



جمهورية مصر العربية

وزارة التعليم العالي والبحث العلمي

Ministry of Higher Education and Scientific Research



المعهد العالى للحاسبات وتكنولوجيا المعلومات
مدينة الشروق - القاهرة
شعبة علوم الحاسب

Course specification

Course Code: CS 220

Course Title: Computer Organization & Assembly
Programming

Academic Year: 2022 /2023

Course specification
(CS 220 – Computer Organization & Assembly Programing)

Course Outline	
Faculty:	HICIT- (Higher Institute for Computers & Information Technology-El Shorouk Academy)
Programme(s) on which the course is given:	Undergraduate program in Computer Science
Major or minor element of programme:	Compulsory
Department offering the program	Department of Computer Science
Department offering the course:	Department of Computer Science
Level	Second Level
Date of specification approval	DD/MM/2023

Basic Information			
Code:	CS 220	Title:	Computer Organization & Assembly Programming
Prerequisites:	CS 121 Logic Design, Electroncis		
Weekly Hours:			
Lecture: 2	Exercise: -	Practical: 2	Total: 3 credit hours

Professional Information
<p><u>Course Aims:</u></p> <p>This course covers basic topics about computer architecture and organization. The course provides the study of the structure, characteristics and operation of modern-day computer systems including a basic background on the computers evolution, its design process and its internal characteristics which includes processor components, control unit architecture, memory organization and system organization. All internal components of a computer including processors, cache memories, random access memories, magnetic disks, optical memories and input/output connections are considered from an architectural perspective. Integer and floating-point representation in arithmetic logic unit (ALU) with arithmetical operations are explained. Operating system principles and are also described</p> <p><u>After completing this course students must be able to:</u></p> <ul style="list-style-type: none"> - Describe the basic organization of microprocessor-based systems. - Develop correct, efficient and easily maintainable programs written in a low-level language. - Discuss the interface between the software and the hardware, and Illustrate how does software instruct the hardware to perform needed functions. - Determine the performance of a program, and illustrate how to improve the performance. - Apply the techniques that can be used by hardware designers to improve performance. - Determine the techniques that can be used by hardware designers to improve energy efficiency. - Discuss the reasons for and the consequences of the recent switch from sequential processing to parallel processing.

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Knowledge and understanding	Intellectual Skills	Professional and practical skills	General and Transferable skills
A8, A10, A15, A18	B7, B8, B12, B16	C1, C6, C9, C14	D1, D3, D4, D10

Intended learning outcomes of course (ILOs)
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A. Knowledge and Under-Standing:

- a1. Understand the basic organization of microprocessor-based systems, the interface between the software and the hardware, and illustrate how does software instruct the hardware to perform needed functions. [A8, A10]
- a2. To understand the blueprint of the architecture of a computer. [A8]
- a3. To explain hardware concepts of small and large computers. [A8]
- a4. Understand the merits and pitfalls in computer performance measurements. [A18]
- a5. Understand the impact of instruction set architecture on cost-performance of computer design. [A8, A10]
- a6. Understand ways to take advantage of instruction level parallelism for high performance processor design. [A8, A15]
- a7. Understand dynamic scheduling methods and their adaptation to contemporary microprocessor design. [A10, A15]
- a8. Understand the impact of branch scheduling techniques and their impact on processor performance. And memory hierarchy and its impact on computer cost/performance. [A8, A10, A15]

B. Intellectual Skills:

- b1. How to think about a micro-program. [B7, B8, B12]
- b2. Determine the techniques that can be used by hardware designers to improve energy efficiency. [B7, B12]
- b3. Discuss the reasons for and the consequences of the recent switch from sequential processing to parallel processing. [B8, B12, B16]

C. Professional and practical skills

- c1. Develop correct, efficient and easily maintainable programs written in a low-level language. [c1]
- c2. Determine the performance of a program and illustrate how to improve the performance. [C1, C6]
- c3. Apply the techniques that can be used by hardware designers to improve performance and discuss the reasons for and the consequences of the recent switch from sequential processing to parallel processing. [C1, C6, C9,C14]

D. General and transferable skills

- d1. Verbally demonstrate and communicate findings on processor simulation. [D1, D3]
- d2. Work as a team on a processor design and simulation project. [D1, D3, D4, D10]
- d3. Apply specific task in certain period. [D3, D4]

Contents		
Topic	Contact Hours	
	lecture	Lab
Introduction to C.O.A and Representation of Basic Information	6	3
Computer Evolution and Performance.	6	3
A Top-Level View of Computer	6	4
Cache Memory	6	3
Internal Memory	6	6
External Memory	6	4
Operating System Support	6	6
Course project	3	3

