

## Module (Course Syllabus) Catalogue 2023-2024

College/ Institute	Khabat technical Institute	
Department	Information Technology	
Module Name	Operating System	
Module Code	OPS402	
Degree	Technical Diploma <input checked="" type="checkbox"/>	Bachelor <input type="checkbox"/>
	High Diploma <input type="checkbox"/>	Master <input type="checkbox"/> PhD <input type="checkbox"/>
Semester	Four	
Qualification		
Scientific Title	Assistant Lecturer	
ECTS (Credits)	6	
Module type	Prerequisite <input type="checkbox"/>	Core <input checked="" type="checkbox"/> Assist. <input type="checkbox"/>
Weekly hours	4	
Weekly hours (Theory)	( 2 )hr Class	( 91 )Total hrs Workload
Weekly hours (Practical)	( 2 )hr Class	(71)Total hrs Workload
Number of Weeks	16	
Lecturer (Theory)	Sozan Sulaiman Maghdid	
E-Mail & Mobile NO.	<a href="mailto:Sozan.maghdid@epu.edu.iq">Sozan.maghdid@epu.edu.iq</a> 07508605038	
Lecturer (Practical)	Sozan Sulaiman Maghdid	
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Websites		

# Course Book

<b>Course Description</b>	<p>This course will introduce you to modern operating systems. We will focus on windows operating system, though we will also learn about alternative operating systems. The course will begin with an overview of the structure of modern operating systems. Over the course of the subsequent units, we will discuss the history of modern computers, analyze in detail each of the major components of an operating system (from processes to threads), and explore more advanced topics in the field, including memory management and file input/output. The class will conclude with a discussion of various system-related security issues.</p>
<b>Course objectives</b>	<ul style="list-style-type: none"><li>• Upon successful completion of this course, the student will be able to Write all or parts of a simple operating system that performs interrupt processing (real or simulated), CPU management (scheduling), and memory management.</li><li>• Compare several different approaches to memory management, file management and processor management</li><li>• Describe various problems related to concurrent operations and their solutions.</li><li>• Explain in detail virtual address translation and distinguish it from the use of cache.</li><li>• Discuss various file system organizations and their interaction with the rest of the operating system.</li><li>• Describe techniques for process synchronization on single and on distributed systems.</li><li>• Explain the interaction between an operating system and a computer system's devices.</li><li>• Describe operating system support for users.</li></ul>

	<ul style="list-style-type: none"> <li>Discuss various threats to system security and compare protection mechanisms which may be used against the threats.</li> </ul>																																																			
<b>Student's obligation</b>	<ul style="list-style-type: none"> <li>Students attending classes regularly.</li> <li>Group work.</li> <li>Doing assignments.</li> <li>Class activities.</li> </ul>																																																			
<b>Required Learning Materials</b>	lecture halls with data show equipment for lecture presentations, white board, overhead projector, posters																																																			
<b>Evaluation</b>	<table border="1"> <thead> <tr> <th>Task</th> <th>Weight (Marks)</th> <th>Due Week</th> <th>Relevant Learning Outcome</th> </tr> </thead> <tbody> <tr> <td>Homework</td> <td>5</td> <td></td> <td></td> </tr> <tr> <td rowspan="6">Assignments</td> <td>Class Activity</td> <td>2</td> <td></td> </tr> <tr> <td>Paper Review</td> <td rowspan="6">10</td> <td></td> </tr> <tr> <td>Report</td> <td></td> </tr> <tr> <td>Seminar</td> <td></td> </tr> <tr> <td>Essay</td> <td></td> </tr> <tr> <td>Project</td> <td></td> </tr> <tr> <td>Quiz</td> <td>8</td> <td></td> <td></td> </tr> <tr> <td>Lab.</td> <td>10</td> <td></td> <td></td> </tr> <tr> <td>Midterm Exam Theory</td> <td>10</td> <td></td> <td></td> </tr> <tr> <td>Midterm Exam Practice</td> <td>15</td> <td></td> <td></td> </tr> <tr> <td>Final Exam Theory</td> <td>20</td> <td></td> <td></td> </tr> <tr> <td>Final Exam Practice</td> <td>20</td> <td></td> <td></td> </tr> <tr> <td>Total</td> <td>100</td> <td></td> <td></td> </tr> </tbody> </table>	Task	Weight (Marks)	Due Week	Relevant Learning Outcome	Homework	5			Assignments	Class Activity	2		Paper Review	10		Report		Seminar		Essay		Project		Quiz	8			Lab.	10			Midterm Exam Theory	10			Midterm Exam Practice	15			Final Exam Theory	20			Final Exam Practice	20			Total	100		
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<b>Specific learning outcome:</b>	<p>Through the study of this course, students will gain a comprehensive understanding on the concepts and functions of a modern operating system. Particularly, they will understand</p> <ol style="list-style-type: none"> <li>The role of the operating system as a high level interface to the hardware.</li> <li>OS as a resource manager that supports multiprogramming.</li> </ol>																																																			

