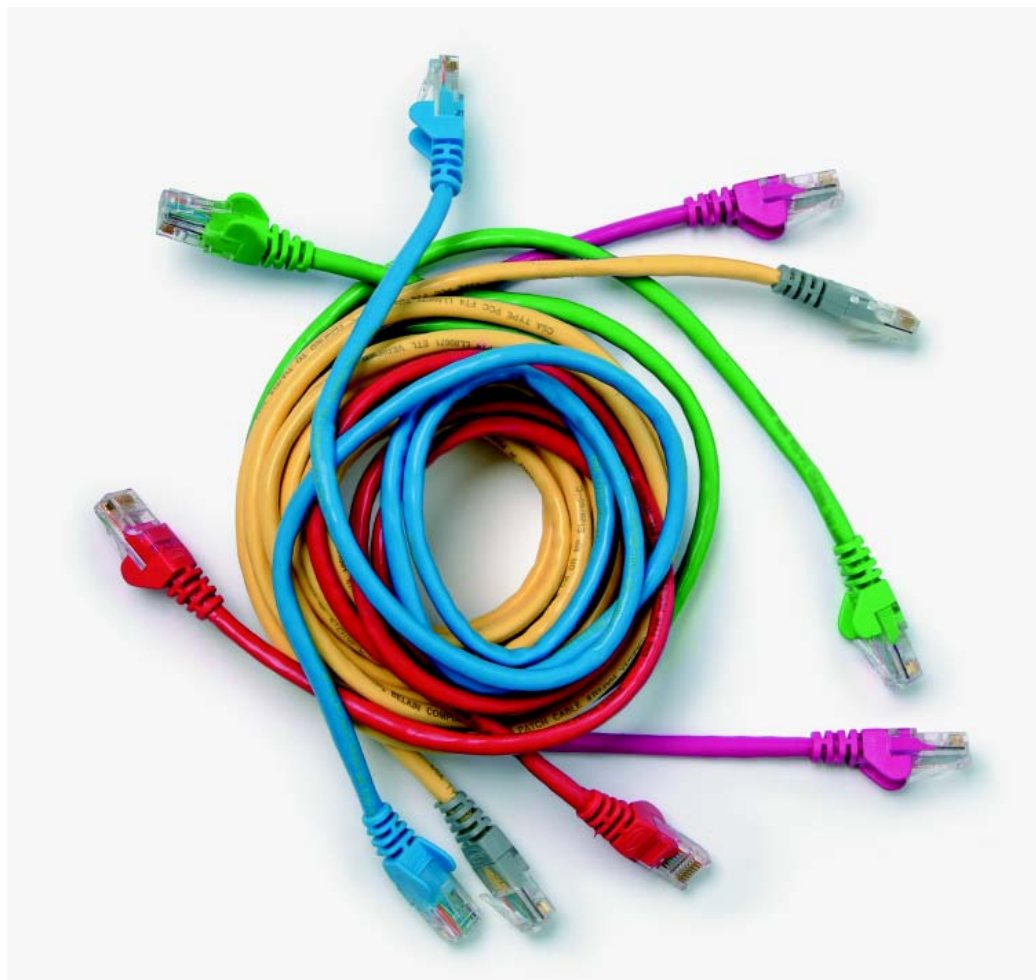


Systems and Principles Unit Syllabus

Level 2 Networking Principles 7540-002



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Unit 002 Networking Principles

Syllabus Overview

Rationale

Networks are a major component of ICT communication. This unit provides learners with both the practical and theoretical knowledge of basic networks. They will learn about the different components used to create a network including hardware, software and topologies. Learners will develop practical skills required to install, configure and test a small computer network.

Once learners have grasped the theoretical and practical knowledge contained in this unit, they can improve their learning of networking by developing further skills in this area, either by self-study or adopting specialised networking routes.

Learning outcomes

There are **four** outcomes to this unit. The candidate will be able to:

- Identify network concepts and terminology
- Identify components that make up a network
- Install, configure and test a network
- Use and control a local area network

Guided learning hours

It is recommended that 60 hours should be allocated for this unit. This may be on a full time or part time basis.

Assessment and grading

Assessment will be by means of a **set assignment** covering both practical activities and underpinning knowledge.

Unit 002

Networking Principles

Outcome 1

Identify network concepts and terminology

Practical activities

The candidate will be able to:

- 1 use data communications services
- 2 use the main hardware components of a network
- 3 use the main functions of a Network Operating System
- 4 use different methods of electronic communication
- 5 use different network configurations
 - a peer-to-peer
 - b server based
- 6 use basic information from the models and standards for electronic communications to select network features eg
 - a OSI
 - b IEEE 802.XXX
- 7 select different network topologies eg
 - a bus
 - b ring
 - c star
 - d mesh
- 8 select protocols used for electronic communications eg
 - a TCP/IP
 - b NetBEUI.

Underpinning knowledge

The candidate will be able to:

- 1 define what a network is and what its main goals are
- 2 describe network topologies eg
 - a bus
 - b star
 - c ring
 - d mesh
- 3 describe the main features (speed, access method, topology and media) of the following network technologies
 - a Ethernet
 - b token ring and token bus
 - c wireless
 - d FDDI/CDDI
- 4 describe the services provided by electronic communications
 - a electronic mail
 - b file transfer
 - c interacting with databases
 - d sharing information on the system
 - e sharing hardware resources
 - f sharing application software
 - g access to and use of the Internet
 - h web browsing
 - j other electronic communication
- 5 describe the main functions of a Network Operating System including
 - a administration
 - b share level security
 - c user level security
 - d hardware support
 - e storage support
- 6 explain modes of electronic communication
 - a simplex, duplex and half duplex
 - b serial and parallel
 - c synchronous and asynchronous

Underpinning knowledge continued

- 7 describe the differences between peer-to-peer and server based networks including
 - a servers
 - b clients
 - c peers
 - d shared resources
 - e operating systems
 - f administration
 - g security
 - h central support systems
- 8 describe binary and hexadecimal number systems
- 9 state the purpose of communication protocols
 - a IPX/SPX
 - b NetBEUI
 - c Appletalk
 - d TCP/IP
 - e FTP
 - f SMTP
 - g HTTP/HTTPS
 - h POP
- 10 explain the function of the TCP/IP protocol
- 11 describe the function and construction of data packets in a network
- 12 describe the function of each of the OSI layers (Open Systems Interconnection)
- 13 state the difference between a local area network (LAN) and a wide area network (WAN)
- 14 identify a MAC address and its parts
- 15 identify an IP address and its parts
- 16 state the purpose of sub-netting
- 17 identify the basic characteristics of the following Internet access technologies
 - a DSL
 - b broadband (ADSL)
 - c PSTN (dial-up)
 - d satellite
 - e wireless
- 18 explain what is meant by a collision and how LANs deal with them
- 19 explain line encoding used in CSMA/CD and CSMA/CA LANs and identify the limitations of CSMA/CA.

Unit 002

Networking Principles

Outcome 2

Identify components that make up a network

Practical activities

The candidate will be able to:

- 1 select suitable cable or wireless methods for connecting network components
- 2 select suitable cable connectors
- 3 select a suitable network interface card
- 4 select a suitable hub
- 5 select network security software
- 6 adjust factors that affect the range and speed of wireless services eg
 - a interference
 - b antenna type and position
 - c environment
 - d configuration.

Underpinning knowledge

The candidate will be able to:

- 1 describe the characteristics of the following components that are used in a network
 - a cables
 - i UTP
 - ii STP
 - iii coaxial
 - iv fibre optic
 - b media connectors
 - i RJ-11
 - ii RJ-45
 - iii fibre optic
 - iv local connector
 - v serial
 - vi USB
 - vii BNC
 - c communication
 - i wired
 - ii wireless 802.11x
 - iii infrared
 - iv Bluetooth
 - v radio waves

- d hub (passive, active, intelligent)
 - e switch
 - f bridge
 - g repeater
 - h router
 - j gateway
 - k NIC
 - i wireless
 - ii fibre optic
 - iii Ethernet
 - l modem
 - m firewall
 - n WAP
 - p back-up devices/media
 - q network printer
 - r network operating systems
 - s other specific computer components, peripherals, and services related to networking
- 2 state the methods of connection to the Internet
- a dial-up
 - b permanent connection
- 3 explain security related issues with using a network
- 4 describe fault tolerance and recovery procedures in a network
- 5 explain the 5-4-3 rule of network design.

