



Accredited

OCR LEVEL 3 CAMBRIDGE TECHNICAL CERTIFICATE/DIPLOMA IN IT

COMPUTER NETWORKS

R/601/7320

LEVEL 3 UNIT 7

GUIDED LEARNING HOURS: 60

UNIT CREDIT VALUE: 10



COMPUTER NETWORKS

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AIM OF THE UNIT

This unit aims to give the learners an understanding of the key components, the network protocols and the services provided by network systems.

Learners will develop skills required to ensure network security, gain an understanding to the functions of hardware and software components, the purpose, connections and connection devices and why network security is important. Networks are used not only in large organisations but in small businesses and homes. Learners will understand the types of network and the principles across LAN and WANs. They will understand the options for wired and wireless networks and the and appreciate the benefits and risks to businesses of a network.

ASSESSMENT AND GRADING CRITERIA

Learning Outcome (LO) The learner will:	Pass The assessment criteria are the pass requirements for this unit. The learner can:	Merit To achieve a merit the evidence must show that, in addition to the pass criteria, the learner is able to:	Distinction To achieve a distinction the evidence must show that, in addition to the pass and merit criteria, the learner is able to:
1 Know types of network systems and protocols	P1 describe the types of networks available and how they relate to particular network standards and protocols		
	P2 describe why different network standards and protocols are necessary	M1 compare and contrast different network standards and protocols	
2 Understand the key components used in networking	P3 explain the key components required for client workstations to connect to a network and access network resources	M2 compare the different options for the key components for an identified user's needs	D1 develop proposals for networked solutions to meet an identified user's need
	P4 explain the function of interconnection devices		
3 Know the services provided by network systems	P5 describe typical services provided by networks	M3 describe where different network services would be used	
4 Be able to make networked systems secure	P6 make a networked system secure		D2 evaluate the procedures organisations should take to secure their networks

TEACHING CONTENT

The unit content describes what has to be taught to ensure that learners are able to access the highest grade.

Anything which follows an i.e. details what must be taught as part of that area of content.

Anything which follows an e.g. is illustrative, it should be noted that where e.g. is used, learners must know and be able to apply relevant examples to their work though these do not need to be the same ones specified in the unit content.

LO1 Know types of network systems and protocols

- **network systems**
 - local area network (LAN)
 - wide area network (WAN)
 - personal Area Network (PAN)
 - WAN technologies
 - frame relay
 - MPLS
 - ATM.
 - logical and physical topologies (eg star, bus, ring)
 - network access methods
 - CSMA
 - Token passing
 - network models
 - OSI 7 layer
 - TCP/IP
 - wireless technologies and factors affecting
 - 802.11
 - Bluetooth
 - 3G
 - 4G
- **protocols**
 - protocols and standard types
 - TCP/IP
 - AppleTalk
 - UDP
 - 802 standards
 - FDDI
 - application layer protocols
 - DNS
 - DHCP
 - HTTP
 - FTP
 - SMTP.

LO2 Understand the key components used in networking

- **key components**
 - workstations

- servers (eg print, mail, file, web, proxy)
- other.
- **interconnection devices**
 - equipment (eg router, switch, wireless access points)
 - purposes.
- **connections and cabling**
 - leased/dedicated line
 - media types (eg Category 5e and 6, UTP, Fibre optic)
 - wireless
 - mobile technology
 - standards.
- **software**
 - network operating systems
 - Mac OSX
 - Linux
 - Windows
 - virus checker
 - firewalls
 - application software
 - security.

LO3 Know the services provided by network systems

- **directory**
 - account management
 - authentication management
 - active directory
 - DNS
- **communication**
 - mail
 - internet relay chat (IRC)
 - discussion boards
 - Remote access (eg via mobiles)
 - file transfer
- file sharing
- application software eg database, web, proxy
- shared resources eg printers, scanners
- storage space
- Voice over IP (VoIP)
- mobile working
- authentication.

LO4 Be able to make networked systems secure

- **security**
 - passwords
 - authorisation permissions and access controls
 - backing up and restoring
 - encryptions
 - biometrics
 - physical security eg CCTV, locks, firewalls
 - levels of risk
 - security issues eg malware, viruses, worms, spyware, adware
 - antivirus software
 - intrusion detection systems.

DELIVERY GUIDANCE

This unit could be delivered as theoretical unit but the learners will benefit from as much varied teaching approaches as possible and can be delivered holistically. Giving the learners the opportunity to work on practical activities using the hardware and software components, and having external professionals such as guest speakers with discussions will all enhance their learning experience.

Know types of network systems and protocols

The centre will benefit from having a separate network that the learners can use to gain hand-on practical experience. This will provide the learners with as many of the different networking components that are available to the centre and practice in implementing security features. If this is not available learners could research in groups the different types of networks and produce posters or leaflets which demonstrate the different networks and security features. This exercise is also beneficial where learners have gained practical experience to reinforce what they have learned.

The learners will need to look at what network protocols and standards are available, this would probably work best with the tutor delivering to the whole group and then giving directed research looking at the application protocols. Learners should be taught and then research the different network systems and protocols to include wireless technologies.

Understand the key components used in networking

The tutor could demonstrate handling and using the key components, interconnection devices, connectors and cabling, and follow this with providing the learners practical exercises with these components. This may be as a workshop with learners working in small groups or in rotation with some practically working with the components and others looking at how the interconnection devices function, what layer each device works on and how they send and receive data, how the connectors are made and the purpose of the interconnection devices.

The learner should then review all their experiences and findings with the group to identify issues that have been experienced by some and not others.

Know the services provided by network systems

Learners will need to look at the services that are provided by network systems such as directory services, telecommunication services, files services and application services as set out in the teaching content for learning outcome 3. This can be delivered as a mixture of tutor lead discussions, exploration by the learners and practical exercises to consolidate understanding and the different uses for the services.

Be able to make networked systems secure

Learners will need to explore the technologies that are used to create and maintain secure systems. This can be carried out with small groups researching an identified topic and presenting to the group to share their knowledge. With this knowledge learners will then need to work on practical exercises in which they apply the security procedures and devices to secure a given network. This should be a hands-on exercise and can be carried out in groups with all learners working individually and as a team.

SUGGESTED ASSESSMENT SCENARIOS AND TASK PLUS GUIDANCE ON ASSESSING THE SUGGESTED TASKS

Assessment Criteria P1, P2, M1

The scenario could be that the learner has been employed to explain possible solutions for a given network.

P1 The learner will need to describe the different types of networks and how the protocols and standards relate to the network. This could be evidenced as a report and diagrams to explain networks and standards may assist with the evidencing.

P2 This could be incorporated into P1, where the learner describes why different network standards and protocols are necessary. This could be presented as a report.

For merit criterion M1. The learners will need to look compare and contrast the different network standards and protocols and for a range of different standards including wireless. This may be presented as an expansion of the work produced for P1 and P2.

Assessment Criteria P3, P4, M2, D1

The learners could have been asked by a client to design and explain the key components in an identified network.

P3 the learners will need to explain the key components that are needed for a connection to a networking system, enabling access to network resources.

P4 learners will need to explain the functions of interconnection devices used within the network.

Learner's evidence for P3 and P4 could be information leaflets, reports or a presentation.

For merit criterion M2 learners will need to be given a specific scenario which gives them the opportunity to use appropriate components. This may already have been used for the identified network in P3 and P4. They must show they have compared different options of components against identified needs. The evidence could be presented as a report, leaflet, or presentation which may include detailed diagrams.

For distinction criterion D1 learners will need to develop a number of proposals resulting in one preferred option. They must detail the reasons why the chosen designed network from M2 meets the users need either as a separate report or an extension to M2.

Assessment Criteria P5, M3

P5 This could be presented as presentation or report. The learner needs to describe typical services provided by networks as identified in the teaching content for learning outcome 3.

For merit criterion M3 learners will need to describe in detail where the different network services would be used within a proposed or identified network explaining their reasons. They will need to look at the directory, telecommunication, file and application services as detailed in the teaching content for learning outcome 3. This could be presented as a presentation, report or similar.

Assessment Criteria P6, D2

P6 The learner should be observed implementing security procedures, they should document these procedures and a witness statements and visual evidence such as photographs or video should support this. The learner will benefit from setting up the system to provide the practical evidence.

For distinction criterion D2 learners will need to look in detail at a range of procedures that organisations could take to secure their networks. They should evaluate these procedures across a range of criteria including usefulness, ease of use, ease of setting up, costs and presented in a clear and understandable format. This could be in the form of a report.

MAPPING WITHIN THE QUALIFICATION TO THE OTHER UNITS

Unit 3 Computer systems

Unit 4 Managing networks

LINKS TO NOS

4.7 System Design

4.8 IT/Technology infrastructure design and planning

5.1 Systems Development

6.2 IT Technology Security Management



CONTACT US

Staff at the OCR Customer Contact Centre are available to take your call between 8am and 5.30pm, Monday to Friday.

We're always delighted to answer questions and give advice.

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