Teaching and learning methods	
Teaching and learning methods	Used
Lectures	√
Tutorial Exercises	√
Practical Lab	√
Discussions.	√
Self – Learning (Reading material, Websites search,)	-
Self-studies	-
Group work	-
Presentation	-
Problem solving/problem solving learning based	-
Case study	-
Synchronous E-Learning	-
Video lectures	-
Asynchronous E-Learning	-

Student assessment methods & Schedule		
Methods	Used	Week#
Midterm Exam	√	8
Final Exam	√	16
Course Work & Quizzes	√	2-14
Practical Exam	√	15

Assessment Weight	
Assessment	Weight %
Mid Term Exam	10%
Practical Exam and Project	10%
Final Exam	70%
Course Work & Quizzes	10%
Total	100
Course Work & Quizzes	
Short Exams, Assignments, Researches, Reports, Presentations	
Class/Project discussion	

List of references

Essential books (textbooks)	<ul style="list-style-type: none"> Principe, Euliano, and Lefebvre, "Neural and Adaptive Systems: Fundamentals through Simulations", John Wiley and Sons, ISBN: 0471351679. Laurene Fausett, "Fundamentals of Neural Networks Haykin, Neural Networks: A Comprehensive Foundation
Course notes	E-Learning Portal
Recommended books	<ol style="list-style-type: none"> <u>Title:</u> Computer Organization and Architecture: Designing for Performance Authors: William Stallings, Publisher: Prentice-Hall India <u>Title:</u> Computer Organization Authors: Carl Hamacher, Zvonko Vranesic and Safwat Zaky Publisher: McGraw Hill
Periodicals, website	<u>Internet</u> Location http://en.wikipedia.org/wiki/Operations_research
Videos link	

Required Facilities

Tools & SW (Technology facilities):	- Python, TensorFlow		
Teaching facilities:	Whiteboard		√
	Computer Lab		√
	Data show		√
	E-Learning		√
	Videos		√
	Website		√

Course Content/ILO Matrix

Course Contents	Knowledge & understanding								Intellectual skills			Professional and practical skills			General		
	a1	a2	a3	a4	a5	a6	a7	a8	b1	b2	b3	c1	c2	c3	d1	d2	d3
Introduction to C.O.A and Representation of Basic Information	x	x	x	x	x				x	x	x						
Computer Evolution and Performance.				x	x	x			x	x	x			x		x	
A Top-Level View of Computer	x	x	x	x	x							x					
Cache Memory				x	x	x	x	x		x		x	x				x
Internal Memory				x	x	x	x	x		x			x		x		
External Memory		x			x	x	x			x					x	x	
Operating System Support			x		x	x	x	x	x	x							
Course project	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x

Learning Method /ILOs Matrix

Learning Methods	Knowledge and understanding								Intellectual skills			Professional and practical skills			General		
	a1	a2	a3	a4	a5	a6	a7	a8	b1	b2	b3	c1	c2	c3	d1	d2	d3
Lectures	x	x	x	x	x	x	x	x	x	x	x	x	x		x	x	x
Tutorial Exercises	x	x	x	x	x	x	x	x	x	x	x	x	x				
Practical Lab									x	x	x	x	x	x			x
Discussions									x	x		x	x		x	x	x

Assessment Methods /ILOs Matrix

Assessment Methods	Knowledge and understanding								Intellectual skills			Professional and practical skills			General		
	a1	a2	a3	a4	a5	a6	a7	a8	b1	b2	b3	c1	c2	c3	d1	d2	d3
Mid Term Exam	x	x	x	x					x	x		x	x				
Final Exam	x	x	x	x	x	x			x	x							
Course Work & Quizzes	x	x	x	x	x	x			x	x		x	x		x	x	x
Practical Exam	x	x	x	x	x	x			x	x		x	x				

Course ILOs \ Prog ILOs		Knowledge and understanding				Intellectual skills				Professional and practical skills				General			
		A8	A10	A15	A18	B7	B8	B12	B16	C1	C6	C9	C14	D1	D3	D4	D10
Knowledge and Understanding	a1	x	x														
	a2	x															
	a3	x			x												
	a4	x															
	a5	x	x	x	x												
	a6	x		x													
	a7		x	x													
	a8	x	x	x													
Intellectual skills	b1					x	x	x									
	b2					x		x									
	b3						x	x	x								
Professional and practical skills	c1									x							
	c2									x	x						
	c3									x	x	x	x				
General skills	d1													x			
	d2													x	x	x	x
	d3													x	x		

Course Coordinator : Dr. Tarek S.AbdElazim ()

Head of Department : Assoc. Prof. Ahmed El-Abbassy ()

Date: --/--/2023