



Course Specification

(Bachelor)

Course Title: **Operating Systems**

Course Code: **APIS1203**

Program: **Diploma in Information Security**

Department: **Diplomas**

College: **Applied College**

Institution: **Umm Al-Qura University**

Version: **1**

Last Revision Date: **14/12/2024**



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A. General information about the course:

1. Course Identification

1. Credit hours: (3)

2. Course type

A. ☐ University ☐ College ☒ Department ☐ Track ☐ Others
B. ☒ Required ☐ Elective

3. Level/year at which this course is offered: (level 2, 1st year)

4. Course general Description:

○ 1. Course Description

This course introduces operating system design and implementation. It covers the major components of most operating systems, process and thread management, CPU scheduling, process synchronization, deadlocks, memory management (segmentation, paging, swapping), virtual memory and file systems.

An operating system defines an abstraction of hardware behavior with which programmers can control the hardware. It also manages resource sharing among the computer's users. The topics in this area explain the issues that influence the design of contemporary operating systems.

Courses that cover this area will typically include a laboratory component to enable students to experiment with operating systems.

1. Explain the objectives and functions of modern operating systems.
2. Understand the main principles and techniques used to implement processes and threads, inter-process communication, CPU scheduling, process synchronization, and algorithms for process scheduling
3. Understand virtual memory abstractions in operating systems.

Understand the disk organization and the file system structure.

5. Pre-requirements for this course (if any):

6. Pre-requirements for this course (if any):

7. Course Main Objective(s):

This course introduces students to the basic concepts, objectives, services, and structures of multitasking systems and the foundations of operating systems design and implementation. The course covers the major components of modern operating systems, such as processes and threads management, CPU scheduling, synchronization, memory management (segmentation, paging, swapping), virtual memory, file systems, I/O system, and operating system protection and security.

2. Teaching mode (mark all that apply)





No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	60	100%
2	E-learning		
3	Hybrid <ul style="list-style-type: none"> Traditional classroom E-learning 		
4	Distance learning		

3. Contact Hours (based on the academic semester)

No	Activity	Contact Hours
1.	Lectures	30
2.	Laboratory/Studio	30
3.	Field	
4.	Tutorial	
5.	Others (specify)	
Total		60

B. Course Learning Outcomes (CLOs), Teaching Strategies and Assessment Methods

Code	Course Learning Outcomes	Code of CLOs aligned with program	Teaching Strategies	Assessment Methods
1.0	Knowledge and understanding			
1.1	Describe the major components of operating systems, the services operating systems provide, and the various ways of structuring an operating system.	K2	Course lectures, project	Quizzes, Midterm Exam, Final Exam
1.2	Describe the representation of processes and threads, and the concepts of inter-process	K2	Course lectures, lab exercises, project	Quizzes, Midterm Exam, Final Exam





Code	Course Learning Outcomes	Code of CLOs aligned with program	Teaching Strategies	Assessment Methods
	communication, process synchronization, and algorithms for process scheduling.			
1.3	Understand and apply memory management concepts including paging, segmentation, address mapping, and page replacement algorithms.	K2	Course lectures, project	Quizzes, Midterm Exam, Final Exam
1.4	Describe the structure and organization of file systems, I/O system and the security and protection issues in computer systems.	K2	Course lectures, lab exercises, project	Quizzes, Midterm Exam, Final Exam
2.0	Skills			
2.1	Computational problem-solving using operating system design and implementation techniques.	S1	Lab coursework Project	Quizzes, Midterm Exam, Final Exam, project
2.2				
3.0	Values, autonomy, and responsibility			
3.1				

C. Course Content

No	List of Topics	Contact Hours
1.	Introduction to Operating Systems	6
2.	Operating Systems Services and Structures	6
3.	Processes and Interposes Communication	6
4.	Thread	6
5.	Process Synchronization and Deadlocks	6
6.	CPU scheduling	6
7.	Memory management	6
8.	Virtual memory	6





9	File and I/O systems	6
10	Protection and security	6
Total		60

D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	Labs	2-9	20%
2.	Quiz 1	4	10%
3.	Quiz 2	9	10%
4.	Midterm	7	20%
5.	Final	15	40%

*Assessment Activities (i.e., Written test, oral test, oral presentation, group project, essay, etc.).

E. Learning Resources and Facilities

1. References and Learning Resources

Essential References	Operating System Concepts, by Abraham Silberschatz, Peter Baer Galvin, and Greg Gagne, 10th Edition, John Wiley & Sons, 2018. ISBN-13: 978-1-118-06333-0.
Supportive References	Operating Systems: Internals and Design Principles, by William Stallings, 9th Edition, Pearson, 2017. ISBN-13: 978-0134670959.
Electronic Materials	Umm Al Qura e-learning system containing teaching resources (Slides, assignment papers, etc.)
Other Learning Materials	N/A

2. Required Facilities and equipment

Items	Resources
facilities (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	Lecture room with: * at least 30 seats * A data show projector connected to a PC preferably with Internet connection * sliding board * PC Lab (at least 30 seats)
Technology equipment (projector, smart board, software)	30 Linux/Windows PCs
Other equipment (depending on the nature of the specialty)	A maintenance lab + A PC lab with various operating systems such as Linux windows etc.





Items	Resources

F. Assessment of Course Quality

Assessment Areas/Issues	Assessor	Assessment Methods
Effectiveness of teaching	Students	Indirect
Effectiveness of Students' assessment	Peers	Direct
Quality of learning resources	Quality Assurance Committee/ Curriculum Committee	Direct
The extent to which CLOs have been achieved	Instructor	Direct
Other		

Assessors (Students, Faculty, Program Leaders, Peer Reviewer, Others (specify))

Assessment Methods (Direct, Indirect)

G. Specification Approval

COUNCIL /COMMITTEE	Umm Al-Qura University Council
REFERENCE NO.	851141114462/190358
DATE	1446/11/22

