



Level 5 Diploma in Routing (111) 141 Credits



Unit: Internetwork Infrastructure	Guided Learning Hours: 240
Exam Paper No.: 2	Number of Credits: 24
Prerequisites: Knowledge in Windows operating system.	Corequisites: A pass or higher in Certificate in Networking or equivalence.
<p>Aim: The purpose of this unit is to give insight of how does the Internet works. The Internet's growth has become explosive and it seems impossible to escape the impact of the web. Because the Internet has become such a large part of our lives, a good understanding is needed to use this new tool most effectively. This unit explains the underlying infrastructure and technologies that make the Internet work. The unit covers: internet addresses; protocol stacks and packets; networking/internet; internet infrastructure; the internet routing hierarchy; domain names and address resolution; internet protocols; application protocols: HTTP and the World Wide Web, SMTP and Electronic Mail; Transmission Control Protocol (TCP). The unit will enable learners understand internetworking requirements, identify solutions, and design the network infrastructure and services to ensure the basic functionality of the proposed solutions. The unit provide learners with the knowledge and skills required to achieve competency in network infrastructure design. The elements for this competency are: plan and design internet infrastructure to meet business requirements; install and configure internet infrastructure to meet business requirements; install and configure internet services to meet business requirements; test security and internet access; ensure that user accounts are verified for security access and monitored; manage and support the internet.</p>	
Required Materials: Recommended Learning Resources.	Supplementary Materials: Lecture notes and tutor extra reading recommendations.
Special Requirements: The unit requires a combination of lectures, demonstrations and class discussions.	
<p>Intended Learning Outcomes:</p> <p>1. Internetworking devices and the devices used in connecting individual networks to each other.</p> <p>2. How LAN technologies are designed for sharing resources and the classification category according to topology.</p>	<p>Assessment Criteria:</p> <p>1.1 Explain how different network technologies work together</p> <p>1.2 Describe internetworking challenges</p> <p>1.3 Analyse how OSI layers communicate</p> <p>1.4 Examine the different data formats</p> <p>1.5 Compare and contrast connection orientated vs connectionless network services</p> <p>1.6 Analyse information flow control and error-checking schemes</p> <p>1.7 Outline internetworking standards organisations</p> <p>1.8 Describe LAN protocols and LAN transmission methods</p> <p>1.9 Analyse WAN protocols and technologies</p> <p>1.10 Describe bridging and switching terminology</p> <p>1.11 Outline routing protocol components</p> <p>1.12 Analyse network management architecture</p> <p>1.13 Outline open system interconnection protocols</p> <p>2.1 Define Ethernet technology</p> <p>2.2 Discuss fiber and twisted-pair cable data rates</p> <p>2.3 Describe IEEE 802.3 layers</p>

	<p>2.4 Describe the CSMA/CD protocol</p> <p>2.5 Explain VLAN tagging</p> <p>2.6 Describe token ring technology</p>
<p>3. The various protocols, technologies used in wide- area network (WAN) environments; the relationship between the common WAN technologies and the OSI model.</p>	<p>3.1 Outline Frame-Relay WAN protocol</p> <p>3.2 Describe High-Speed Serial Interface (HSSI) characteristics</p> <p>3.3 Outline Integrated Services Digital Network (ISDN) underlying services and technologies</p> <p>3.4 Outline Point-to-Point Protocol (PPP) components</p> <p>3.5 Describe the Switched Multi-megabit Data Service (SMDS) technology</p> <p>3.6 Describe the Synchronous Data Link Control (SDLC) protocol</p> <p>3.7 Define X.25 protocol</p> <p>3.8 Describe Digital Subscriber Line (DSL) technology</p>
<p>4. How network protocol controls data travels over an IP-based network in the form of packets and the addressing schemes used.</p>	<p>4.1 Describe the history of internet protocols</p> <p>4.2 Discuss IP addressing</p> <p>4.3 Describe Address Resolution Protocol (ARP)</p> <p>4.4 Describe IP Application-layer protocols</p> <p>4.5 Describe IP multicast addresses</p>
<p>5. Bridges and switches data communications devices that operate principally at Layer 2 of the OSI reference model.</p>	<p>5.1 Describe transparent bridge operations</p> <p>5.2 Explain source-route bridging algorithm</p> <p>5.3 Outline Asynchronous Transfer Mode (ATM) devices and technology</p> <p>5.4 Describe LAN switching technology</p> <p>5.5 Describe Multiprotocol Label Switching (MPLS) operations</p> <p>5.6 Outline IBM's Data Link switching</p> <p>5.7 Analyse tag switching architecture</p>
<p>6. Understand how routing technologies managing the flow of data between network segments, which are also known as subnets.</p>	<p>6.1 Explain Fiber Distributed Data Interface (FDDI) specifications and operations</p> <p>6.2 Outline Open System Interconnection Routing Protocols</p> <p>6.3 Describe Open Shortest Path First (OSPF) protocol components</p> <p>6.4 Describe Routing Information Protocol (RIP) features and capabilities</p> <p>6.5 Outline Border Gateway Protocol (BGP) operations</p> <p>6.6 Analyse Cisco's proprietary Interior Gateway Routing Protocol (IGRP) and Enhanced Interior Gateway Routing Protocol (EIGRP) design features and characteristics</p>
<p>7. The many technologies; tools available for various functions of network management ensures reliable, high-quality application performance and delivery.</p>	<p>7.1 Describe Virtual Private Networks (VPN) technology</p> <p>7.2 Outline remote monitoring specifications</p> <p>7.3 Describe Simple Network Management Protocol (SNMP) operations</p> <p>7.4 Describe the importance of voice and data integration for the enterprise</p>

