



52. Course Specification of Computer Networks

I. Course Identification and General Information:						
1.	Course Title:	Computer Networks				
2.	Course Code & Number:	CCE451				
3.	Credit hours:	C.Hs				Total
		Th.	Tu.	Pr.	Tr.	
		2	-	2	-	
4.	Study level/ semester at which this course is offered:	5 th level / First semester				
5.	Pre –requisite (if any):	Signals & Systems (CCE231), Programming Language 3 (Java) (CCE244)				
6.	Co –requisite (if any):	N/A				
7.	Program (s) in which the course is offered:	Computer Engineering & Control				
8.	Language of teaching the course:	Mixture of English and Arabic				
9.	Location of teaching the course:	Electrical Engineering Department Building				
10.	Prepared By:	Asst. Prof. Dr. Ali Al-Hamdi				
11.	Date of Approval					

II. Course Description:
<p>This course aims to provide students with basic principles and concepts related to data communications and networking design, simulation & implementation, as well as their applications in social, industries and marketing environments. The course covers the fundamentals of data communications and networking, networks models, multiplexing and transmission media, switching, error detection and correction, network layers protocols and network design concepts, transport layer protocols and network management. This course is supported with practical lab experiments & computer-based lap works which develop student's</p>

Prepared by	Head of Department Asst. Prof. Dr. Adel Ahmed Al-Shakiri	Quality Assurance Unit Assoc. Prof. Dr. Mohammad Algorafi	Dean of the Faculty Prof. Dr. Mohammed AL-Bukhaiti	Academic Development Center & Quality Assurance Assoc. Prof. Dr. Huda Al-Emad
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practical & problem-solving skills related to network design, simulation, implementation and installation to different environmental issues.

III. Course Intended learning outcomes (CILOs) of the course		Referenced PILOs
a1	Define important terminologies related to computer networks such as network main components, characteristics, topology types, models, standards, protocols, addressing, casting types, problems, management, etc....	A1 and A2
a2	Explain the computer network fundamentals such as protocol layering and operation, switching types and operation, error detection and correction mechanisms, addressing, casting operation, areas of network management, etc...	A3 and A4
b1	Compare, in terms of merits and drawbacks, between the computer network protocol types, topology types, switching methods, mechanisms of error detection and correction, addressing, casting types, management tools, etc....	B2, and B3
b2	Select the appropriate computer network topology, type, protocol type, switching method and associated switch, mechanism of error detection and correction, casting type, and management tool to the required or desired issues and applications.	B4
c1	Use standard laboratory instruments and computer-based simulation to configure and analyze the computer network operation and features.	C4
c2	Apply theoretical knowledge and practical skills gained to build a computer network of any type using the essential computer and communications H/W and S/W components.	C1 and C3
d1	Work effectively as a part of a team in applying skills gained throughout the course to prepare mini reports related to construct and configure any type of network.	D1 and D2

Prepared by Head of Department Quality Assurance Unit Dean of the Faculty Academic Development
 Asst. Prof. Dr. Adel Assoc. Prof. Dr. Prof. Dr. Mohammed Center & Quality Assurance
 Ahmed Al-Shakiri Mohammad Algorafi AL-Bukhaiti Assoc. Prof. Dr. Huda Al-Emad

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d2	Communicate effectively orally and in written forms within a team discussing the different aspects and problems related to computer networks and providing appropriate technical and managerial solutions.	D3 and D4
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(A) Alignment Course Intended Learning Outcomes of Knowledge and Understanding to Teaching Strategies and Assessment Strategies:		
Course Intended Learning Outcomes	Teaching strategies	Assessment Strategies
a1- Define important terminologies related to computer networks such as network main components, characteristics, topology types, models, standards, protocols, addressing, casting types, problems, management, etc....	<ul style="list-style-type: none"> ▪ Active Lectures, ▪ Interactive class discussions, ▪ Laboratory Sessions, ▪ Homework& Assignments 	<ul style="list-style-type: none"> ▪ Written Exams (Mid-term, Final & Quizzes), ▪ Lab Assessments, ▪ Homework, ▪ Reports.
a2- Explain the computer network fundamentals such as protocol layering and operation, switching types and operation, error detection and correction mechanisms, addressing, casting operation, areas of network management, etc...	<ul style="list-style-type: none"> ▪ Active Lectures, ▪ Interactive class discussions, ▪ Laboratory Sessions, ▪ Homework& Assignments, ▪ Projects. 	<ul style="list-style-type: none"> ▪ Written Exams (Mid-term, Final & Quizzes), ▪ Lab Assessments, ▪ Homework, ▪ Project Reports.

(B) Alignment Course Intended Learning Outcomes of Intellectual Skills to Teaching Strategies and Assessment Strategies:		
Course Intended Learning Outcomes	Teaching strategies	Assessment Strategies

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 Asst. Prof. Dr. Adel Assoc. Prof. Dr. Prof. Dr. Mohammed Center & Quality Assurance
 Ahmed Al-Shakiri Mohammad Algorafi AL-Bukhaiti Assoc. Prof. Dr. Huda Al-Emad

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<p>b1- Compare, in terms of merits and drawbacks, between the computer network protocol types, topology types, switching methods, mechanisms of error detection and correction, casting types, management tools, etc....</p>	<ul style="list-style-type: none"> ▪ Active Lectures, ▪ Interactive class discussions, ▪ Laboratory Sessions, ▪ Homework & Assignments, ▪ Projects. 	<ul style="list-style-type: none"> ▪ Written Exams (Mid-term, Final & Quizzes). ▪ Lab Assessments, ▪ Homework, ▪ Lab & Project Reports.
<p>b2- Select the appropriate computer network topology, type, protocol type, switching method and associated switch, mechanism of error detection and correction, casting type, and management tool to the required or desired issues and applications.</p>	<ul style="list-style-type: none"> ▪ Active Lectures, ▪ Interactive class discussions, ▪ Laboratory Sessions, ▪ Homework & Assignments, ▪ Projects. 	<ul style="list-style-type: none"> ▪ Written Exams (Mid-term, Final & Quizzes). ▪ Lab Assessments, ▪ Homework, ▪ Lab & Project Reports.

© Alignment Course Intended Learning Outcomes of Professional and Practical Skills to Teaching Strategies and Assessment Strategies:		
Course Intended Learning Outcomes	Teaching strategies	Assessment Strategies
<p>c1- Use standard laboratory instruments and computer-based simulation to configure and analyze the computer network operation and features.</p>	<ul style="list-style-type: none"> ▪ Computer-based Laboratory Sessions, ▪ Practical Laboratory Experiments, ▪ Projects. 	<ul style="list-style-type: none"> ▪ Lab Assessments, ▪ Lab & Project Reports.
<p>c2- Apply theoretical knowledge and practical skills gained to build a computer network of any type using the essential computer</p>	<ul style="list-style-type: none"> ▪ Computer-based Laboratory Sessions, ▪ Practical Laboratory Experiments, ▪ Projects. 	<ul style="list-style-type: none"> ▪ Lab Assessments, ▪ Lab & Project Reports.

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 Asst. Prof. Dr. Adel Assoc. Prof. Dr. Prof. Dr. Mohammed Center & Quality Assurance
 Ahmed Al-Shakiri Mohammad Algorafi AL-Bukhaiti Assoc. Prof. Dr. Huda Al-Emad

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and communications H/W and S/W components.		
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(D) Alignment Course Intended Learning Outcomes of Transferable Skills to Teaching Strategies and Assessment Strategies:		
Course Intended Learning Outcomes	Teaching strategies	Assessment Strategies
d1- Work effectively as a part of a team in applying skills gained throughout the course to prepare mini reports related to constructing and configuring any type of network.	<ul style="list-style-type: none"> ▪ Laboratory Sessions, ▪ Projects. 	<ul style="list-style-type: none"> ▪ Lab Assessments, ▪ Lab & Project Reports.
d2- Communicate effectively orally and in written forms within a team discussing the different aspects and problems related to computer networks and providing appropriate technical and managerial solutions.	<ul style="list-style-type: none"> ▪ Laboratory Sessions, ▪ Interactive class discussions, ▪ Projects. 	<ul style="list-style-type: none"> ▪ Lab Assessments, ▪ Lab & Project Reports.

IV. Course Content:					
A – Theoretical Aspect:					
Order	Units/Topics List	Learning Outcomes	Sub Topics List	Number of Weeks	Contact hours
1.	Course plan distribution and presentation	N/R	<ul style="list-style-type: none"> ▪ Course Identification and General Information, ▪ Course Description, ▪ Intended learning outcomes (ILOs) of the course, 	1	2

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 Asst. Prof. Dr. Adel Assoc. Prof. Dr. Prof. Dr. Mohammed Center & Quality Assurance
 Ahmed Al-Shakiri Mohammad Algorafi AL-Bukhaiti Assoc. Prof. Dr. Huda Al-Emad

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			<ul style="list-style-type: none"> ▪ Course Content: theoretical and practical aspects, ▪ Teaching strategies of the course, ▪ Lab Assignments, ▪ Assessment methods, ▪ Learning Resources, ▪ Course Policies. 		
2.	Introduction	a1, b1, b2 & d2	<ul style="list-style-type: none"> ▪ Data Communications, ▪ Networks, ▪ Network Types & Topologies, ▪ Internet History, ▪ Standards and Administration. 	1	2
3.	Network Models	a2, b1, b2 & d2	<ul style="list-style-type: none"> ▪ The ISO/OSI model ▪ Protocol Layering ▪ TCP/IP Protocol Suite. 	1.5	3
4.	Multiplexing & Transmission Media	b1, b2 & d2	<ul style="list-style-type: none"> ▪ Introduction to Multiplexing, ▪ Analog & Digital Multiplexing, ▪ Transmission Media, ▪ Guide & Un-Guided Transmissions media. 	1.5	3
5.	Switched WAN Networks	a1, a2, b1, b2 & d2	<ul style="list-style-type: none"> ▪ Introduction to internetworking elements and device, Hubs, Bridges, Switches & Routers, ▪ Circuit-Switched Networks, ▪ Packet-Switched Networks, ▪ Virtual Circuit Switched Networks, ▪ Structure of Switches & Routers. 	2	4

Prepared by Head of Department
 Asst. Prof. Dr. Adel
 Ahmed Al-Shakiri

Quality Assurance Unit
 Assoc. Prof. Dr.
 Mohammad Algorafi

Dean of the Faculty
 Prof. Dr. Mohammed
 AL-Bukhaiti

Academic Development
 Center & Quality Assurance
 Assoc. Prof. Dr. Huda Al-Emad

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6.	Introduction to Data-Link Layer & Error Detection and Correction	a1, a2, b1, b2 & d2	<ul style="list-style-type: none"> ▪ Introduction to Data-Link Layer, IEEE802.3 Frame Header & Addressing, ▪ Introduction, ▪ Block Coding, ▪ Cyclic Codes, ▪ Checksum, ▪ Forward Error Correction. 	2	4
7.	Network Layer Protocols	b1, b2, & d2	<ul style="list-style-type: none"> ▪ Introduction and comparisons between Internet Protocols, IPv4 & IPv6, ▪ IPv4 Class-full & Classless Addressing, ▪ Subnetworking and Network Design and IP's Distributions, ▪ ICMPv4, ▪ MOBILE IP, ▪ IPv4 Vs. IPv6 Headers. 	2	4
8.	Multicast Routing	b1, b2, & d2	<ul style="list-style-type: none"> ▪ Multicasting Basic, ▪ Intradomain Multicast Protocols, ▪ Interdomain Multicast Protocols, ▪ IGMPv4, ▪ OSPF Protocol. 	1	2
9.	Transport Layer Protocols and Network Management & Security	b1, b2, & d2	<ul style="list-style-type: none"> ▪ Introduction, ▪ User datagram protocol (UDP), ▪ Transmission control Protocol (TCP), and STCP ▪ Introduction, SNMP, ASN.1, 	2	4

Prepared by Head of Department Quality Assurance Unit Dean of the Faculty Academic Development
 Asst. Prof. Dr. Adel Assoc. Prof. Dr. Prof. Dr. Mohammed Center & Quality Assurance
 Ahmed Al-Shakiri Mohammad Algorafi AL-Bukhaiti Assoc. Prof. Dr. Huda Al-Emad

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			<ul style="list-style-type: none"> Introduction, Confidentiality, Other aspects of security. 		
Number of Weeks /and Units Per Semester:				14	28

