Technology and Performance (1.2, 1.5, 1.7-1.11)
- Processor: Instruction-Level Parallelism (4.6–4.12, 4.15–4.16)

Midterm Exam

- Selected Topics from Parallel Processors (6.3 and 6.4)
- Memory Hierarchy (5.1–5.11, 5.13, 5.16–5.17)

Final Exam

Policies

- Attendance is required
- Be ready to participate in solving class problems
- All submitted work must be yours
- Cheating will not be tolerated
- The use of any electronic or communication device is strictly prohibited during exams.
- Refer to the [relevant student bylaws](#).
- Check announcements on [Computer Engineering Dept](#) page.

Grading

- Two Quizzes 6%
- Four Homework Assignments 4%
- Technology Trends Research Assessment 10%
 - This assessment will be with Quiz 2
- Midterm Exam 30%
- Final Exam 50%

Important Dates

Date	Event
Sun 11/10/2026	First Lecture
Sun 1/11/2026	Homework 1 Due
Tue 3/11/2026	Quiz 1 and Announcement of the Research Topic
Sun 29/11/2026	Homework 2 Due
Tue 1/12/2026	Midterm Exam
Sun 27/12/2026	Homework 3 Due
Tue 29/12/2026	Quiz 2 and Research Assessment
Sun 10/1/2027	Homework 4 Due
Tue 12/1/2027	Last Lecture
Wed 13/1/2027	Last Date to Withdraw

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Questions?

