

COURSE SPECIFICATION

This Course Specification provides a concise summary of the main features of the course and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if he/she takes full advantage of the learning opportunities that are provided. It should be cross-referenced with the programme specification.

1. Teaching Institution	University of Baghdad/Al_Khwarizmi College of Engineering
2. University Department/Centre	Information and Communication Engineering
3. Course title/code	Computer Architecture
4. Programme(s) to which it contributes	This course contributes primarily to the students' knowledge for working professionally in the area of computer architecture and organization. Students should be able to apply knowledge of science and engineering, as well as the techniques, skills, and modern engineering tools to analyze, design and optimize computer architecture.
5. Modes of Attendance offered	attendance is mandatory according to the university rules
6. Semester/Year	2022-2023
7. Number of hours tuition (total)	90
8. Date of production/revision of this specification	April/2022
9. Aims of the Course	

Students will be introduced to main structures of computer system, their principle of operation, analysis and their design. The course provides introduce the student to CPU, memory and I/O structures with the bus structure.

10. Learning Outcomes, Teaching ,Learning and Assessment Methode

A- Knowledge and Understanding

At the completion of the course, students will be able to...

A1. Analyze and design the components of computer system (memory in levels of main memory, secondary storage and caches, I/O modules, CPU components and buses) and their relationship.

A2. Analyze and design the instruction pipeline.

A3. Design, program and implement the control unit.

A4. Program in microprogramming level.

A5. Analyze and design Interrupt, caches, peripheral component interconnect, direct memory access.

A6. Analyze and design the parallel organization systems.

B. Subject-specific skills

In addition to the measurable student learning outcomes listed above, students enrolled in computer architecture Course will be required to demonstrate their more in-depth knowledge of the course material by

B1. Analyze additional, more challenging exam problems.

Teaching and Learning Methods

Lectures, Presentations, Recitation and Documentations

Assessment methods

homework 10%

quizzes - 15%

midterm -15%

final - 60%

C. Thinking Skills

C1. Ability to apply knowledge of science and engineering.

C2. Ability to identify the structure and operation of a computer system component.

C3. Ability to identify the cooperation of processors in parallel organization system.

D. General and Transferable Skills (other skills relevant to employability and personal development)

D1. Ability to design and conduct experiments.

D2. Ability to design a system, component or process to meet desired needs

11. Course Structure

Week	Hours	ILOs	Unit/Module or Topic Title	Teaching Method	Assessment Method
1	3	Analyze and design the components of computer system (memory in levels of main memory, secondary storage and caches, I/O modules, CPU components and buses) and their relationship	Organization and Architecture Structure and Function A Brief History of Computers	Classroom with whiteboard	Quizzes
2	3	Analyze and design the components of computer system (memory in levels of main memory, secondary storage and caches, I/O modules, CPU components and buses) and their relationship	Computer Components Interconnection Structure	Classroom with whiteboard	Quizzes
3	3	Analyze and design Interrupt, caches, peripheral component interconnect, direct memory access.	Bus Interconnection PCI	Classroom with whiteboard	Quizzes
4	3	Analyze and design the components of computer system (memory in levels of main memory, secondary storage and caches, I/O modules, CPU components and buses) and their relationship	Computer Memory System Overview. Cache Memory Principles.	Classroom with whiteboard	Quizzes
5	3	Analyze and design Interrupt, caches, peripheral component interconnect, direct memory access.	Elements of Cache Design	Classroom with whiteboard	Quizzes
6	3	Analyze and design Interrupt, caches, peripheral component interconnect, direct memory access.	Pentium 4 and Power PC Cache Organization	Classroom with whiteboard	Quizzes
7	3	Analyze and design the components of computer system (memory in levels of main memory, secondary storage and caches, I/O modules, CPU components and buses) and their relationship	Semiconductor Main Memory.	Classroom with whiteboard	Quizzes
8	3	Analyze and design the components of computer system (memory in levels of main memory, secondary storage and caches, I/O modules, CPU components and buses) and their relationship	Error Correction Advanced DRAM Organization	Classroom with whiteboard	Quizzes

