



COLLEGE OF INFORMATION TECHNOLOGY  
DEPARTMENT OF INFORMATION TECHNOLOGY  
COURSE SYLLABUS/ SPECIFICATION

**Course Code & Title:** ITCS 409 - Operating systems

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

**Prerequisite:** ITCS 214

**NQF Level Allocated:** Level 8

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

**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.

**Objective:**

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 resources.
4. To examine the algorithmic ideas integrated in the design and implementation of different operating systems.

**SEMESTER:**

**ACADEMIC YEAR:**

**INSTRUCTOR:**

**OFFICE TEL:**

**EMAIL:**

## Intended Learning Outcomes (ILOs):

A. Knowledge and Understanding		NQF Descriptor/ Level
A1	<b>Concepts and Theories:</b> Demonstrate critical knowledge and understanding of the concepts of operating system, its architecture and functions.	Knowledge: theoretical understanding [Level 8]
A2	<b>Contemporary Trends, Problems and Research:</b> Demonstrate critical knowledge and understanding of major current issues of computer resources management and methods of handling these problems in modern operating systems.	Knowledge: theoretical understanding [Level 8]
A3	<i>Professional Responsibility: N/A</i>	N/A
B. Subject-specific Skills		NQF Descriptor/ Level
B1	<b>Problem Solving:</b> 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.	Knowledge: Practical Application [Level 8] Skills: Communication, ICT & Numeracy [Level 8]
B2	<b>Modeling and Design:</b> 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.	Knowledge: Practical Application [Level 8]
B3	<i>Application of Methods and Tools: N/A</i>	N/A
C. Critical-Thinking Skills		NQF Descriptor/ Level
C1	<b>Analytic skills:</b> Critically analyze and evaluate the performance and effectiveness of different algorithms used by different operating systems.	Generic Problem Solving & Analytical skills [Level 8]
C2	<i>Synthetic: N/A</i>	N/A
C3	<b>Creative Thinking and innovation:</b> Extend knowledge in operating system to construct specific and effective solution to manage and control computer resources.	Generic Problem Solving & Analytical skills [Level 8]
D. General and Transferable Skills (other skills relevant to employability and personal development)		NQF Descriptor/

		Level
D1	<b>Communication:</b> Show ability to communicate information in appropriate oral and written forms.	Communication, ICT and Numeracy Skills [Level 8]
D2	<b>Teamwork and Leadership:</b> N/A	N/A
D3	<b>Organizational and Developmental Skills:</b> Demonstrate ability to organize ideas and effectively allocate time in given assignment.	Competence: Autonomy, Responsibility and Context [Level 8]
D4	<b>Ethics and Social Responsibility:</b> N/A	N/A

### Course Structure (Outline)

Week	Hours		ILOs	Unit/Module or Topic Title	Teaching Method	Assessment Method
	Lec.	Lab				
1	3	-	A1	Introduction	Lecture	Oral Participation
2	3	-	A1	Computer Hardware Structure Overview	Lecture/ Class Discussion	Oral Participation
3	3	-	A1	Operating System Concepts and Structure	Lecture/ Class Discussion	Quiz1
4	3	-	A1	<b>Process:</b> Concepts, States, Operations, Process Communication	Lecture/ Class Discussion	Oral Participation
5	3	-	A1	<b>Threads:</b> Benefits, Multi-core Systems	Lecture/ Class Discussion	Oral Participation
6	3	-	A1, B1, C1	<b>Memory Management</b>	Lecture/ In-Class Supervised Work	In-Class Exercises/ Assignment1
7	3	-	A1, B1	<b>Virtual Memory</b>	Lecture/ Class Discussion	Oral Participation
8-9	6	-	A2, B1, B2, C1, C3	<b>Process Management:</b> Process Synchronization and Scheduling	Lecture/ Independent Learning/ In-Class Supervised Work	In-Class Exercises/ Major Test (week 8)

10	3	-	A2, B1, B2, C1, C3, D1, D3	<b>Process Management:</b> Deadlocks	Lecture/ In-Class Supervised Work	In-Class Exercises/Quiz 2 (Week 10)/ Assignment2
11	3	-	A1, B1, B2, C1,	<b>Mass Storage Management</b>	Lecture/ In-Class Supervised Work / Independent Learning	In-Class Exercises/ Quiz 3
12	3	-	A1, B1, C1, D1, D2	<b>System administrations and File-Systems</b>	Lecture/ Class Discussion	Assignment3/ Quiz 4
13-14	6	-	B1, C1	<b>System administration: Linux</b>	In Lab Demonstration  In-Lab Supervised Work	In-Lab Exercises
15	3	-	-	Revision	Class Discussion	
16	2	-	A1, A2, B1, B2, C1, C3	All Topics		Final Exam

### Teaching Materials:

<b>Textbook(s):</b>	1. Silberschatz A., Galvin P. B. and Gagne G. (2018) <i>Operating System Concepts</i> , 10 <sup>th</sup> Edition, Wiley..
<b>Handout(s):</b>	Available on Moodle i.e. <a href="http://www.ahlia.edu.bh/moodle">http://www.ahlia.edu.bh/moodle</a>
<b>Reference(s):</b>	<ol style="list-style-type: none"> <li>1. Silberschatz, Abraham, Greg Gagne, and Peter B. Galvin. (2018), <i>Operating system concepts</i>. Wiley.</li> <li>2. Jain, Manish. (2018) <i>Basic System Administration. Beginning Modern Unix</i>. Apress, Berkeley.</li> <li>3. Mchose A. and Flynn I. M. (2011) <i>Understanding Operating Systems</i>, Sixth Edition, Cengage Learning.</li> <li>4. Tanenbaum A. S. and Woodhull A. S. (2006) <i>Operating Systems Design and Implementation</i>, Third Edition, Pearson Hall.</li> </ol>

## Assessment

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 analysis questions.	A1, B1, B2, C1	20 %
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%
<b>Overall</b>			<b>100%</b>

Admissions	
Minimum number of students	5
Maximum number of students	25

**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).**