	<p>networks and ISPs</p> <p>7.5 Describe voice/data inter-operability standards</p> <p>7.6 Describe Voice over IP (VOIP) technology</p> <p>7.7 Define Media Gateway Control Protocol (MGCP)</p> <p>7.8 Explain the technologies used in dialup networks the benefits (and drawbacks) of different dialup technologies</p> <p>7.9 Describe dialup connectivity technology</p> <p>7.10 Analyse network digital methods</p> <p>7.11 Describe advantages and disadvantages of different technologies</p>
<p>8. Examples of wireless technology; the differences between wireless technology and wired technology.</p>	<p>8.1 Outline the different types of wireless technologies</p> <p>8.2 Describe the advantages and disadvantages of wireless</p> <p>8.3 Analyse IP wireless open standards</p> <p>8.4 Compare and contrast WLAN standards</p> <p>8.5 Explain the key technologies used in Community Antenna Television (CATV) systems</p> <p>8.6 Describe CATV network</p> <p>8.7 Evaluate downstream and upstream cable specifications</p> <p>8.7 Describe DOCSIS specifications</p>
<p>9. Security technologies providing penetration testing software solutions that expose vulnerabilities, measure operational risk; assure security; including the hardware, software, networking, wireless computing, security and cutting-edge technologies.</p>	<p>9.1 Describe internet security issues</p> <p>9.2 Outline attack methods used to compromise network integrity</p> <p>9.3 Define trusted, untrusted and unknown networks</p> <p>9.4 Outline considerations in establishing security perimeter</p> <p>9.5 Explain Quality of Service (QoS) technologies that support levels of predictable performance for network systems and the elements of Quality of Service.</p> <p>9.6 Describe QoS</p> <p>9.7 Analyse congestion management tools</p> <p>9.8 Describe Resource Reservation Protocol (RSVP)</p> <p>9.9 Describe how QoS prioritisation of network traffic works</p> <p>9.10 Demonstrate how QoS provide guarantees to deliver predictable results.</p> <p>9.11 Describe latest internet applications designed to use QoS</p>
<p>10. Network caching technologies used in the enterprises to provide the optimised performance, more bandwidth, secure access and fast operations.</p>	<p>10.1 Define network caching</p> <p>10.1 Analyse how web caching works</p> <p>10.3 Explain HTTP caching standards</p> <p>10.4 Describe the various areas of the computer and networking that uses caching</p> <p>10.5 Describe Web Content Caching and Browser-Based Client Caching</p>

Methods of Evaluation: A 2½-hour written examination paper with five essay questions, each carrying 20 marks. Candidates are required to answer all questions. Candidates also undertake project/coursework in Internetwork Infrastructure with a weighting of 100%.

Recommended Learning Resources: Internetwork Infrastructure

Text Books	<ul style="list-style-type: none">• Networking Complete by Dave Evans ISBN-10: 0782141439• Networking Explained by Michael Gallo and William M. Hancock ISBN-10: 1555582524• The Illustrated Network: How TCP/IP Works in a Modern Network by Walter Goralski. ISBN-10: 0123745411
Study Manuals 	BCE produced study packs
CD ROM 	Power-point slides
Software 	None

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