



University/Academy: Arab Academy for Science, Technology & Maritime Transport
Faculty/Institute: College of Engineering & Technology
Program: B.Sc. Computer Engineering

Form no. (12): Course Specification

1- Course Data

Course Code: CC418	Course Title: Operating System	Academic Year/Level: 4th year / 8th semester
Specialization: Computer Engineering	No. of Instructional Units 3	Lecture 2
		Practical 2

2- Course Aim

To develop computer skills in the design and analysis of computer systems with applications to processing and scheduling techniques.

3- Intended Learning Outcomes

a- Knowledge and Understanding	<p>Through knowledge and understanding, students will be able to: a5. Engineering principles in the fields of logic design, circuit analysis, machine and assembly languages, computer organization and architectures, memory hierarchy, advanced computer architectures, embedded systems, signal processing, operating systems, real-time systems and reliability analysis.</p> <ul style="list-style-type: none"> • Define the computer System and describe computer system components. • Describe the memory hierarchy and how it is being accessed by the Operating System. • Understand the process, and how is it being controlled by the operating system. • Demonstrate the problems with processes interaction. • Illustrate the difference between the Threads and processes, using diagrams and contents. • Define mutual exclusion, and trying synchronization. • Explain the deadlock occurs because of mutual exclusion. • Study theories of the deadlock solutions. • Define the concept of memory management. • Define dealing with the two levels memory. • Define the concept of scheduling and its usage. • Define dealing with files. • Define how the computer systems are being secured.
b- Intellectual Skills	<p>Through intellectual skills, students will be able to: b4. Assess and evaluate the characteristics and performance of components, systems and processes and investigate their failure.</p> <ul style="list-style-type: none"> • Relate the computer system structure to the Linux environment. • Calculate the average access time for different memory types. • Discover the process interaction, and how it can communicate with each others. • Construct the different types of processes interaction. • Analyze a multithreaded system with its usage. • Apply mutual exclusion to a multithreaded system. • Apply selected solutions for deadlock prevention, avoidance, and detection • Solve the deadlock problems • Demonstrate different types of memory management • Relate accessing one level in the memory with the new topic of accessing the two

	<p>levels.</p> <ul style="list-style-type: none"> • Show different scheduling techniques and compare between them. • Differentiate between different ways of securing a computer system
c- Professional Skills	<p>Through professional and practical skills, students will be able to:</p> <p>c2. Create and/or re-design a process, component or system, and carry out specialized engineering designs with neatness and aesthetics in design and approach.</p> <ul style="list-style-type: none"> • Differentiate between Operating Systems environments. • Understand the Linux basics • Experiment the process interaction under Linux environment. • Implement the analyzed multithreaded model to a running code under Linux. • Design codes for the deadlock avoidance and detection • Implement the codes designed in the previous part. • Explain dealing with paging and segmentation • Design diagrams of dealing with virtual memory through the main memory.
d- General Skills	<p>Through general and transferable skills, students will be able to:</p> <p>d2. Work in stressful environment and within constraints, communicate effectively, lead and motivate individuals and effectively manage tasks, time, and resources.</p> <ul style="list-style-type: none"> • Verify theory with practice • Verify with practice the implementation of deadlock avoidance, detection, and the scheduling techniques

4- Course Content

Week No.1	Computer System Overview
Week No.2	Operating System Overview
Week No.3	Process Description and Control
Week No.4	Process Description and Control, Cont'd
Week No.5	Threads
Week No.6	Concurrency: Mutual Exclusion and Synchronization
Week No.7	7th week Exam + Concurrency: Mutual Exclusion and Synchronization
Week No.8	Concurrency: Deadlock and Starvation
Week No.9	Concurrency: Deadlock and Starvation, Cont'd
Week No.10	Memory Management.
Week No.11	Virtual Memory
Week No.12	12th week Exam + Uni-processor Scheduling
Week No.13	Uni-processor Scheduling
Week No.14	File Management
Week No.15	Computer Security
Week No.16	Presentation of projects and Final Exam.

5- Teaching and Learning Methods

<ul style="list-style-type: none"> • Lectures • Tutorials • Reports & sheets • Laboratories • Seminars

6-Teaching and Learning Methods for Students with Special Needs

- Lectures
- Tutorials
- Reports & sheets
- Laboratories
- Seminars

The academic advisors of each student, as well as dedicated department TAs monitor the students' progress and solve any problem he/she may encounter.

7- Student Assessment

a-Procedures used	1-Written Examinations to assess The Intended Learning Outcomes.	
	2-Class Activities (Reports, Discussions, -----) to assess The Intellectual Skills.	
b- Schedule:	Assessment 1	7 th Week Written Exam
	Assessment 2	12 th Week Written Exam
	Assessment 3	Continuous
	Assessment 4	16 th Week Final Written Exam
c- Weighing of Assessment	7 th Week Examination	30 %
	12 th Week Examination	20 %
	Final-term Examination	40 %
	Oral Examination	00 %
	Practical Examination	00 %
	Semester Work	10 %
	Total	100%

8- List of References:

a- Course Notes	
b- Required Books (Textbooks)	• William Stallings, <i>Operating Systems</i> , 5th Edition, Prentice Hall, 2005
c- Recommended Books	<ul style="list-style-type: none"> • Harvey M. Deitel, <i>An introduction to Operating Systems</i>, Addison Wesley, 1990 • Andrew S Tanenbaum and Albert S Woodhull, <i>Operating Systems Design and Implementation</i>, 3rd Edition, Prentice Hall, 2006 • Abraham Silberschatz, Peter Baer Galvin, and Greg Gagne, <i>Operating Systems Concepts</i>, 7th Edition, Wiley, 2005 • Andrew S. Tanenbaum, <i>Modern Operating Systems</i>, 2nd Edition, Prentice Hall, 2001
d- Periodicals, Web Sites, etc.	

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