Level 4 Certificate in Networking (107) 129 Credits

Unit: TCP/IP Network Architecture	**Guided Learning Hours:** 220
Exam Paper No.: 4	**Duration:** 22
Prerequisites: Basic knowledge in the use of Microsoft Windows Applications.	**Corequisites:** A pass or higher in Diploma in Information Technology or equivalence
Aim: This unit provides the knowledge and skills required to set up, configure, use and support TCP/IP on any network. It provides tutorial guidelines on networking media, physical and logical topologies, common networking standards and popular networking protocols. The unit emphasis is on TCP/IP protocol suite and related IP addressing schemes, including CIDR; selected topics in network implementation, support and LAN/WAN connectivity. The unit has been designed to supply information that will enable learners to confidently address such issues as: the intricacies of TCP/IP addressing and configuration; how to troubleshoot and decode TCP/IP; how to use subnet masks in an internetworked environment for management and security and outlining how specific protocols work; IP, ARP, FTP and TFTP.	
Required Materials: Recommended Learning Resources.	**Supplementary Materials:** Lecture notes and tutor extra reading recommendations.
Special Requirements: The unit requires a combination of lectures, demonstrations, discussions, and hands-on labs.	

Intended Learning Outcomes:	Assessment Criteria:
1. Broad overview of the Internet history, terms, and concepts; the TCP/IP protocol architecture; how the Internet allows computers to communicate with each other.	1.1 Define protocol 1.2 Analyse interconnecting problems 1.3 Explain TCP/IP history 1.4 Describe advantages and disadvantages of TCP/IP 1.5 Analyse Windows tools for supporting TCP/IP 1.6 Compare and contrast TCP/IP and OSI models 1.7 Analyse TCP/IP's many protocols 1.8 Identify IP packet structure 1.9 Describe Transmission Control Protocol (TCP) operation
2. Overview of IP addressing concepts and issues; the key components of the IP addressing; how to apply these principles, subnetting concepts; the default subnets for each network Class.	2.1 Identify components of an IP address 2.2 Explain IP address classes 2.3 Distinguish public vs private address 2.4 Describe IP Address, IP Subnet Mask and Default Gateway 2.5 Create and configure IP address on a PC 2.6 Outline the reasons for subnetting 2.7 Describe default and custom subnet mask features 2.8 Explain functions of subnet mask 2.9 Demonstrate how to subnet 2.10 Define supernetting
3. Understand how to assign IP address and determining the cause of TCP/IP networking problems.	3.1 Demonstrate how to install TCP/IP 3.2 Describe TCP/IP configuration process 3.3 Demonstrate how to use TCP/IP verification and testing tools 3.4 Create and configure IP addresses for

			DNS
		3.5	Compare and contrast OSI vs TCP/IP
4. How routers learn of routes; manage network traffic; find the best route for sending data and update the routing table.		4.1	Describe the functions of routers
		4.2	Examine and describe the routing table information
		4.3	Distinguish static vs dynamic routing
		4.4	Describe address resolution tools
		4.5	Analyse routing verification and implement testing utilities
5. Basic installation and configuration of DHCP; dealing with the failover functionality and managing the DHCP service on a network.		5.1	Describe DHCP client addressing process
		5.2	Demonstrate how install and configure DHCP client and server properties
		5.3	Explain DHCP options and implementation issues
		5.4	Describe DHCP services
		5.5	Explain client process of obtaining IP address
6. Understand the different methods of host name to IP address resolutions used by Microsoft Windows clients.		6.1	Describe NetBIOS name resolution
		6.2	Describe LMHOSTS configuration procedures
		6.3	Analyse WINS client and server configuration
		6.4	Describe WINS implementation
		6.5	Explain DNS name resolution concepts
		6.6	Describe Primary and Secondary DNS servers
		6.7	Describe DNS zones
		6.8	Describe DNS diagnostic utilities
7. TCP/IP provides end-to-end connectivity, diagnostic and server-based software utilities.		7.1	Describe the Remote Execution utilities
		7.2	Describe file and data transfer utilities
		7.3	Analyse the procedures for setting up printers
		7.4	Demonstrate connectivity utilities used to interact with and use resources on a variety of Microsoft and non-Microsoft hosts, such as UNIX systems.
		7.5	Demonstrate diagnostic utilities used to detect and resolve networking problems.
		7.6	Describe how TCP/IP server software provides printing and publishing services to TCP/IP-based clients.
8. Devices that support SNMP; routers, switches, servers, workstations and printers and implementation issues.		8.1	Describe SNMP functions
		8.2	Identify reasons for implementing SNMP
		8.3	Demonstrate how to install and configure SNMP
		8.4	Describe SNMP testing utilities
9. Troubleshooting TCP/IP LAN, Internet connection technical issues or routing problems.		9.1.	Describe the troubleshooting process and tools available
		9.2	Identify common network errors and solutions available
		9.3	Demonstrate how to use the network monitor troubleshooting and monitoring tool

Methods of Evaluation: A 2-hour written examination paper with Section A and Section B. Section A has 40 multiple choice questions. Section B has three essay questions, each carrying 20 marks. Candidates are required to answer all questions. Candidates also undertake project/coursework in TCP/IP Network Architecture with a weighting of 100%.

Recommended Learning Resources: TCP/IP Network Architecture

Text Books	• TCP/IP Illustrated: Protocols v. 1 (APC) by W. Richard Stevens. ISBN-10: 0201633469 • TCP/IP Network Administration by Craig Hunt. ISBN-10: 0596002971 • Complete TCP/IP by Martin Bligh, Dennis Short and Thomas Lee. ISBN-10: 0672310554
Study Manuals	BCE produced study packs
CD ROM	Power-point slides
Software	Server Operating System