The University of Jordan
School of Engineering
Computer Engineering Department

Academic Year:	2025 / 2026
Semester:	Fall
Course:	0917335 Computer Architecture and Organization (1) 3 Credits / Dept. Obligatory
Catalog Description:	Introduction to computer organization. Computer instruction set. Machine language. Data processing. Arithmetic and logic unit, Carry look-ahead adders, multipliers and dividers. Floating-point number representation and arithmetic. Data path design. Control unit design. Microprogramming. Pipelining.
Prerequisite(s):	0907231 Digital Logic
Co-requisite(s):	None
Background:	Students are assumed to have had sufficient knowledge pertaining to digital computers and their internal and external components, the design and analysis of digital logic circuits; combinational and sequential.
Textbooks:	• Patterson and Hennessy. Computer Organization & Design RISC-V Edition: The Hardware/Software Interface, 2nd ed., Morgan Kaufmann, 2021.
References:	• Hennessy and Patterson, Computer Architecture: A Quantitative Approach, 6th ed., Morgan Kaufmann, 2017. • J. Hayes. Computer Architecture and Organization, 3rd ed., McGraw-Hill, 1998. • M. Mano. Computer System Architecture, 3rd ed., Prentice Hall, 1993.
Course Website:	https://sites.google.com/view/iyadjafar and Microsoft Teams
Schedule & Duration:	16 Weeks, 45 lectures, 50 minutes each (including exams)
Student Material:	Text book, class handouts, some instructor keynotes, and access to a personal computer and the internet.
Facilities:	Classroom with whiteboard, smart board, projector, library, and computer laboratory.
Course Objectives:	• Understanding how data is represented and manipulated inside computers. • Basic organization of instruction sets, language translation, and program execution. • Analyzing and designing the basic datapath and control units of the processor. • Assessing and evaluating processor performance and its factors. • Identifying and understanding the difference and operation of single-cycle, multi-cycle, and pipelined processors.

Course Outcomes and Relation to ABET Program Outcomes:

Upon successful completion of this course, a student should be able to:

- Understand simple machine architecture and the reduced instruction set computers [**SO1**].
- Write simple RISC-V assembly language programs [**SO1**].
- Understand basic data flow through the CPU (interfacing and internal communications) [**SO1**].
- Build, analyze, and modify simple processor datapath and control (Single-Cycle, Multi-Cycle, and Pipeline) [**SO1**].

Course Topics:

- Computer Abstractions and Technology (Sections 1.1–1.4 and 1.6)
- RISC-V Instruction set (Sections 2.1–2.10)
- Computer Arithmetic (Appendix A.5, Appendix A.6, and Sections 3.1–3.5)
- The Processor Control and Datapath (Sections 4.1–4.7 and Appendix C)

Computer Usage:

Practical aspects of the course are covered in Computer Organization Lab 0917439.

Policies:

- Attendance is mandatory and will be recorded each class; university absence rules apply.
- All submitted work must be your own; cheating, plagiarism, unauthorized AI-generated work, or improper use of AI tools will result in academic penalties.
- Professional conduct, timely communication, and adherence to assessment schedules are expected throughout the course.

Assessment Tools & Grading:

☒ First Exam	20%	☒ Midtem Exam	30%
☒ Final Exam	50%	☐ Quizzes	0%
☐ Assignments	0%	☐ Projects	0%
☐ Other:			

Instructor(s):

- Prof. Iyad Jafar (iyad.jafar@ju.edu.jo)

Section(s):

- **Section 1:** Monday and Wednesday 08:30 – 10:30
- **Section 2:** Sunday, Tuesday and Thursday 09:30 – 10:30

Student Outcomes (SO)

SO1. An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics.

SO2. 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.

SO3. An ability to communicate effectively with a range of audiences.

SO4. 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

SO5. 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.

SO6. An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions.

SO7. An ability to acquire and apply new knowledge as needed, using appropriate learning strategies.

Last modified: September 30, 2025