



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	Network Protocols & Programming
Course code	CS331

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

Course content	Week	Knowledge	Intellectual skills	Professional skills	General skills
Introduction to TCP/IP	1	<ul style="list-style-type: none"> Define TCP/IP Layers Describe functions provided by TCP/IP layers 	<ul style="list-style-type: none"> Differentiate between Operating Systems environments. Relate the computer system structure to the Linux environment. 	<ul style="list-style-type: none"> Use Linux operating system 	G1.Demonstrate skills in group working, team management, time management and organizational skills. G2.Show the use of general computing facilities. G7.Demonstrate the ability to make use of a range of learning resources and to manage one's own learning.
The Network Layer: IP Suite	2	<ul style="list-style-type: none"> Explain IP addressing 	<ul style="list-style-type: none"> Extract network and subnet address from an IP address 	<ul style="list-style-type: none"> Use Linux operating system Use network tools to discover IP address 	
The Transport Layer: TCP and UDP	3	<ul style="list-style-type: none"> Demonstrate TCP reliability features Define interface Maximum Transfer Unit (MTU) Illustrate TCP state transition diagram using diagrams Explain basic UDP functionality 	<ul style="list-style-type: none"> Calculate TCP acknowledgment number Reason about a TCP connection state Differentiate between link MTU and path MTU Analyze TCP connection establishment and termination 	<ul style="list-style-type: none"> Use network tools to discover TCP connection state 	
Elementary Sockets	4	<ul style="list-style-type: none"> Define socket address structures 	<ul style="list-style-type: none"> Apply the use of socket address structures 	<ul style="list-style-type: none"> Design and implement a simple client/server application 	

Elementary TCP Sockets	5	<ul style="list-style-type: none"> • Demonstrate basic client and server • Demonstrate basic TCP socket API functions 	<ul style="list-style-type: none"> • Analyze use of TCP as a transport layer protocol 	<ul style="list-style-type: none"> • Design and implement TCP client/server 	
TCP Client/Server Example	6	<ul style="list-style-type: none"> • Demonstrate TCP client/server example 	<ul style="list-style-type: none"> • Analyze TCP connection establishment and termination 	<ul style="list-style-type: none"> • Design and implement TCP client/server 	
7th week Exam	7				
I/O Multiplexing	8	<ul style="list-style-type: none"> • Define I/O multiplexing 	<ul style="list-style-type: none"> • Reason about the need for I/O multiplexing 	<ul style="list-style-type: none"> • Design and implement I/O multiplexing application 	
Socket Options	9	<ul style="list-style-type: none"> • Define IPv4 socket options 	<ul style="list-style-type: none"> • Apply IPv4 socket options 	<ul style="list-style-type: none"> • Design and Implement an application to demonstrate socket options 	
Elementary UDP Sockets	10	<ul style="list-style-type: none"> • Demonstrate basic UDP socket API functions 	<ul style="list-style-type: none"> • Analyze use of UDP as a transport layer protocol 	<ul style="list-style-type: none"> • Design and implement UDP application 	
Name and Address Conversions	11	<ul style="list-style-type: none"> • Demonstrate name and address conversions API functions 	<ul style="list-style-type: none"> • Apply name and address conversions through DNS resolution 	<ul style="list-style-type: none"> • Implement name and address conversions functions 	
12th week Exam	12				
Multicasting	13	<ul style="list-style-type: none"> • Explain multicast operation on a LAN • Explain multicast operation on a WAN 	<ul style="list-style-type: none"> • Apply network-layer multicast on a LAN • Differentiate between multicast on a LAN and on a WAN • Differentiate between application-layer and network-layer multicast 	<ul style="list-style-type: none"> • Design and implement a multicast network application 	

Client/Server Design Alternatives – Part I	14	<ul style="list-style-type: none"> • Discuss TCP client/server design alternatives 	<ul style="list-style-type: none"> • Compare between different client/server design alternatives • Evaluate client/server design alternatives 	<ul style="list-style-type: none"> • Design and implement TCP client/server with different design alternatives 	
Client/Server Design Alternatives – Part II	15	<ul style="list-style-type: none"> • Discuss TCP client/server design alternatives 	<ul style="list-style-type: none"> • Compare between different client/server design alternatives • Evaluate client/server design alternatives 	<ul style="list-style-type: none"> • Design and implement TCP client/server with different design alternatives 	

Course Instructor

Name:

Signature:

Head of Department

Name:

Signature: