



Detailed Course Description - Course Plan Development and Updating Procedures/ Computer Science Department	QF01/0408-3.0E
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Faculty	Faculty of Science and IT	Department	Computer Science
Course number	0122242	Course title	Network Protocols
Number of credit hours	3	Pre-requisite/co-requisite	Computer network 1

Brief course description.

The goal of this course is to familiarize students with the concepts of data communication, computer networks, and Internetworking. At the end of this course, students will be able to understand the principles of computer networking, including protocol features, protocol layering, and addressing, routing, and basic network security issues. Students will be able to enumerate the architectural structures of the ISO/OSI and TCP/IP and explain functions of each layer. In addition, student will be able to understand Networks applications, Network Protocols and architecture; Data link layer: framing, error detection and correction. In addition, it will explain CSMA/CD, LAN IEEE standards; Network layer: IP service model, IP V4 and IPV6 Addressing, subnetting, Host configuration DHCP, ARP Protocol, ICMP protocol; Transport layer: UDP protocol, TCP protocol, TCP reliable transfer and sliding window. TCP flow and congestion control; Application layer: DNS protocol, NAT protocol, HTTP protocol. In addition Network layer routing protocols, such as Routing Information Protocol (RIP), Open Shortest Path First (OSPF), Border Gateway Protocol (BGP) and routing Algorithms like, Link Stat, Distance Vector. In addition, the course will cover the essential wireless network protocols.

Course goals and learning outcomes	
Goal 1	examine and evaluate the structure and functionality of network protocols
Learning outcomes	1.1. able to understand data communication and networking concepts. 1.2. Able to understand computer networks' standards, protocols (OSI and Internet reference models).. 1.3. Be able to understand principles, concepts and protocols of computer network design and building.
Goal 2	Describe and get familiar with the structure and functionality of the Data Link Layer and MAC
Learning outcomes	2.1. To recognize internetworking concepts, architecture and protocols. 2.2 To compare between alternative computer networks design approaches 2.3. To analyze network protocols designs.
Goal 3	Examine the concept of the Network Layer, design local area networks (LAN), comprehend IP addressing scheme, examine and design subnetworks, Will be able to examine Routing Algorithms and analyze routing information exchange,



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Learning outcomes	3.1. Discuss various network architectures and protocols. 3.2 Elaborate on differences of protocols and architectures. 3.3. Quantify the values of protocol parameters and indicate their advantages and disadvantages
Goal 4	Comprehend the functionality of the Transport Layer and TCP/IP protocol stack.
Learning outcomes	4.1 Distinguish between the connection-oriented and Connectionless networking. TCP and UDP protocols 4.2 Understand IPv4 and IPv6 4.3 Learn Windows in TCP, Flow Control, Error Control
Textbook	1.- Data Communications and Networking FIFTH EDITION Behrouz A. Forouzan 2013
Supplementary references	1.- Computer Networking : Principles, Protocols and Practice second edition 2017 2.- Tanenbaum, Andrew S., 1944- Computer networks / Andrew S. Tanenbaum, David J. Wetherall. -- 5th ed ISBN-13: 978-0-13-212695-3 3.- Computer networking : a top-down approach / James F. Kurose, Keith W. Ross.—6th ed. Copyright © 2013 ISBN-13: 978-0-13-285620-1

Course timeline				
Week	Number of hours	Course topics	Pages (textbook)	Notes
01	1	CHAPTER 2 Network Models, protocol layering, Principles of Protocol Layering	32	
	1	TCP/IP PROTOCOL SUITE, Layered Architecture, Layers in the TCP/IP Protocol Suite, Description of Each Layer	35	
	1	Encapsulation and Decapsulation, Addressing, Multiplexing and Demultiplexing	41	
02	1	THE OSI MODEL	44	
	1	Media Access Control (MAC), random access,	325	
	1	Aloha CSMA, CSMA/CD	331	
03	1	Controlled Access, Reservation, Polling Token	341	
	1	Passing	344	



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	1	Channelization. FDMA, TDMA, CDMA	364	
04	1	Network-Layer Performance Delay; Throughput ; Packet Loss; Congestion Control	522	
	1	IPV4 Addresses, Classful Addressing, Subnetting and Supernetting, Address Mask	528	
	1	Dynamic Host Configuration Protocol (DHCP), DHCP Message Format	539	
05	1	Network Address Resolution (NAT), Address Translation, Using One IP Address, Using a Pool of IP Addresses	543	
	1	Forwarding Based on Destination Address	547	
	1	CHAPTER 19, Network-Layer Protocols, INTERNET PROTOCOL (IP), Datagram Format	562	
06	1	Options, Security of IPv4 Datagrams Fragmentation, Maximum Transfer Unit (MTU), Fields Related to Fragmentation	572	
	1	ICMPv4 ; MESSAGES; Debugging Tools; ICMP Checksum	574	
		First Exam		
07	1	CHAPTER 20 Unicast Routing, Introduction General Idea, Least-Cost Routing	596	
	1	ROUTING ALGORITHMS, Distance-Vector Routing	598	
	1	Link-State Routing, Path-Vector Routing	604	
08	1	UNICAST ROUTING PROTOCOLS , Internet Structure, Routing Information Protocol (RIP)	611	
	1	Open Shortest Path First (OSPF), Border	618	
	1	Gateway Protocol Version 4 (BGP4	623	
09	1	CHAPTER 22 Next Generation IP, IPv6 Addressing, Mixed Notation	666	
	1	Address Space,	667	
	1	Autoconfiguration, Renumbering	672	
10	1	THE IPv6 PROTOCOL, Packet Format	674	
	1	Extension Header	677	
	1		679	



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		THE ICMPv6 PROTOCOL, Error-Reporting Messages, Informational Messages		
11	1	Neighbor-Discovery Messages, Group	681	
	1	Membership Messages		
	1	TRANSITION FROM IPv4 TO IPv6, Strategies Use of IP Addresses Second Exam	682	
12	1	Transport-Layer Protocols, introduction,	735	
	1	Services, Port Numbers, user datagram protocol USER DATAGRAM PROTOCOL User	737	
	1	Datagram, UDP Services TRANSMISSION CONTROL PROTOCOL, TCP Services, TCP Features	743	
13	1	Segment, A TCP Connection, Three-Way	748	
	1	Handshaking,		
	1	State Transition Diagram Windows in TCP, Flow Control, Error Control	756 761	
14	1	WORLD WIDE WEB AND HTTP, World Wide Web,	872	
	1	Uniform Resource Locator (URL)		
	1	HyperText Transfer Protocol (HTTP), FTP, Two Connections, Control Connection Control Connection	876 878	
15	1	Electronic Mail, Architecture, Web-Based Mail	891	
	1	TELNET, SECURE SHELL (SSH)	904	
	1	DOMAIN NAME SYSTEM (DNS), Name Space, DNS in the Internet	910	
16	1 1 1	FINAL EXAM		

Theoretical course evaluation methods and weight	Participation = 10% First exam 20%	Practical (clinical) course evaluation methods	Semester students' work = 50%
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Al-Zaytoonah University of Jordan
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	Second exam 20%		(Reports, research, quizzes, etc.)
	Final exam 50%		Final exam = 50%

Approved by head of department		Date of approval	
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Extra information (to be updated every semester by corresponding faculty member)

Name of teacher		Office Number	
Phone number (extension)		Email	_____@zug.edu.jo
Office hours			

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