B - Practical Aspect:				
Order	Tasks/ Experiments	Number of Weeks	Contact hours	Learning Outcomes
1.	Introduction: Presentation of lab topics, Simulation tool (Packet Tracer+ GNS3+Wireshark+VMware+PowerSNMP), and lab terminal nodes (PCs, laptops, etc..).	1	2	a1
2.	Network passive and active devices: while passive devices include Guided (wired) like twisted-par, coaxial cable and fiber-optic cable. Unguided (wireless) like radio wave, microwave and infrared, active devices include switches, bridges, repeater, hubs, routers, wireless access points, firewalls, etc... Network's cables & RG45 Connectors and its installation on coaxial cable	1	2	a1, a2 & c1
3.	Addressing: MAC addressing, IP addressing (with different classes), privates IP addressing, etc...	1	2	a1, a2, & c1
4.	Subnetting and VLSM: Basics, Subnetting Class C Addresses, Subnetting Class B	1	2	a1, a2, & c1

Prepared by Head of Department Quality Assurance Unit Dean of the Faculty Academic Development
 Asst. Prof. Dr. Adel Assoc. Prof. Dr. Prof. Dr. Mohammed Center & Quality Assurance
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	Addresses, Subnetting Class A Addresses, Variable Length Subnet Masks (VLSMs).			
5.	Configuration: Router Interfaces, implementing a Topology Using Packet Tracer, Some of Router Modes, Configurations Commands, Verification Commands.	1	2	a1, a2, & c1
6.	Switching: Configuring VLANs, Routing between VLANs, Verification Commands, Issue to Solve.	1	2	a1, a2 & c1
7.	Static Routing: Introduction, Pros and Cons, WAN Components, The Scenario, Configurations Commands, Verification Commands.	1	2	a1, a2 & c1
8.	Dynamic Routing: Introduction, Pros and Cons, The Configurations (RIP, EIGRP, OSPF), Verification commands.	1	2	a1, a2 & c1
9.	Servers and Protocols: HTTP, DNS, DHCP, Email, TFTP, Servers Testing, Router as DHCP Server, Telnet, Useful Command.	1	2	a1, a2, b1, b2, & c1
10.	Network Management: SNMP Protocol.	1	2	a1, a2 & c1
11.	Network implementation: LAN network implementation using necessary H/W and S/W.	2	4	a1, a2, b1, b2, c1, c2, d1, & d2
12.	Project document submission & Presentations and Final Lab assessment.	2	4	a1, a2, b1, b2, c1, c2, d1 & d2
Number of Weeks /and Units Per Semester		14	28	

Prepared by

Head of Department
 Asst. Prof. Dr. Adel
 Ahmed Al-Shakiri

Quality Assurance Unit
 Assoc. Prof. Dr.
 Mohammad Algorafi

Dean of the Faculty
 Prof. Dr. Mohammed
 AL-Bukhaiti

Academic Development
 Center & Quality Assurance
 Assoc. Prof. Dr. Huda Al-Emad

Rector of Sana'a University
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V. Teaching strategies of the course:	
<ul style="list-style-type: none"> ▪ Active Lectures, ▪ Interactive class discussions, ▪ Practical Laboratory Experiments, ▪ Computer-based Laboratory Sessions, ▪ Homework & Assignments, ▪ Projects. 	

VI. Assignments & Reports:				
No	Assignments	Aligned CILOs(symbols)	Week Due	Mark
1.	Homework on Network Types & Topologies and Networking Models.	a1, a2, and d1	3 rd & 4 th	1
2.	Problems and questions on Multiplexing Report on Transmission Media Techniques.	a1, a2, and d1	5 th	1
3.	Switching	a1, a2, c1, and d1	6 th & 7 th	1
4.	Error Detections & Corrections	a1, a2, c1, and d1	9 th & 10 th	1
5.	Simulation and questions on subnetting, routing & configuration with Lab Reports.	a1, a2, c1, and d1	11 th & 12 th	1.5
6.	Simulation and questions on servers & protocols and Network Managements with Lab Reports.	a1, a2, c1, and d1	13 th	1.5
7.	Reports on network implementation	a1, a2, b1, b2, c1, c2, and d1	14 th	3
8.	Topics Preparation & Participations	a1, a2, b1, b2, c1, c2, and d2	Weekly	5
	Total			15

Prepared by Head of Department Quality Assurance Unit Dean of the Faculty Academic Development
 Asst. Prof. Dr. Adel Assoc. Prof. Dr. Prof. Dr. Mohammed Center & Quality Assurance
 Ahmed Al-Shakiri Mohammad Algorafi AL-Bukhaiti Assoc. Prof. Dr. Huda Al-Emad

