

**COLLEGE OF INFORMATION TECHNOLOGY**

**DEPARTMENT OF INFORMATION TECHNOLOGY**

**COURSE SYLLABUS/SPECIFICATION**

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| **CODE& TITLE:** | **ITCS 214–COMPUTER SYSTEMS** | |
| **WEIGHT:** | **(3 - 0 - 3)** |  |
| **PREREQUISITE:** | **ITCS 101** |  |
| **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. | |
| **OBJECTIVES:** | 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)**

Upon successful completion of the course, students should be able to:

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| **A. Knowledge and Understanding** | |
| **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. |
| **A2** | Contemporary Trends, Problems and Research: Demonstrate awareness of the current trends  and advancements in computer systems. |
| **A3** | Professional Responsibility: NA |

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| **B. Subject-Specific Skills** | |
| **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. |
| **B2** | Modeling and Design: Model the structure of ALU and design simple logic circuits to  implement different kind of operations. |
| **B3** | Application of Methods and Tools: NA |

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| **C. Thinking Skills** | |
| **C1** | Analytic: Demonstrate the ability to analyze the computer system performance and identify  the computer problems. |
| **C2** | Synthetic: NA |
| **C3** | Creative: NA |

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| **D. General and Transferable Skills (Other Skills Relevant to Employability and Personal**  **Development)** | |
| **D1** | Communication: Express and communicate ideas in written and oral form. |
| **D2** | Teamwork and Leadership: NA |
| **D3** | Organizational and Developmental Skills: Demonstrate ability to organize ideas and  effectively allocate time in given assignment. |
| **D4** | Ethical and Social Responsibility: NA |

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| **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) |
| 4-5 | 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 (week5) |
| 6 | 3 | - | A1, B1 | **Processor Technology and**  **Architecture:**  To describe instruction set, assembly programming | Lecture/ In-Class Supervised Work | In-Class Exercises/ Quiz3 |
| 7 | 3 | - | A1, A2, D1, D3 | **Processor Technology and**  **Architecture:**  To describe addressing modes and CPU concepts. | Lecture/ Independent Learning | Assignment1 |
| 8-10 | 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/ Major Test (week9) |
| 11 | 3 | - | A1, B1, C1 | **System Integration and**  **Performance:**  To describe: system bus, I/O ports, interrupt, and fault tolerance. | Lecture/ In-Class Supervised Work | In-Class Exercises/ Quiz 4 |
| 12 | 3 | - | A1, B1, C1 | **System Integration and**  **Performance**  To describe: Cache and  Buffers. | Lecture/ In- Class Supervised Work |  |

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| 13 | 3 | - | A1, B1, C1 | **System Integration and**  **Performance:**  To describe: parallel processing. | Lecture/ In- Class Supervised Work |  |
| 14 | 3 | - | A1 | **I/O Devices:**  Common I/O device types with their characteristics | Lecture/ Class  Discussion |  |
| 15 | 3 | - | A1, A2, D1, D3 | **I/O Devices:**  Memory mapped I/O and  DMA. | Lecture/  Independent  Learning | Assignment 2 |
| 16 | 2 | - | A1, B1, B2,  C1 | All Topics |  | Final Exam |

**TEACHING MATERIALS:**

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| **TEXTBOOK(S):** | 1. Stallings W. (2015) *Computer Organization and Architecture: Designing for*  *Performance,* 10th Edition, Pearson.  2. Burd, S. D. (2010) *Systems Architecture*, Cengage Learning. |
| **HANDOUT(S):** | PowerPoint slides available on Moodle i.e. <http://www.ahlia.edu.bh/moodle> |
| **REFERENCE(S):**  **WEBSITE(S):** | 1. Brookshear J. (2011) *Computer Science: An Overview,* 11thEdition, Addison- Wesley.  2. Hamacher C., Vranesic Z., Zaky S. and Manjikian N. (2011) *Computer*  *Organization and Embedded Systems,* McGraw-Hill.  3. Patterson D. and Hennessy J. (2013) *Computer Organization and Design*, 5th  Edition, Newnes. |

**ASSESSMENTS:**

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| **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 |

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| 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%** |

***Ahlia University values academic integrity. Therefore, all students must understand the meaning and consequences of cheating, plagiarism and other academic offences under the Code of Student Conduct and Disciplinary Procedures (see*** [***www.ahlia.edu.bh/integrity***](http://www.ahlia.edu.bh/integrity) ***for more information).***