



الجامعة الافتراضية السورية
SYRIAN VIRTUAL UNIVERSITY

Operating Systems (1)

Course Definition

Information

Technology

Engineering



Powered by:



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1. Basic Information:

Course Name	Operating Systems (1)
Course Code	BOS501
Number of Presentational Sessions*	10
Number of Synchronous Sessions**	10
Number of Shorter Tests***	2
Number of Exams***	1
Theoretical Sessions Work Load (hrs.)	60
Practical Sessions Work Load (hrs.)	30
Credit Hours	4

*Each presentational session comprises both recorded lecture (1.5 hrs.) and interactive learning content (1.5 hrs.).

**Each synchronous session comprises the interactive lecture carried out in real time in a virtual class (1.5 hrs.).

***Each shorter test is 0.5 hr. long. The final exam is 2 hrs. long.

N.B.

Generally, each chapter requires two presentational sessions: one for the recorded content and one for the interactive content (unless the chapter is too long, in which case it may require more sessions (. This note applies to synchronous sessions as well, where each chapter requires one synchronous session generally.

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2. Prerequisites courses:

Course	Code
Computer Architecture course	BCA501
Assembly programming	BPG402

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3. Course Objectives:

Operating systems 1 course is a critically important part of computer science curricula. It allows students to integrate several previously acquired concepts they get in first courses (programming, computer architecture, assembly programming) to be reach a broad and clear understanding of the way a computer system works. In particular, the operating system structure, functions, and operation is described as the center of this computer system. This course contains also a description of the main concepts and the most important components of an operating system which constitutes the common basic knowledge all computer science graduates will need in their professional career, regardless their specific specialization.

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4. Learning Outcomes (LO):

By the end of this course, the learner is expected to acquire and learn the following subjects:

- General structure of an operating system and its main functions
- Operating systems functions
- The relationship between hardware and operating systems: Interrupts, input/output management.
- Processes and process programming
- Threads and thread programming
- Interprocess communication and synchronization: needs, and tools (atomic instructions, semaphore, and monitor).
- Scheduling algorithms

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5. Assessment Results:

Chapter Number	Chapter Title	General Objectives	Assessment Type				
			Interactive Content & Recorded Sessions	Applied Activities (Synch. Sessions)	Final Exam*/ Shorter Tests**	Presentations and Interviews***	Reports ***
CH1	OS basic concepts	Provide a definition of operating systems and their main functions and the historic evolution that accompanied technological advance.	√	√	√	√	√
CH2	OS general architecture	Introduce the various components of the OS, including the strong ties between hardware and OS.	√	√	√	√	√
CH3	Processes and Threads	Explain the role of the processes in the OS and the added value of threads as a	√	√	√	√	√

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		separation between resources and execution					
CH4	Synchronization	Introduce the important concepts of concurrency, Inter process communication and synchronization	√	√	√	√	√
CH5	Scheduling	The definition of scheduling, understand the various scheduling algorithms and their applicability	√	√	√	√	√

***The final exam is two hours long and is given at the end of the course.**

****Shorter tests are about 30 minutes long and are given after three or four lectures throughout the semester during synchronous sessions.**

*****Presentations, interviews, and reports are submitted once after each three or four lectures throughout the semester during synchronous sessions.**

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6. Course Syllabus:

Chapter	Subject	Content	Number of Learning Objects	Number of synchronous Learning Objects
CH1	OS basic concepts	<ol style="list-style-type: none"> 1. Definition of OS and Virtual machine concept 2. OS tasks 3. Historic evolution of OS 	3	1
CH2	OS general architecture	<ol style="list-style-type: none"> 1. Reminder of basic computer architecture concepts (register, interrupts, processor). 2. Importance of Interrupts and their use in OS 3. Processor work modes and relation with OS 4. Design of OS and concept of Microkernel 	4	3
CH3	Processes and Threads	<ol style="list-style-type: none"> 1. Definition of process and its role 2. Process execution states 3. Multi process operating systems 4. Threads, need and implementation 	4	2

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CH4	Synchronization	<ol style="list-style-type: none"> 1. Synchronization: Definition and need 2. Implementing synchronization with busy wait 3. Implementing synchronization with OS tools (semaphore and monitor) 4. Famous problems and examples 	4	2
CH5	Scheduling	<ol style="list-style-type: none"> 1. Definition of scheduling and associated operations 2. Scheduling algorithms 3. Static and dynamic scheduling 4. Examples for most important algorithms (FCFS, SJF, RR) 	4	2

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7. Practical Activity:

- **Tools and Labs:**

Tool Name	Description
Linux	
C language programming	

- **Practical Activities per Chapters:**

Chapter	Activities Type	Remarks
CH1	<input checked="" type="checkbox"/> Exercises <input checked="" type="checkbox"/> Assignments <input type="checkbox"/> Webinars <input type="checkbox"/> Project <input checked="" type="checkbox"/> Experiment <input checked="" type="checkbox"/> Other	
CH2	<input checked="" type="checkbox"/> Exercises <input checked="" type="checkbox"/> Assignments <input checked="" type="checkbox"/> Seminars <input type="checkbox"/> Projects <input checked="" type="checkbox"/> Practices <input checked="" type="checkbox"/> Others	

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CH3	<input checked="" type="checkbox"/> Exercises <input checked="" type="checkbox"/> Assignments <input type="checkbox"/> Seminars <input type="checkbox"/> Projects <input checked="" type="checkbox"/> Practices <input type="checkbox"/> Others	
CH4	<input checked="" type="checkbox"/> Exercises <input checked="" type="checkbox"/> Assignments <input checked="" type="checkbox"/> Seminars <input type="checkbox"/> Projects <input checked="" type="checkbox"/> Practices <input type="checkbox"/> Others	
CH5	<input checked="" type="checkbox"/> Exercises <input checked="" type="checkbox"/> Assignments <input checked="" type="checkbox"/> Seminars <input type="checkbox"/> Projects <input checked="" type="checkbox"/> Practices <input type="checkbox"/> Others	

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8. References:

- Willian Stallings, Operating Systems: Internals and design principles, 7th edition, Prentice hall.
- Andrew Tanenbaum, Modern Operating Systems, 4th edition, Pearson.
- Abraham Silberschatz, Operating Systems Concepts, 10th Edition, Wiley.
- Allen Downey, The little book of semaphoers, 2nd edition.