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VII. Schedule of Assessment Tasks for Students During the Semester:					
No.	Assessment Method	Week Due	Mark	Proportion of Final Assessment	Aligned Course Learning Outcomes
1.	Assignments & Reports	Weekly	15	10%	a1, a2, b1, b2, c1, c2, d1 and d2
2.	Quizzes	5 th , 10 th & 14 th	10	6.67%	a1, a2, b1, b2, d1
3.	Midterm Exam (Theory)	8 th	20	13.33%	a1, a2, b1, & b2
4.	Final Lab. Exam (including Course Project Evaluation)	13 th & 14 th	30	20%	a1, a2, b1, b2, c1, c2, d1, d2
5.	Final Exam (Theory)	16 th	75	50%	a1, a2, b1, & b2
Total			150	100%	

VIII. Learning Resources:	
<ul style="list-style-type: none"> Written in the following order: (Author - Year of publication – Title – Edition – Place of publication – Publisher). 	
1- Required Textbook(s) (maximum two).	
	<ol style="list-style-type: none"> Behrouz A. Forouzan, 2013, “Data Communications and networking”, 5th Edition, USA, McGraw Hill. William Stallings, 2007 “Data Communications and networking”, 10th Edition, Pearson Prentice Hall.
2- Essential References.	
	<ol style="list-style-type: none"> Behrouz A. Forouzan, 2018, “Data and computer Communications”, 8th Edition, USA.

Prepared by Head of Department Quality Assurance Unit Dean of the Faculty Academic Development
 Asst. Prof. Dr. Adel Assoc. Prof. Dr. Prof. Dr. Mohammed Center & Quality Assurance
 Ahmed Al-Shakiri Mohammad Algorafi AL-Bukhaiti Assoc. Prof. Dr. Huda Al-Emad

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3- Electronic Materials and Web Sites <i>etc.</i>	
	<ol style="list-style-type: none"> 1. www.mhhe.com/forouzan 2. If additional websites are required, they will be submitted to the students during the semester. The addresses of those websites will be indicated in the handouts.

IX. Course Policies:	
1.	<p>Class Attendance:</p> <ul style="list-style-type: none"> - The students should have more than 75% of attendance according to rules and regulations of the faculty.
2.	<p>Tardy:</p> <ul style="list-style-type: none"> - The students should respect the timing of attending the lectures. They should attend within 15 minutes from starting of the lecture.
3.	<p>Exam Attendance/Punctuality:</p> <ul style="list-style-type: none"> - The student should attend the exam on time. The punctuality should be implemented according to rules and regulations of the faculty for mid-term exam and final exam.
4.	<p>Assignments & Projects:</p> <ul style="list-style-type: none"> - The assignment is given to the students after each chapter; the student has to submit all the assignments for checking on time.
5.	<p>Cheating:</p> <ul style="list-style-type: none"> - If any cheating occurred during the examination, the student is not allowed to continue and he has to face the examination committee for enquiries.
6.	<p>Plagiarism:</p> <ul style="list-style-type: none"> - If one student attends the exam on another behalf; he will be dismissed from the faculty according to the policy, rules and regulations of the university.
7.	<p>Other policies:</p> <ul style="list-style-type: none"> - All the teaching materials should be kept out the examination hall and mobile phones are not allowed.

Prepared by	Head of Department Asst. Prof. Dr. Adel Ahmed Al-Shakiri	Quality Assurance Unit Assoc. Prof. Dr. Mohammad Algorafi	Dean of the Faculty Prof. Dr. Mohammed AL-Bukhaiti	Academic Development Center & Quality Assurance Assoc. Prof. Dr. Huda Al-Emad
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- Mutual respect should be maintained between the student and his teacher and also among students. Failing in keeping this respect is subject to the policy, rules and regulations of the university.

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Reviewed By	<p><u>Vice Dean for Academic Affairs and Post Graduate Studies: Asst. Prof. Dr. Tarek A. Barakat</u> <u>President of Quality Assurance Unit: Assoc. Prof. Dr. Mohammed Algorafi</u> <u>Name of Reviewer from the Department: Assoc. Prof. Dr. Farouk Al-Fuhaidy</u></p>
	<p><u>Deputy Rector for Academic Affairs Asst. Prof. Dr. Ibrahim AlMutaa</u> <u>Assoc. Prof. Dr. Ahmed Mujahed</u> <u>Asst. Prof. Dr. Munasar Alsubri</u></p>

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52. Course Plan of Computer Networks

I. Information about Faculty Member Responsible for the Course:							
Name of Faculty Member	Dr. Ali AL-HAMDI	Office Hours					
Location & Telephone No.	Electrical department building	SA	SU	MO	TU	WE	TH
E-mail	aalhamdi1989@gmail.com		12-14				12-14

II. Course Identification and General Information:						
1.	Course Title:	Computer Networks				
2.	Course Number & Code:	CCE451				
3.	Credit hours: 3	C.H				
		Th.	Tu.	Pr.	Tr.	Total
		2	-	2	-	3
4.	Study level/year at which this course is offered:	5 th level (final)/ First semester				
5.	Pre –requisite (if any):	Signals & Systems (CCE231), Programming Language 3 (Java) (CCE244)				
6.	Co –requisite (if any):	N/A				
7.	Program (s) in which the course is offered	Computer Engineering & Control				
8.	Language of teaching the course:	Mixture of English and Arabic				
9.	System of Study:	Annual				
10.	Mode of delivery:	Collective and individual learning				
11.	Location of teaching the course:	Education Building, 2sd flour, Room 105				

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III. Course Description:

This course aims to provide students with basic principles and concepts related to data communications and networking design, simulation & implementation, as well as their applications in social, industries and marketing environments. The course covers the fundamentals of data communications and networking, networks models, multiplexing and transmission media, switching, error detection and correction, network layers protocols and network design concepts, transport layer protocols and network management. This course is supported with practical lab experiments & computer-based lap works which develop student's practical & problem-solving skills related to network design, simulation, implementation and installation to different environmental issues.

IV. Intended learning outcomes (ILOs) of the course:

- Brief summary of the knowledge or skill the course is intended to develop:
 1. Define important terminologies related to computer networks such as network main components, characteristics, topology types, models, standards, protocols, addressing, casting types, problems, management, etc....
 2. Explain the computer network fundamentals such as protocol layering and operation, switching types and operation, error detection and correction mechanisms, addressing, casting operation, areas of network management, etc...
 3. Compare, in terms of merits and drawbacks, between the computer network protocol types, topology types, switching methods, mechanisms of error detection and correction, addressing, casting types, management tools, etc....
 4. Select the appropriate computer network topology, type, protocol type, switching method and associated switch, mechanism of error detection and correction, casting type, and management tool to the required or desired issues and applications.
 5. Use standard laboratory instruments and computer-based simulation to configure and analyze the computer network operation and features.
 6. Apply theoretical knowledge and practical skills gained to build a computer network of any type using the essential computer and communications H/W and S/W components.

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7. Work effectively as a part of a team in applying skills gained throughout the course to prepare mini reports related to construct and configure any type of network.
8. Communicate effectively orally and in written forms within a team discussing the different aspects and problems related to computer networks and providing appropriate technical and managerial solutions.

V. Course Content:			
A – Theoretical Aspect:			
Order	Topics List	Weeks Due	Contact hours
1.	Course plan presentation: titles of this plan.	1 st	2
2.	Introduction: Data Communications, Networks, Network Types, Internet History, Standards and Administration	2 nd	2
3.	Network Models: Protocol Layering TCP/IP Protocol Suite, The OSI model.	3 rd to 4 th	3
4.	Multiplexing & Transmission Media - Introduction to Multiplexing, - Analog & Digital Multiplexing, - Transmission Media, - Guide & Un-Guided Transmissions media.	4 th to 5 th	3
5.	Switched WAN Networks - Introduction to internetworking elements and device, Hubs, Bridges, Switches & Routers, - Circuit-Switched Networks, - Packet-Switched Networks, - Virtual Circuit Switched Networks, - Structure of Switches & Routers.	6 th & 7 th	4
6.	- Mid Term Exam	8 th	2

Prepared by Head of Department Quality Assurance Unit Dean of the Faculty Academic Development
 Asst. Prof. Dr. Adel Assoc. Prof. Dr. Prof. Dr. Mohammed Center & Quality Assurance
 Ahmed Al-Shakiri Mohammad Algorafi AL-Bukhaiti Assoc. Prof. Dr. Huda Al-Emad

