

COURSE SPECIFICATION

This Course Specification provides a concise summary of the main features of the course and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if he/she takes full advantage of the learning opportunities that are provided. It should be cross-referenced with the programme specification.

1. Teaching Institution	University of Baghdad/Al_Khwarizmi College of Engineering
2. University Department/Centre	Information and Communication Engineering
3. Course title/code	Computer Networks
4. Programme (s) to which it contributes	This course contributes primarily to the students' knowledge for working professionally in the area of Computer Networks. Students should be able to apply knowledge of the techniques, skills, and modern engineering tools to analyze, design and implement different Computer Networks.
5. Modes of Attendance offered	attendance is mandatory according to the university rules
6. Semester/Year	٢٠١٧-٢٠١٨
7. Number of hours tuition (total)	60
8. Date of production/revision of this specification	May/2018
9. Aims of the Course	
The objective of this course is gain an understanding of the concepts and techniques	

used to model and implement communications between processes residing on independent host computers. The course examines the conceptual framework for specifying a computer network - the network architecture, and investigates the set of rules and procedures that mediate the exchange of information between two communicating processes.

10. Learning Outcomes, Teaching ,Learning and Assessment Methods

1. Knowledge and Understanding

At the completion of the course, students will be able to...

A1. Understand the OSI Model and different computer network architecture

A2. Understand the computer Networks operations

A3. Able to design different computer networks

A4. Able to use Packet Tracer software

A5. Understand the Network devices operations

A6..

B. Subject-specific skills

In addition to the measurable student learning outcomes listed above, students enrolled in Computer Networks Course will be required to demonstrate their more in-depth knowledge of the course material by

B1. Study different Networks in real Life Solving additional, more challenging exam problems.

Teaching and Learning Methods

Lectures, Presentations, Recitation and Documentations

Assessment methods

homework 10%

quizzes - 10%

midterm -20%

Lab-10%

final - 50%

C. Thinking Skills

C1. Ability to apply knowledge of computer Networks according to market requirements.

C2. Ability to identify, formulate and solve engineering problems.

C3. Ability to use different techniques, skills and modern engineering tools necessary for engineering practice.

D. General and Transferable Skills (other skills relevant to employability and personal development)

D1. Ability to design any computer Network.

D2. Ability to use Packet Tracer

D3 Ability to configure different Network devices

11. Course Structure					
Week	Hours	ILOs	Unit/Module or Topic Title	Teaching Method	Assessment Method
1	2	DATA COMMUNICATIONS <ol style="list-style-type: none"> 1. Components 2. Data Representation 3. DataFlow NETWORKS <ol style="list-style-type: none"> 4. Distributed Processing 5. Network Criteria 6. Physical Structures 7. Network Models 8. Categories of Networks 9. Interconnection of Networks: Internetwork 	Data Communication and Networking Introduction	Classroom with whiteboard and Lab	Quizzes
2	2	THE INTERNET <ol style="list-style-type: none"> 1. A Brief History 2. The Internet Today PROTOCOLS AND STANDARDS <ol style="list-style-type: none"> 3. Protocols 4. Standards 5. Standards Organizations 6. Internet Standards 	Data Communication and Networking Introduction	Classroom with whiteboard and Lab	Quizzes
3	2	LAYERED TASKS <ol style="list-style-type: none"> 1. Sender, Receiver, and Carrier 2. Hierarchy 3. THE OSI MODEL 4. Layered Architecture 5. Peer-to-Peer Processes 6. Encapsulation 	Network Models	Classroom with whiteboard and Lab	Quizzes
4	2	LAYERS IN THE OSI MODEL <ol style="list-style-type: none"> 1. Physical Layer 2. Data Link Layer 3. Network Layer 4. Transport Layer 5. Session Layer 6. Presentation Layer 7. Application Layer 8. Summary of Layers 	Network Models	Classroom with whiteboard and Lab	Quizzes
5	2	TCP/IP PROTOCOL SUITE <ol style="list-style-type: none"> 1. Physical and Data Link Layers 2. Network Layer 3. Transport Layer 4. Application Layer ADDRESSING <ol style="list-style-type: none"> 1. Physical Addresses 2. Logical Addresses 3. Port Addresses 4. Specific Addresses 	Network Models	Classroom with whiteboard and Lab	Quizzes
6	2	GUIDED MEDIA <ol style="list-style-type: none"> 1. Twisted-Pair Cable 2. Coaxial Cable Fiber-Optic Cable UNGUIDED MEDIA: WIRELESS <ol style="list-style-type: none"> 1. Radio Waves 2. Microwaves 	Transmission Media	Classroom with whiteboard and Lab	Quizzes