9	3	Analyze and design the components of computer system (memory in levels of main memory, secondary storage and caches, I/O modules, CPU components and buses) and their relationship	External Devices I/O Module Programmed I/O	Classroom with whiteboard	Quizzes
10	3	Analyze and design Interrupt, caches, peripheral component interconnect, direct memory access.	Interrupt Direct Memory Access (DMA)	Classroom with whiteboard	Quizzes
11	3	Analyze and design the components of computer system (memory in levels of main memory, secondary storage and caches, I/O modules, CPU components and buses) and their relationship	Input-Output Channels and Processors External Interlace: Serial port, Parallel port ,USB and FireWire.	Classroom with whiteboard	Quizzes
12	3	Analyze and design the components of computer system (memory in levels of main memory, secondary storage and caches, I/O modules, CPU components and buses) and their relationship	CPU Structure and Function Processor Organization	Classroom with whiteboard	Quizzes
13	3	Analyze and design the instruction pipeline	Register Organization	Classroom with whiteboard	Quizzes
14	3	Analyze and design the instruction pipeline	Machine Instruction Characteristics Types of Operands Pentium and Power PC Data Types	Classroom with whiteboard	Quizzes
15	3	Analyze and design the instruction pipeline	Types of Operations Pentium and Power PC Operation Types	Classroom with whiteboard	Quizzes
16	3	Analyze and design the components of computer system (memory in levels of main memory, secondary storage and caches, I/O modules, CPU components and buses) and their relationship	Assembly language	Classroom with whiteboard	Quizzes
17	3	Analyze and design the instruction pipeline	Addressing Pentium and Power PC Addressing Modes Instruction Formats	Classroom with whiteboard	Quizzes

18	3	Analyze and design the instruction pipeline	Instruction Cycle Instruction Pipelining	Classroom with whiteboard	Quizzes
19	3	Analyze and design the components of computer system (memory in levels of main memory, secondary storage and caches, I/O modules, CPU components and buses) and their relationship	Pentium and Power PC Processor	Classroom with whiteboard	Quizzes
20	3	Design, program and implement the control unit	Micro - operation Control of the processor Hardwired Implementation	Classroom with whiteboard	Quizzes
21	3	Program in microprogramming level	Basic concepts of microprogrammed control	Classroom with whiteboard	Quizzes
22	3	Design, program and implement the control unit	Control signals	Classroom with whiteboard	Quizzes
23	3	Program in microprogramming level	Microinstruction Sequencing	Classroom with whiteboard	Quizzes
24	3	Program in microprogramming level	Microinstruction Execution	Classroom with whiteboard	Quizzes
25	3	Design, program and implement the control unit	Hardwired Implementation	Classroom with whiteboard	Quizzes
26	3	Program in microprogramming level	Application of Microprogramming	Classroom with whiteboard	Quizzes
27	3	Analyze and design the parallel organization systems	Multiple Processor Organization symmetric Multiprocessor	Classroom with whiteboard	Quizzes
28	3	Analyze and design the parallel organization systems	cache Coherence and the MESI Protocol Clusters	Classroom with whiteboard	Quizzes
29	3	Analyze and design the parallel organization systems	Multicore Computers	Classroom with whiteboard	Quizzes

30	3	Analyze and design the parallel organization systems	Examples of Intel Core Due and Intel Core i7	Classroom with whiteboard	Quizzes
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12. Infrastructure

Required reading: · CORE TEXTS · COURSE MATERIALS · OTHER	Text book 1 :William Stallings ,”Computer organization and Architecture, designing for performance”, 8th edition 2010, Pearson Education, Inc..
Special requirements (include for example workshops, periodicals, IT software, websites)	Nil.
Community-based facilities (include for example, guest Lectures , internship , field studies)	Summer training, Scientific visits.

13. Admissions

Pre-requisites	Fundamentals of logical design, microprocessor and computer fundamentals.
Minimum number of students	
Maximum number of students	30