COLLEGE OF INFORMATION TECHNOLOGY

DEPARTMENT OF INFORMATION TECHNOLOGY

COURSE SYLLABUS/ SPECIFICATION

Course Code & Title: ITCS 214 - Computer systems

Weight: **(3 - 0 - 3)**

Prerequisite: ITCS 101

NQF Level Allocated: Level 6

NQF Notional Hours / Credits: 120 notional hours/ 12 NQF credit

Description: This course is an introduction to the fundamental concepts of computer systems and their performance analysis. It explores how computers execute programs and manipulate data. Topics covered include: data representation of primitive data types, machine-level programming, digital logic, memory organization and management, I/O devices and storage devices. In addition, it covers the techniques used to improve computer performance and to solve its problems.

Objective:

1. To explain various data representation methods of the basic data types.
2. To introduce the physical structure of ALU and logic design.
3. To help students understand the behavior of processor by introducing the instruction set and assembly programming.
4. To recognize and describe different kinds of storage systems and I/O devices.
5. To introduce the concepts of evaluating and improving computer system performance.

SEMESTER: **ACADEMIC YEAR:**

INSTRUCTOR:
OFFICE TEL:
EMAIL:

Intended Learning Outcomes (ILOs):

A. Knowledge and Understanding		NQF Descriptor/ Level
A1	**Concepts and Theories:** Demonstrate a broad knowledge of the concept and theories of computer system, such as digital logic, data representation and manipulation, and storage systems.	Knowledge: theoretical understanding [Level 6]
A2	**Contemporary Trends, Problems and Research:** Demonstrate awareness of the current trends and advancements in computer systems.	Knowledge: theoretical understanding [Level 6]
A3	***Professional Responsibility:*** ***N/A***	

B. Subject-specific Skills		NQF Descriptor/ Level
B1	**Problem Solving:** Demonstrate knowledge of the methods and techniques used to solve the problems of computer systems and thus improve its performance, as well as to solve computational problems using logic circuit design and assembly programming.	Knowledge: Practical Application [Level 6] Skills: Communication, ICT &Numeracy [Level 6]
B2	**Modeling and Design:** Model the structure of ALU and design simple logic circuits to implement different kind of operations.	Knowledge: Practical Application [Level 6]
B3	***Application of Methods and Tools:*** *N/A*	

C. Critical-Thinking Skills		NQF Descriptor/ Level
C1	**Analytic skills:** Demonstrate the ability to analyze the computer system performance and identify the computer problems.	Generic Problem Solving & Analytical skills [Level 6]
C2	***Synthetic:*** *N/A*	
C3	***Creative Thinking and innovation:*** ***N/A***	

D. General and Transferable Skills (other skills relevant to employability and personal development)		NQF Descriptor/ Level
D1	**Communication:** Express and communicate ideas in written and oral form.	Communication, ICT and Numeracy Skills

		[Level 6]
D2	***Teamwork and Leadership:*** ***N/A***	
D3	**Organizational and Developmental Skills:** Ability to work effectively as a member of a development team.	Competence: Autonomy, Responsibility and Context [Level 6]
D4	***Ethics and Social Responsibility:*** ***N/A***	

Course Structure (Outline)

Course Structures (Outline)						
Week	**Hours**		**ILOs**	**Unit/Module or Topic Title**	**Teaching Method**	**Assessment Method**
	Lec.	**Lab**				
1	3	-	A1	Syllabus- Introduction	Lecture	
2-3	6	-	A1, B1, C1	**Data Representation:** To describe numbering systems, data type size and numeric range, as well as different representation techniques to represent real, integer, Boolean, memory address, and characters together with performance evaluation.	Lecture/ In-Class Supervised Work	In-Class Exercises/ Quiz 1 (week3)
4-6	9	-	A1, B1, C1	**Data Storage:** To describe the three types of storage devices, with performance evaluation and data format.	Lecture/ In-Class Supervised Work	In-Class Exercises/ Assignment1
7-8	6	-	A1, B1, B2, C1	**Processor Technology and Architecture:** To describe Boolean Algebra, logic design.	Lecture/ In-Class Supervised Work	In-Class Exercises/ Quiz 2
9	3	-	A1, B1	**Processor Technology and Architecture:** To describe instruction set, assembly programming	Lecture/ In-Class Supervised Work	In-Class Exercises

10-11	6	-	A1, A2, D1, D3	**Processor Technology and Architecture:** To describe addressing modes and CPU concepts.	Lecture/ Independent Learning	Major Test (week10)/ Assignment 2
12	3	-	A1, B1, C1	**System Integration and Performance:** To describe: system bus, I/O ports, interrupt, fault tolerance, Cache and Buffers.	Lecture/ In-Class Supervised Work	In-Class Exercises/ Quiz 3
13	3	-	A1, B1, C1	**System Integration and Performance:** To describe: parallel processing.	Lecture/ In- Class Supervised Work	In-Class Exercises
14	3	-	A1	**I/O Devices:** Common I/O device types with their characteristics	Lecture/ Class Discussion	Quiz 4
15	3	-	A1, A2, D1, D3	**I/O Devices:** Memory mapped I/O and DMA.	Lecture/ Independent Learning	
16	2	-	A1, B1, B2, C1	**All Topics**		Final Exam

Teaching Materials:

Textbook(s):	1. Stallings W. (2015) *Computer Organization and Architecture: Designing for Performance*, 10th Edition, Pearson. 2. Burd, S. D. (2015) *Systems Architecture*, 7th Edition, Cengage Learning.
Handout(s):	Available on Moodle i.e. http://www.ahlia.edu.bh/moodle

Reference(s):	1. Siewiorek, D. and Swarz, R., (2017). Reliable Computer Systems: Design and Evaluatuion. Digital Press. 2. Fu, K.S., (2018). Special computer architectures for pattern processing. CRC press. 3. Brookshear J. (2011) Computer Science: An Overview, 11th Edition, Addison- Wesley. 4. Hamacher C., Vranesic Z., Zaky S. and Manjikian N. (2011) Computer Organization and Embedded Systems, McGraw-Hill. 5. Patterson D. and Hennessy J. (2013) Computer Organization and Design, 5th Edition, Newnes

Assessment

Type of Assessment	Description	ILOs	Weighting
Quizzes	Four written quizzes to be conducted with different question types like: problem solving and short-answer. Each quiz is for 30 minutes. The total of best three quizzes will be considered, each worth 5%.	A1, B1, B2, C1	15%
Assignments	Two assignments to be given to students, each assignment worth 15%, and the total is the average of two assignments. The assignments will assess students' awareness in the current trends and advancements in computer systems.	A2, D1, D3	15%
In-Class Exercises	In-class exercises consisting mainly of problem solving and performance analysis questions.	B1, B2, C1	Formative
Major Test	The major test is a written, in-class 90 minutes test. It will cover topics studied in the first nine weeks. The test will include several types of questions such as: short-answer, essay and problem solving.	A1, B1, B2, C1	30%
Final Exam	The final exam is a comprehensive, written exam and will be of two hours. It will consist of problem solving, short-answer and essay questions.	A1, B1, B2, C1	40%
Overall			**100%**

Admissions	
Minimum number of students	**5**
Maximum number of students	**25**

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