University/Academy: Arab Academy for Science and Technology & Maritime Transport
Faculty/Institute: College of computing & Information Technology
Program: B.Sc. in Computer Science

Course title	**Distributed Systems**
Course code	**CS425**

Form no. (11A): **Knowledge and skills matrix for a course**

Course content	Week	Knowledge	Intellectual skills	Professional skills	General skills
Introduction to Distributed Systems	1	• Define a distributed system • Identify distributed systems goals • Identify types of distributed systems	• Differentiate between types of distributed systems		
Distributed Systems Architectures	2	• Identify system architectures for distributed systems • Define self-management in distributed systems	• Evaluate system architectures for distributed systems • Analyze self-management techniques in distributed systems		
Process and Threads in Distributed Systems	3	• Explain threads implementation in distributed systems • Define the role of virtualization in distributed systems	• Evaluate different thread implementation techniques • Compare between architectures of virtual machines		
Communication Models	4	• Explain types of communication in distributed systems	• Contrast types of communication in distributed systems		

Remote Procedure Call (RPC) and Remote Method Invocation (RMI)	5	• Describe RPC operation	• Compare between RPC and RMI	• Design a distributed system application using RPC • Implement a distributed system application using RPC	• Verify theory with practice
Remote Procedure Call (RPC) and Remote Method Invocation (RMI) (cont.)	6	• Describe RMI operation	• Compare between RPC and RMI	• Design a distributed system application using RMI • Implement a distributed system application using RMI • Design distributed system services using Jini (Apache River) • Implement distributed system services using Jini (Apache River)	• Verify theory with practice
7th week Exam	7				
Naming Introduction	8	• Identify naming schemes	• Compare between naming schemes		
Naming (DNS and LDAP)	9	• Describe DNS operation • Describe LDAP operation	• Compare between DNS and LDAP as naming systems	• Experiment with DNS resolution services	• Verify theory with practice
Synchronization	10	• Identify the use physical clocks and logical clocks • Define Lamport's logical clocks	• Evaluate a clock synchronization algorithm • Compare physical clocks versus logical clocks	• Design an application using logical clocks • Implement an application using logical clocks • Experiment with synchronization using network time servers	• Verify Theory with practice

Mutual Exclusion	11	• Define mutual exclusion • Describe mutual exclusion techniques	• Evaluate a mutual exclusion algorithm	• Implement a mutual exclusion algorithm	• Verify Theory with practice
12th week Exam	12				
Consistency and Replication	13	• Describe mutual exclusion techniques • Define consistency in distributed systems • Describe data-centric consistency models • Describe client-centric consistency models • Explain replica management	• Contrast consistency models • Contrast replica placement techniques		
Fault Tolerance	14	• Define fault tolerance • Define agreement in faulty systems	• Illustrate byzantine agreement and when can be reached	• Implement a scenario of byzantine agreement	• Verify Theory with practice
Distributed File Systems	15	• Identify architectures for distributed file systems	• Compare system architectures for distributed file systems		

Course Instructor

Name:

Signature:

Head of Department

Name:

Signature: