QF01/0408-4.0E	Course Plan for Master program - Study Plan Development and Updating Procedures/ Computer Science Department

Study plan No.	**2021/2022**		**University Specialization**		**Computer Science**	
Course No.	**0102731**		**Course name**		**Advanced Computer Architecture**	
Credit Hours	**3 hours**		**Prerequisite Co-requisite**		**----------**	
Course type	☐ **MANDATORY UNIVERSITY REQUIREMENT**	☐ **UNIVERSITY ELECTIVE REQUIREMENTS**	☑ **FACULTY MANDATORY REQUIREMENT**	☐ **Support course family requirements**	☐ **Mandatory requirements**	☐ **Elective requirements**
Teaching style	☐ **Full online learning**		☐ **Blended learning**		☑ **Traditional learning**	
Teaching model	☐ **2 Synchronous: 1asynchronous**		☐ **2 face to face : 1synchronous**		☑ **3 Traditional**	

Faculty member and study divisions' information (to be filled in each semester by the subject instructor)

Name	Academic rank	Office No.	Phone No.	E-mail	
To be filled by the instructor					
Division number	**Time**	**Place**	**Number of students**	**Teaching style**	**Approved model**
To be filled by the instructor					

Brief description

Computer architecture is concerned with computer design, organization, operating systems, Networks, and many other materials. This course introduces the following topics: **Computer architecture and organization, Bus system and control unit, Instruction cycle, Addressing architectures, CISC & RISC computers, Modes of transfer, Micro-programmed control, Pipeline and vector processing, Memory organization, Multiprocessors.**

Learning resources

Course book information (Title, author, date of issue, publisher ... etc)	William Stallings, "**Computer Organization and architecture"**, 10th ed., Prentice-hall, 2016.			
Supportive learning resources (Books, databases, periodicals, software, applications, others)	1.- David Harris and Sarah Harris, "**Digital design and computer architecture",** 2nd ed., Morgan Kaufmann, 2012. 2.- John L. and David A., '**Computer Architecture** " , 5th ed, Morgan Kaufmann, 2011 . 3.- Linda Null and Julia Lobur, "**Essentials of Computer Organization and Architecture**", 3rd ed, Jones & Bartlett Learning, 2010. 4. Morris .M .Mano, Charles R. Kime," **Logic and Computer Design Fundamentals",** 4th ed., Prentice-hall, 2008.			
Supporting websites	https://elearning.zuj.edu.jo/			
The physical environment for teaching	☑ Class room	☐ labs	☐ Virtual educational platform	☐ Others
Necessary equipment and	----------			

software	
Supporting people with special needs	----------
For technical support	----------

Course learning outcomes (S= *Skills, C= Competences K= Knowledge,)*

No.	Course learning outcomes	The associated program learning output code
	Knowledge	
K1	**Learning about computer architecture and organization.**	**MK2**
K2	**Recognizing addressing architectures, CISC & RISC computers, modes of transfer.**	**MK2**
K3	**Understanding micro-programmed control, parallel processing, and pipelining.**	**MK2**
K4	**Providing knowledge of memory organization and multiprocessors.**	**MK2**
	Skills	
S1	**Define the computer instruction code. Explain the basic computer organization.**	**MS4**
S2	**Understand instruction formats and addressing modes. Know the characteristics of CISC & RISC CPUs.**	**MS4**
S3	**Use microprogramming for control purpose. Understand parallel processing and pipelining.**	**MS4**
S4	**Understand the organization of internal memory. Know the characteristics of multiprocessors.**	**MS4**
	Competences	
C1	**The ability to construct the control unit and control signals.**	**MC2**
C2	**The ability to understand the interrupt I / O, and DMA.**	**MC2**
C3	**The ability to use microprogramming for control purpose.**	**MC3**
C4	**The ability to understand the characteristics of multiprocessors.**	**MC2**

Mechanisms for direct evaluation of learning outcomes

Type of assessment / learning style	Fully electronic learning	Blended learning	Traditional Learning (Theory Learning)	Traditional Learning (Practical Learning)
First exam	0	0	**%20**	0
Second / midterm exam	%30	%30	**%20**	30%
Participation / practical applications	0	0	**%10**	30%
Asynchronous interactive activities	%30	%30	**0**	0
final exam	%40	%40	**%50**	40%

Note: Asynchronous interactive activities are activities, tasks, projects, assignments, research, studies, projects, and work within student groups ... etc, which the student carries out on his own, through the virtual platform without a direct encounter with the subject teacher.

Schedule of simultaneous / face-to-face encounters and their topics

Week	Subject	learning style*	Reference **
1	**Computer architecture and organization**. Instruction code. Stored program organization.	Lectures	380-420
2	**Bus system and Control unit**. Common bus system.	Lectures	458- 499

	Timing and control.		
3	Control signals. **Instruction cycle.** Computer instructions.	Lectures	501-524
4	Fetch the instruction. Decode the instruction. Determine the type and execute the instruction.	Lectures	
5	**Addressing architectures.** Instruction formats. Addressing modes.	Lectures	554-571
6	**CISC & RISC computers.** Characteristics of CISC & RISC CPUs First Exam**.**	Lectures	573- 587
7	**Modes of transfer**. Computer I / O. I / O bus and interface unit.	Lectures	597-627
8	Programmed I / O. Interrupt I / O. DMA.	Lectures	
9	**Micro-programmed control**. Control memory. Address sequencing.	Lectures	630-649
10	Micro-program example. Design of control unit. **Pipeline and vector processing.**	Lectures	655-670
11	Parallel processing. Pipelining. Instruction pipeline.	Lectures	
12	RISC pipeline. Vector processing. Second Exam.	Lectures	
13	**Memory organization**. Organization of internal memory. Cache memory.	Lectures	672-691
14	Virtual memory. Memory management. **Multiprocessors.**	Lectures	697-715
15	Characteristics of multiprocessors. Interconnection structures. General problems and applications.	Lectures	
16	Final Exam		

*** Learning styles: Lecture, flipped learning, learning through projects, learning through problem solving, participatory learning ... etc.**
**** Reference: Pages in a book, database, recorded lecture, content on the e-learning platform, video, website ... etc.**