

**COLLEGE OF INFORMATION TECHNOLOGY**

**DEPARTMENT OF INFORMATION TECHNOLOGY**

**COURSE SYLLABUS/SPECIFICATION**

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| **CODE& TITLE:** | **ITCS 409–Operating Systems** |  |
| **WEIGHT:** | **(3 - 0 - 3)** |  |
| **PREREQUISITE:** | **ITCS 214** |  |
| **DESCRIPTION:** | This course is to cover the concepts, structure, and functions of operating system (OS). Students will learn how an operating system provides an environment in which users can execute programs in a convenient and efficient manner. Topics covered include computer system and OS structure; process management: process, threads, CPU scheduling, process synchronization, deadlocks; memory management; mass storage management, and file systems. | |
| **OBJECTIVES:** | 1. To critically understand the specialist theories, principles and concepts of modern operating systems.  2. To explain the fundamental structure of modern operating system and its core functions and services.  3. To critically examine and evaluate different strategies and techniques used by operating systems to manage computer recourses.  4. To examine the algorithmic ideas integrated in the design and implementation of different operating systems. | |
| **SEMESTER: Secondsecond** |  | **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 critical knowledge and understanding of the concepts of operating system, its architecture and functions. |
| **A2** | Contemporary Trends, Problems and Research: Demonstrate critical knowledge and  understanding of major current issues of computer recourses management and methods of handling these problems in modern operating systems. |
| **A3** | Professional Responsibility: NA |

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| **B. Subject-Specific Skills** | |
| **B1** | Problem Solving: Use a range of approaches to critically analyze and evaluate practices of  operating systems in identifying, defining and solving problems by using alternative effective and efficient algorithms. |
| **B2** | Modeling and Design: Use a range of specialist models to model the problems of computer  and communication systems, such as deadlock, and design efficient and effective handling procedures. |
| **B3** | Application of Methods and Tools: NA |

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| **C. Thinking Skills** | |
| **C1** | Analytic: Critically analyze and evaluate the performance and effectiveness of different algorithms used by different operating systems. |
| **C2** | Synthetic: NA |
| **C3** | Creative: Extend knowledge in operating system to construct specific and effective solution  to manage and control computer resources. |

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| **D. General and Transferable Skills (Other Skills Relevant to Employability and Personal**  **Development)** | |
| **D1** | Communication: Show ability to communicate information in appropriate oral and written forms. |
| **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 |

**Week**

**Hours**

**Lecture Lab**

**Course Structure (Outline)**

**ILOs Unit/Module or Topic Title**

**Teaching**

**Method**

**Assessment**

**Method**

1 3 - A1 Introduction Lecture Oral

Participation

2 3 - A1 Computer Hardware Structure

Overview

3 3 - A1 Operating System Concepts and Structure

**Process:** Concepts, States,

Lecture/ Class Discussion Lecture/ Class Discussion

Lecture/

Oral

Participation

Quiz1

4 3 - A1

5 3 - A1

A2, B1, B2,

Operations, Process

Communication

**Threads:** Benefits, Multi-core

Systems

Class Discussion Lecture/ Class Discussion Lecture/ Independent

Oral

Participation

Oral

Participation

Assignment1

6-7 6 -

8-9 6 -

10 3 -

C1, C3, D1, D3

A1, B1, B2, C1

A2, B1, B2, C1, C3, D1, D3

**Process Management:**

Process Synchronization

**Process Management:**

Process Scheduling

**Process Management:**

Deadlocks

Learning/ In-

Class Supervised Work Lecture/ In- Class Supervised Work Lecture/ In- Class Supervised Work / Independent Learning Lecture/ In-

Class

/Quiz2 (Week 6)

In-Class Exercises/ Quiz3/ Major Test (week9)

In-Class Exercises/ Assignment2

In-Class

11 3 - A1, B1, C1 **Memory Management**

12 3 - A1, B1 **Virtual Memory**

Supervised Work Lecture/ Class

Discussion

Exercises/

Quiz4

Oral

Participation

13 3 - A1, B1 **Mass Storage Management** Lecture/ Class

Oral

Participation

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|  |  |  |  |  | Discussion |  |
| 14 | 3 | - | A1, B1, C1, D1, D3 | **File Systems** | Lecture/  In-Class Supervised Work | Assignment3 |
| 15 | 3 | - | - | Revision | Class  Discussion |  |
| 16 | 2 | - | A1, A2, B1,  B2, C1, C3 | All Topics |  | Final Exam |

**TEACHING MATERIALS:**

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| **TEXTBOOK(S):** | Silberschatz A., Galvin P. B. and Gagne G. (2018) *Operating System Concepts,* 10th  Edition, Wiley. |
| **HANDOUT(S):** | PowerPoint slides available on Moodle i.e. [http://www.ahlia.edu.bh/moodle.](http://www.ahlia.edu.bh/moodle) |
| **REFERENCE(S):** | 1. Tanenbaum, Andrew S. *Modern operating system*. 4th Edition, Pearson Education, Inc, 2014.  2. Mchose A. and Flynn I. M. (2011) *Understanding Operating Systems*, Sixth  Edition, Cengage Learning.  3. Tanenbaum A. S. and Woodhull A. S. (2006) *Operating Systems Design and*  *Implementation*, Third Edition, Pearson Hall. |

**ASSESSMENT:**

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| **Type of Assessment** | **Description** | **ILOs** | **Weighting** |
| Quizzes | Four written quizzes to be conducted where  the average of best two quizzes will be considered. | A1 | 10 % |
| Assignments | Three Assignments to be given to students,  each assignment worth 10%. The assignments will assess students’ awareness of the current trends and advancements in operating systems. It will include verity of case studies and implementation of some operating system concepts and techniques. | A2, B1, B2, C1, C3, D1, D3 | 30 % |
| In-Class Exercises | In-class exercises consisting mainly of  problem solving and analysis questions. | B1, B2, C1 | Formative |
| Oral Participation | In-class participation and discussion will  assess student understanding of several concepts and theories. | A1 | Formative |
| Major Test | The major test is a written, in-class 90  minutes test. It will cover topics studied in the first eight weeks. The majority of the test’s questions are problem solving and | A1, B1, B2, C1 | 20 % |

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|  | analysis questions. |  |  |
| Final Exam | The final exam is a comprehensive, written  exam and will be of two hours. It will consist of problem solving, short-answer, analysis, and essay questions. | A1, A2, B1, B2, C1, C3 | 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).***