	<ul style="list-style-type: none"> <li>3. The low level implementation of CPU dispatch.</li> <li>4. The low level implementation of memory management.</li> <li>5. The performance trade-offs inherent in OS implementation</li> </ul>	
<b>Course References:</b>	Operating System Concepts, 9th edition (2013) By Abraham Silberschatz, Peter Baer Galvin, Greg Gagne	
<b>Course topics (Theory)</b>	<b>Week</b>	<b>Learning Outcome</b>
<ul style="list-style-type: none"> <li>• Background</li> <li>• What happens in a computer system when a program is executed?</li> <li>• Computer-system structures</li> <li>• Operating system structures</li> </ul>	1,2	OS Overview
<ul style="list-style-type: none"> <li>• Process Concept</li> <li>• Processes and threads</li> <li>• Process synchronization</li> <li>• CPU Scheduling</li> <li>• Deadlock</li> </ul>	3,4	Process Management
<ul style="list-style-type: none"> <li>• Major issues: fetch, placement, contiguity, relocation adjustment</li> <li>• Paging and virtual memory</li> <li>• Translate-look-aside buffer (associative memory)</li> <li>• Single and Multi-level page tables</li> <li>• Paging with segmentation</li> <li>• Problems of large address spaces and how they are addressed</li> </ul>	5,6	Memory management
<ul style="list-style-type: none"> <li>• Mass Storage structure</li> <li>• File System Interface</li> <li>• Physical Storage Management <ul style="list-style-type: none"> <li>○ Disk seek scheduling</li> <li>○ Disk performance features</li> <li>○ Disk reliability concerns</li> </ul> </li> </ul>	7,8	Storage management
<ul style="list-style-type: none"> <li>• I/O</li> <li>• Secondary-storage structure</li> </ul>	9,10	I/O Systems

The OSI model (cont....)	11,12	Protection
<b>Practical Topics</b>	<b>Week</b>	<b>Learning Outcome</b>
Learning MS-DOS Basics	1	View to the basic MS-DOS commands. By following the procedures in this section
Dir. Command	2	View the contents of a directory, Change from one directory to another
<ul style="list-style-type: none"> <li>• Make Directory Command</li> </ul>	3	View how to create and delete directories
<ul style="list-style-type: none"> <li>• Change Directory Command</li> </ul>	4	View how to change from one drive to another
<ul style="list-style-type: none"> <li>• COPY command</li> </ul>	5	View how to copy files and rename files
<ul style="list-style-type: none"> <li>• Delete Command</li> <li>• Format Command</li> </ul>	6	View how to delete files, Format a floppy disk
<ul style="list-style-type: none"> <li>• Windows.</li> <li>• Starting windows.</li> <li>• Turning off your computer.</li> <li>• Using mouse.</li> <li>• Desktop.</li> <li>• Task Bar.</li> </ul>	7	Understanding and using all components that contain Operating System like as Windows.
<ul style="list-style-type: none"> <li>• Start Menu.</li> <li>• Change the start menu style.</li> <li>• Operating a program.</li> <li>• Minimize, Maximize, close.</li> <li>• Switching between Running</li> </ul>	8	Understanding and using all components that contain Operating System like as Windows.
<ul style="list-style-type: none"> <li>• My Pictures &amp; My Music.</li> <li>• Control Panel.</li> <li>• Control panel Views.</li> </ul>	9	Understanding and using all icons on the desktop windows.