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7.	<p>Introduction to Data-Link Layer & Error Detection and Correction</p> <ul style="list-style-type: none"> - Introduction to Data-Link Layer, IEEE802.3 Frame Header & Addressing, - Introduction, - Block Coding, - Cyclic Codes, - Checksum, - Forward Error Correction. 	9 th & 10 th	4
8.	<p>Network Layer Protocols</p> <ul style="list-style-type: none"> - Introduction and comparisons between Internet Protocols, IPv4 & IPv6, - IPv4 Class-full & Classless Addressing, - Subnetworking and Network Design and IP's Distributions, - ICMPv4, - MOBILE IP, - IPv4 Vs. IPv6 Headers. 	11 th & 12 th	4
9.	<p>Multicast Routing</p> <ul style="list-style-type: none"> - Multicasting Basic, - Intradomain Multicast Protocols, - Interdomain Multicast Protocols, - IGMPv4, - OSPF Protocol. 	13 th	2
10.	<p>Transport Layer Protocols and Network Management & Security</p> <ul style="list-style-type: none"> - Introduction, - User datagram protocol (UDP), - Transmission control Protocol (TCP), and STCP - Introduction, SNMP, ASN.1, - Introduction, Confidentiality, Other aspects of security. 	14 th & 15 th	4
11.	- Final Exam	16 th	2
Number of Weeks /and Units Per Semester:		16	32

Prepared by Head of Department Quality Assurance Unit Dean of the Faculty Academic Development
 Asst. Prof. Dr. Adel Assoc. Prof. Dr. Prof. Dr. Mohammed Center & Quality Assurance
 Ahmed Al-Shakiri Mohammad Algorafi AL-Bukhaiti Assoc. Prof. Dr. Huda Al-Emad

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 Prof. Dr. Al-Qassim Mohammed Abbas



B – Practical Aspect:			
Order	Topics List	Week Due	Contact Hours
1.	Introduction: Presentation of lab topics , Simulation tool (Packet Tracer+ GNS3+Wireshark+VMware+PowerSNMP), and lab terminal nodes (PCs, laptops, etc..).	1 st	2
2.	Network passive and active devices: while passive devices include Guided (wired) like twisted-par, coaxial cable and fiber-optic cable. Unguided (wireless) like radio wave, microwave and infrared, active devices include switches, bridges, repeater, hubs, routers, wireless access points, firewalls, etc... Network's cables & RG45 Connectors and it installation on coaxial cable	2 nd	2
3.	Addressing: MAC addressing, IP addressing (with different classes), privates IP addressing, etc...	3 rd	2
4.	Subnetting and VLSM: Basics, Subnetting Class C Addresses, Subnetting Class B Addresses, Subnetting Class A Addresses, Variable Length Subnet Masks (VLSMs).	4 th	2
5.	Configuration: Router Interfaces, implementing a Topology Using Packet Tracer, Some of Router Modes, Configurations Commands, Verification Commands.	5 th	2
6.	Switching: Configuring VLANs, Routing between VLANs, Verification Commands, Issue to Solve.	6 th	2
7.	Static Routing: Introduction , Pros and Cons, WAN Components, The Scenario, Configurations Commands, Verification Commands.	7 th	2
8.	Dynamic Routing: Introduction , Pros and Cons, The Configurations (RIP, EIGRP, OSPF), Verification commands .	8 th	2

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9.	Servers and Protocols: HTTP, DNS, DHCP, Email, TFTP, Servers Testing, Router as DHCP Server, Telnet, Useful Command.	9 th	2
10.	Network Management: SNMP Protocol.	10 th	2
11.	Network implementation: LAN network implementation using necessary H/W and S/W.	11 th & 12 th	4
12.	Project document submission & Presentations and Final Lab assessment.	13 th & 14 th	4
Number of Weeks /and Units Per Semester:		14	28

VI. Teaching strategies of the course:	
<ul style="list-style-type: none"> ▪ Active Lectures, ▪ Interactive class discussions, ▪ Practical Laboratory Experiments, ▪ Computer-based Laboratory Sessions, ▪ Homework & Assignments, ▪ Projects. 	

