Course Description Form

This course description has the characteristics of the course and the learning outcomes that the student is expected to achieve, which requires inspiring evidence of whether it can make the most of the available learning opportunities. The alternative is necessary and describes the alternative.

Educational Institution	Shatt Al-Arab University / College of Computer Science
Scientific Department / Center	Computer Science Department
Course Name	Computer Architecture
Available forms of attendance	Weekly / Theoretical
For the semester / year	Second semester 2024-2025
Number of study hours (Total)	28 hour theoretical
Date of preparation of this description	2025\7\29
Course Description	This course provides an overview of the basic concepts of computer architecture and its fundamentals, benefits, forms, and layers. In order to help the computer organization improve performance-based products, for example, software engineers need to know the processing power of processors. They may need to optimize software in order to get the most performance at the least expense. This can require a very detailed analysis of the computer organization.

9. Course outcomes, teaching, learning and assessment methods

1- Learn about computer architecture and how it is organized.
2- Learn about memory transfer methods.
3- Learn about I/O interrupts.
4- Learn about RISC.

A- Cognitive objectives

1- Encouraging the use of modern technology in curriculum assessment
2- Encouraging self-learning processes
3- Encouraging students to present, meet, and participate in group discussions
4- Graduation research and academic reports
5- Readings, self-study, and discussion groups
6- Classroom exercises and activities
7- Directing students to useful websites

B-Skill objectives of the course

1. Low-level code analysis (assembly language)
2. Design and implement basic units within the processor, such as the arithmetic logic unit (ALU) or registers, using simulators such as Logisim.
3. Understand and implement the fetch-decode-execute cycle

4. Analyze processor performance in terms of clock cycles, instructions per cycle (IPC), and the impact of cache on performance.

Teaching and learning methods

Evaluation methods

1- Theoretical Exams:
To measure the student's understanding of basic concepts such as processor design, memory, and instruction patterns.
2- Practical Reports / Mini Projects:
To assess the student's ability to design processor modules or simulate their operation using tools such as Logisim.
3- Classroom Assignments & Quizzes:
To measure the student's continued adherence to and comprehension of lecture content.

Syllabus

Week	Hours	Learning Outcomes	Unit/Subject Name	Teaching Method	Evaluation Method
First	**2**	Introduction chapter	Structure and Function	theoretical	General questions and discussion
Second	**2**	Introduction Chapter	The Evolution of the Intel x86 Architecture	theoretical	General questions and discussion
Third	**2**	Introduction chapter	Embedded Systems	theoretical	General questions and discussion
Fourth	**2**	Introduction chapter	ARM Architecture	theoretical	General questions and discussion
Fifth	**2**	The Computer System	Computer Components	theoretical	General questions and discussion
Sixth	**2**	The Computer System	Interrupts	theoretical	General questions and discussion
Seventh	**2**	The Computer System	Interconnection Structures	theoretical	General questions and discussion
Eighth	**2**	The Memory Hierarchy	- Principle Of Locality - Characteristics Of Memory Systems	theoretical	General questions and discussion
Ninth	**2**	The Memory Hierarchy	The Memory Hierarchy Types	theoretical	General questions and discussion
Tenth	**2**	Cache Memory	introduction and Elements of Cache Design	theoretical	General questions and discussion
Eleventh	**2**	Cache Memory	Mapping Function	theoretical	General questions and discussion
Twelfth	**2**	Internal Memory	Semiconductor Main Memory	theoretical	General questions and discussion
Thirteenth	**2**	Internal Memory	-Advanced DRAM Organization - Flash Memory	theoretical	General questions and discussion
Fourteenth	**2**	External Memory	External Memory Types	theoretical	General questions and discussion

1- Required textbooks	
2- Main references (sources)	1. John L. Hennessy and David A. Patterson, “Computer Architecture a Quantitative Approach”, fifth Edition, 2012. 2. Mostafa Abd-El-Barr and Hesham El-Rewini, “FUNDAMENTALS OF COMPUTER ORGANIZATION AND ARCHITECTURE”, 2005.