<ul style="list-style-type: none"> <li>• Desktop Background.</li> <li>• Screen saver.</li> <li>• Changing the Look of Windows Elements.</li> </ul>		
<ul style="list-style-type: none"> <li>• Screen Colors Settings.</li> <li>• Date and Time.</li> <li>• Regional Settings.</li> <li>• Set, Change Keyboard Language.</li> <li>• Volume.</li> <li>• Assigning Sounds to system Events</li> </ul>	10	Understanding and using all icons on the desktop windows.
<ul style="list-style-type: none"> <li>• Reversing Your Mouse Buttons.</li> <li>• Adjusting the Double Click Speed.</li> <li>• Pointers Speed.</li> <li>• Adding / Removing Programs.</li> <li>• Recycle Bin</li> <li>• Start.</li> </ul>	11	Using all components of control panel and how we set the hardware and the system like as mouse, keyboard...etc.
<ul style="list-style-type: none"> <li>• Shut down.</li> <li>• Folders, Files, Renaming and Drives.</li> <li>• My Computer.</li> <li>• Part of Windows.</li> <li>• Copy File and Folder</li> </ul>	12	Using all components of control panel and how we set the hardware and the system like as mouse, keyboard...etc.

### Questions Example Design

**Q/why can't secondary storage (Hard drives) be used instead of RAM?**

**Answer:** A computer stores data using several different methods. Therefore, there are different levels of data storage, which may be referred to as primary and secondary storage. A computer's internal hard drive is often considered a primary storage device, while external hard drives and other external media are considered secondary storage devices. However, primary and secondary storage may also refer specifically to the components inside the computer. In this case, primary storage typically refers to random access memory (RAM), while secondary storage refers to the computer's internal hard drive.

**Q/ what happens inside the computer when you double click on a word file (e.g text.docx)?**

**Answer:** Double-click is a term used to describe the process of quickly pressing a mouse button twice while keeping it still. In most cases, a double-click is with the left mouse button and is used to open or execute a file, folder, or software program. For example, programs or files in Microsoft Windows operate this way, and if you wanted to open your Internet browser, you would need to double-click the shortcut icon for the browser.

**Q/ Draw Gant chart and find waiting time for each process and average waiting time and maximum waiting time for those processes using Shortest Job First (SJF) scheduling algorithm.**

Process	Arrival	Burst time
P1	0	8
P2	2	4
P3	3	7
P4	8	2

**Answer :**  
**Grant chart**

**Input :**

**process no-> 1 2 3 4 5**

**arrival time-> 0 1 3 2 4**

**burst time-> 3 6 1 2 4**

**priority-> 3 4 9 7 8**

**Output :**

Process no	Start time	Complete time	Trun_Around_Time	Wating_Time
1	0	3	3	0
2	3	9	8	2
4	9	11	9	7
3	11	12	9	8

5

16

12

12

8

**Average Waiting Time is : 5.0**

**Average Turn Around time is : 8.2**

**Q/Draw Gant chart and find average waiting time and maximum waiting time for those processes using Round Robin (RR) scheduling algorithm with slice time (quantum time) of 5.**

Process	Arrival	Burst time
P1	0	21
P2	8	15

**Answer**

Process	Arrival Time	Burst Time (x)	Turnaround Time(t)	Normalized Turnaround Time(t/x)	Waiting Time
P1	0	9	21	2.34	12
P2	1	5	17	3.4	12
P3	2	3	11	3.67	8
P4	3	4	12	3	8

**Average Turnaround Time = 15.25**

**Average Normalized Turnaround Time = 3.10**

**Average Waiting Time = 10**



## **Extra notes:**

Making the topics covered in the semester compatible with reality of the educational. Covering more than 80% of the prescribed subjects to improve the scientific level of students and preserve the standardization of diploma programs.

## **External Evaluator**

I have been reviewed this course book, its perfect and feet for this subject in the level of institute student, so I have no suggestion.

**Didar Rashad Qadir**

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