VII. Assignments & Reports:				
No	Assignments	Aligned CILOs(symbols)	Week Due	Mark
1.	Homework on Network Types & Topologies and Networking Models.	a1, a2, and d1	3 rd & 4 th	1
2.	Problems and questions on Multiplexing Report on Transmission Media Techniques.	a1, a2, and d1	5 th	1
3.	Switching	a1, a2, c1, and d1	6 th & 7 th	1

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4.	Error Detections & Corrections	a1, a2, c1, and d1	9 th & 10 th	1
5.	Simulation and questions on subnetting, routing & configuration with Lab Reports.	a1, a2, c1, and d1	11 th & 12 th	1.5
6.	Simulation and questions on servers & protocols and Network Managements with Lab Reports.	a1, a2, c1, and d1	13 th	1.5
7.	Reports on network implementation	a1, a2, b1, b2, c1, c2, and d1	14 th	3
8.	Topics Preparation & Participations	a1, a2, b1, b2, c1, c2, and d2	Weekly	5
Total				15

VIII. Schedule of Assessment Tasks for Students During the Semester:					
No.	Assessment Method	Week Due	Mark	Proportion of Final Assessment	Aligned Course Learning Outcomes
1.	Assignments & Reports	Weekly	15	10%	a1, a2, b1, b2, c1, c2, d1 and d2
2.	Quizzes	5 th , 10 th & 14 th	10	6.67%	a1, a2, b1, b2, d1
3.	Midterm Exam (Theory)	8 th	20	13.33%	a1, a2, b1, & b2
4.	Final Lab. Exam (including Course Project Evaluation)	13 th & 14 th	30	20%	a1, a2, b1, b2, c1, c2, d1, d2
5.	Final Exam (Theory)	16 th	75	50%	a1, a2, b1, & b2
Total			150	100%	

Prepared by Head of Department
 Asst. Prof. Dr. Adel
 Ahmed Al-Shakiri

Quality Assurance Unit
 Assoc. Prof. Dr.
 Mohammad Algorafi

Dean of the Faculty
 Prof. Dr. Mohammed
 AL-Bukhaiti

Academic Development
 Center & Quality Assurance
 Assoc. Prof. Dr. Huda Al-Emad

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IX. Learning Resources:	
<ul style="list-style-type: none"> Written in the following order: (Author - Year of publication – Title – Edition – Place of publication – Publisher). 	
1- Required Textbook(s) (maximum two).	
	1. Behrouz A. Forouzan, 2013, “Data Communications and networking”, 5th Edition, USA, McGraw Hill. 2. William Stallings, 2007 “Data Communications and networking”, 10th Edition, Pearson Prentice Hall.
2- Essential References.	
	1. Behrouz A. Forouzan, 2018, “Data and computer Communications”, 8th Edition, USA.
3- Electronic Materials and Web Sites etc.	
	1. www.mhhe.com/forouzan 2. If additional websites are required, they will be submitted to the students during the semester. The addresses of those websites will be indicated in the handouts.

X. Course Policies:	
1.	Class Attendance: -A student should attend not less than 75 % of total hours of the subject; otherwise he will not be able to take the exam and will be considered as exam failure. If the student is absent due to illness, he/she should bring an approved statement from university Clinic
2.	Tardy: - For late in attending the class, the student will be initially notified. If he repeated lateness in attending class he will be considered as absent.
3.	Exam Attendance/Punctuality: - A student should attend the exam on time. He is Permitted to attend an exam half one hour from exam beginning, after that he/she will not be permitted to take the exam and he/she will be considered as absent in exam.
4.	Assignments & Projects:

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	- The assignment is given to the students after each chapter; the student has to submit all the assignments for checking on time.
5.	Cheating: - For cheating in exam, a student will be considered as failure . In case the cheating is repeated three times during his/her study the student will be disengaged from the Faculty.
6.	Plagiarism: Plagiarism is the attending of a student the exam of a course instead of another student. If the examination committee proved a plagiarism of a student, he will be disengaged from the Faculty. The final disengagement of the student from the Faculty should be confirmed from the Student Council Affair of the university.
7.	Other policies: - Mobile phones are not allowed to use during a class lecture. It must be closed, otherwise the student will be asked to leave the lecture room - Mobile phones are not allowed in class during the examination. Lecture notes and assignments my given directly to students using soft or hard copy

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Prepared by

Head of Department
Asst. Prof. Dr. Adel
Ahmed Al-Shakiri

Quality Assurance Unit
Assoc. Prof. Dr.
Mohammad Algorafi

Dean of the Faculty
Prof. Dr. Mohammed
AL-Bukhaiti

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