		3. Infrared			
7	2	CIRCUIT-SWITCHED NETWORKS 1. Three Phases 2. Efficiency 3. Delay 4. Circuit-Switched Technology in Telephone Networks DATAGRAM NETWORKS 1. Routing Table 2. Efficiency 3. Delay 4. Datagram Networks in the Internet	Switching	Classroom with whiteboard and Lab	Quizzes
8	2	VIRTUAL-CIRCUIT NETWORKS 1. Addressing 2. Three Phases 3. Efficiency 3. Delay in Virtual-Circuit Networks 4. Circuit-Switched Technology in WANs STRUCTURE OF A SWITCH 1. Structure of Circuit Switches 2. Structure of Packet Switches	Switching	Classroom with whiteboard and Lab	Quizzes
9	2	CONNECTING DEVICES 1. Passive Hubs 2. Repeaters 3. Active Hubs 4. Bridges 5. Two-Layer Switches 6. Routers	Connecting LANs, Backbone Networks, and Virtual LANs	Classroom with whiteboard and Lab	Quizzes
10	2	7. Three-Layer Switches 8. Gateway BACKBONE NETWORKS 1. Bus Backbone 2. Star Backbone 3. Connecting Remote LANs	Connecting LANs, Backbone Networks, and Virtual LANs	Classroom with whiteboard and Lab	Quizzes
11	2	VIRTUAL LANs 1. Membership 2. Configuration 3. Communication Between Switches 4. IEEE Standard 5. Advantages Review Questions	Connecting LANs, Backbone Networks, and Virtual LANs	Classroom with whiteboard and Lab	Quizzes
12	2	INTRODUCTION 1 Nodes and Links 2 Services 3 Two Categories of Links 4 Two Sublayers LINK-LAYER ADDRESSING .1 Three Types of addresses	Data-Link Layer	Classroom with whiteboard and Lab	Quizzes
13	2	2 Address Resolution Protocol (ARP) 3 An Example of Communication	Data-Link Layer	Classroom with whiteboard and Lab	Quizzes
14	2	IPV4ADDRESSES 1. Address Space 2. Notations 3. Classful Addressing	Network Layer: Logical Addressing	Classroom with whiteboard and Lab	Quizzes
15	2	3. Classful Addressing	Network Layer: Logical	Classroom with whiteboard and	Quizzes

			Addressing	Lab	
16	-	Midyear Holiday	-	Classroom with whiteboard and Lab	-
17	-	Midyear Holiday	-	Classroom with whiteboard and Lab	-
18	2	4. Classless Addressing	Network Layer: Logical Addressing	Classroom with whiteboard and Lab	Quizzes
19	2	Classful Addressing And Classless Addressing Examples	Network Layer: Logical Addressing	Classroom with whiteboard and Lab	Quizzes
20	2	Network Address Translation (NAT) IPv6 ADDRESSES 1. Structure 2. Address Space	Network Layer: Logical Addressing	Classroom with whiteboard and Lab	Quizzes
21	2	INTERNETWORKING 1. Need for Network Layer 2. Internet as a Datagram Network 3. Internet as a Connectionless Network	Network Layer: Internet Protocol	Classroom with whiteboard and Lab	Quizzes
22	2	IPv4 1. Datagram	Network Layer: Internet Protocol	Classroom with whiteboard and Lab	Quizzes
23	2	2. Fragmentation 3. Checksum 4. Options	Network Layer: Internet Protocol	Classroom with whiteboard and Lab	Quizzes
24	2	IPv6 1. Advantages 2. Packet Format	Network Layer: Internet Protocol	Classroom with whiteboard and Lab	Quizzes
25	2	3. Extension Headers TRANSITION FROM IPv4 TO IPv6 1. Dual Stack 1. Tunneling 604 3. Header Translation	Network Layer: Internet Protocol	Classroom with whiteboard and Lab	Quizzes
26	2	PROCESS-TO-PROCESS DELIVERY 1. Client/Server Paradigm 2. Multiplexing and Demultiplexing 3. Connectionless Versus Connection-Oriented Service 4. Reliable Versus Unreliable 5. Three Protocols	Process-to-Process Delivery: UDP, TCP.	Classroom with whiteboard and Lab	Quizzes
27	2	USER DATAGRAM PROTOCOL (UDP) 1. Well-Known Ports for UDP 2. User Datagram 3. Checksum	Process-to-Process Delivery: UDP, TCP.	Classroom with whiteboard and Lab	Quizzes

28	2	4. UDP Operation 5. Use of UDP TCP 1. TCP Services 2. TCP Features 3. Segment	Process-to- Process Delivery: UDP, TCP.	Classroom with whiteboard and Lab	Quizzes
29	2	4. A TCP Connection 5. Flow Control 6. Error Control 7. Congestion Control	Process-to- Process Delivery: UDP, TCP.	Classroom with whiteboard and Lab	Quizzes
30	2	General Review	-	Classroom with whiteboard and Lab	Quizzes

12. Infrastructure

<p>Required reading:</p> <ul style="list-style-type: none"> · CORE TEXTS · COURSE MATERIALS · OTHER 	<p>Text book 1 : "DATA COMMUNICATION AND NETWORKING BY BEHROUZE FROUZAN EDITION 4TH ED.</p> <p>Text book 2 : "DATA COMMUNICATION AND NETWORKING BY BEHROUZE FROUZAN EDITION 5TH ED.</p> <p>Text book 3 : CCNA Routing and Switching, Cisco Press</p>
Special requirements (include for example workshops, periodicals, IT software, websites)	<p>Putty</p> <p>Packet tracer v6.3.</p>
Community-based facilities (include for example, guest Lectures , internship , field studies)	Summer training, Scientific visits.

13. Admissions

Pre-requisites	
Minimum number of students	
Maximum number of students	30