Unit 002

Networking Principles

Outcome 3

Install, configure and test a network

Practical activities

The candidate will be able to:

- 1 select specific hardware components for a peer-to-peer network
 - a network interface cards
 - b hubs/switches
 - c cables and connectors
- 2 use tools and antistatic equipment to ensure safe working conditions
- 3 install and configure necessary hardware for a network eg a NIC
- 4 produce suitable cables for networking
 - a straight through
 - b crossover
- 5 connect and operate computers and a printer in a peer-to-peer network
- 6 install and configure the network software components
 - a drivers
 - b protocols
- 7 set up the system to access the Internet
- 8 configure the system/network according to any specific user requirements
- 9 install and configure other software required on the network
 - a virus protection software
 - b firewall software
 - c web browser
 - d email software
 - e messaging software
 - f other required software
- 10 set up clients and directory/folder facilities to access resources on a computer
- 11 configure the host computer to allow access to specified shared resources by the guest computer using a password
- 12 perform a post installation check to test the functionality of the network
- 13 test the network system for
 - a access to the Internet
 - b downloading files
 - c send and receive email
 - d speed of access to the World Wide Web
 - e operation of firewall and anti-virus

Practical activities continued

- 14 resolve routine problems encountered on the network
- 15 given a scenario, select and use appropriate network trouble-shooting utilities eg
 - a tracert
 - b ping
 - c netstat
 - d network analysers
 - e other utilities.

Underpinning knowledge

The candidate will be able to:

- 1 identify basic requirements for client workstations to connect to and use network resources (media, protocols, services, DNS)
- 2 identify the tools typically required for creating a network cable
- 3 identify the purpose, benefit and characteristics of a network firewall (hardware and software)
- 4 state the purpose, benefit and characteristics of using anti-virus software
- 5 state the importance of performing pre-installation checks on hardware components
- 6 explain the reasons for considering the user's requirements/needs when setting up a system/network
- 7 describe the common problems associated with network installation and operation eg
 - a computers not switched on
 - b breaks in cables
 - c network software/drivers incorrectly installed
 - d incorrect drivers installed
 - e cable plugged into incorrect socket
 - f connector not firmly plugged in
 - g protocols incorrectly set up
- 8 describe the role of drivers
 - a network interface card
 - b drive controller
 - c printer
 - d other
- 9 explain the function of an ISP when accessing the World Wide Web
- 10 describe the components of a website URL (Uniform Resource Locator) and how it relates to an IP address.

Unit 002

Networking Principles

Outcome 4

Use and control a local area network

Practical activities

The candidate will be able to:

- 1 use the main facilities of a computer network
- 2 perform data/file processes eg
 - a retrieve
 - b create
 - c amend
 - d delete
 - e save
- 3 use shared peripheral devices
- 4 perform file management activities
- 5 adjust file properties eg
 - a read-only
 - b hidden
- 6 use network applications
- 7 maintain user accounts
 - a create a new user account
 - b delete a user account
 - c modify access rights for user accounts.

Underpinning knowledge

The candidate will be able to:

- 1 describe the file management facilities on a network eg
 - a group access
 - b back-up
 - c copy, rename, delete, move
 - d search tools
 - e file listing
 - f directory/folder structure
 - g access rights to directory/folder structure
- 2 explain the security measures used on a network eg
 - a user identification
 - b password
 - c copyright requirements
 - d back-up

- 3 describe the access rights available on a network eg
 - a read
 - b write
 - c execute
- 4 describe the process of setting up a new user on a network eg
 - a creating a user account
 - b setting passwords
 - c setting access rights.

Unit record sheet

Use this form to track your progress through this unit.

Tick the boxes when you have covered each outcome. When they are all ticked, you are ready to be assessed.

Outcome	✓	Date
1 Identify network concepts and terminology	<input type="checkbox"/>	
2 Identify components that make up a network	<input type="checkbox"/>	
3 Install, configure and test a network	<input type="checkbox"/>	
4 Use and control a local area network	<input type="checkbox"/>	

Candidate Signature **Date**

**City & Guilds
Registration Number**

**Quality nominee
(if sampled)** **Date**

Assessor Signature **Date**

**External Verifier
Signature (if sampled)** **Date**

Centre Name **Centre Number**

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