UNIT HANDBOOK

City & Guilds Level 2/3 Award/ Certificate/Diplomas in ICT Systems and Principles (7540-12/13)

Level 1 and 2 Unit Handbook

March 2022 Version 2.0

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Qualification at a glance

Subject area	**ICT Systems and Principles**
City & Guilds number	7540-12/13
Age group approved	All
Grading	Pass/Fail
Assessment	By means of either set assignment or portfolio. Some units have a paired multiple-choice test (please see individual units for details)
Support materials	Assignments 7540 Qualification Handbook
Registration and certification	Consult the Walled Garden/Online Catalogue for last dates

Title and level	City & Guilds number	Ofqual number
City & Guilds Level 2 Award in ICT Systems and Principles	7540-12	500/3475/3
City & Guilds Level 2 Certificate in ICT Systems Support	7540-12	501/1623/X
City & Guilds Level 2 Diploma in ICT Systems Support	7540-12	501/1430/X
City & Guilds Level 2 Diploma in ICT Systems and Principles for IT Professionals	7540-12	501/1859/6
City & Guilds Level 3 Certificate in ICT Systems and Principles	7540-13	500/3476/5
City & Guilds Level 3 Diploma in ICT Systems Support	7540-13	501/1585/6
City & Guilds Level 3 Diploma for ICT Systems and Principles for IT Professionals	7540-13	501/0277/1

Version and date	Change detail	Section
1.1 November 2013	Added “be able to” to learning outcomes in unit 229	**Units**
1.2 January 2014	Unit 111 added.	Units
1.3 March 2015	Unit 235 added.	Units
1.4 July 2016	Unit 111 Added to unit overview	Units
2.0 March 2022	Units added and deleted as part of a structural amendment of this qualification.	Units

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Contents

Units

Structure of units

These units each have the following:

- City & Guilds reference number
- Unit Accreditation Number (UAN)
- Title
- Level
- Credit value
- Unit aim
- Relationship to NOS, other qualifications and frameworks
- Endorsement by a sector or other appropriate body
- Information on assessment
- Learning outcomes which are comprised of a number of assessment criteria

Assignments are available for some units; these units are indicated in the table below:

Unit Number	UAN	Title	Assessment Available
001	T/601/8296	Customer Support Provision	Assignment
002	T/601/3289	Networking Principles	Assignment
003	D/601/3206	Data representation and manipulation for IT	Assignment
010	J/601/3295	Telecommunications principles	Assignment
011	L/601/3508	Principles of ICT system and data security	Assignment
012	J/601/3510	Software testing	Assignment
013	M/601/3503	Systems architecture	Assignment
014	R/601/3512	Web fundamentals	Portfolio
060	J/502/4609	Drawing and planning software	Portfolio
061	M/502/4572	Design software	Portfolio
062	J/502/4299	Using email	Assignment
063	J/502/4612	Imaging software	Portfolio
064	T/502/4296	Using the Internet	Portfolio

065	Y/502/4565	Desktop publishing software	Portfolio
066	K/502/4621	Presentation software	Portfolio
067	A/502/4624	Spreadsheet software	Assignment
068	L/502/4627	Word processing software	Portfolio
069	L/502/4630	Website software	Portfolio
070	H/502/4553	Database software	Portfolio
071	Y/502/4615	Multimedia software	Portfolio
072	A/502/4610	Drawing and planning software	Assignment
073	D/502/4616	Multimedia software	Assignment
075	T/502/4573	Design software	Assignment
076	A/123/1234	Desktop publishing software	Assignment
077	M/502/4300	Using email	Assignment
078	L/502/4613	Imaging software	Assignment
079	A/502/4297	Using the Internet	Assignment
080	M/502/4622	Presentation software	Assignment
081	F/502/4625	Spreadsheet software	Assignment
082	R/502/4628	Word processing software	Assignment
083	R/502/4631	Website software	Assignment
084	M/502/4555	Database software	Assignment
111	L/500/7388	Technical fault diagnosis	Portfolio
225	K/501/3957	Fibre optic cabling in an internal environment	Assignment and online multiple choice test (525)*
226	M/501/3958	Fibre optic cabling in an external environment	Assignment and online multiple choice test (526)*
227	F/600/6815	Copper cabling in an internal environment	Assignment and online multiple choice test (527)*
228	K/501/3960	Maintain ICT equipment and systems 2	Assignment and online multiple choice test (528)*
229	J/501/3979	Install and configure ICT equipment and operating systems	Assignment

230	A/501/3980	Install, configure and maintain software	Assignment
231	J/501/3982	Testing ICT systems	Assignment
232	R/501/3984	ICT systems monitoring and operation	Assignment
233	Y/501/3985	ICT repair centre procedure	Assignment
234	K/501/3991	Create automated procedures for ICT operating systems	Assignment
235	H/501/3990	Install, configure and test ICT networks	Assignment
270	L/502/3798	Basic principles of communications systems	Portfolio
284	A/502/1108	Business concepts	Portfolio
600	A/601/3164	Computer Games Development	Assignment
601	A/601/3200	Data modelling	Assignment
603	J/601/3247	Introduction to IT systems development	Portfolio
604	A/507/0177	Practical fundamentals of ICT	Portfolio
605	F/507/0178	Fundamentals of IT technology	Portfolio
606	A/507/0180	Principles and concepts of cloud computing	Portfolio
607	J/507/8508	ICT fundamentals	Portfolio
617	R/507/0234	Fundamentals of Windows based server administration	Portfolio
618	M/507/0774	Fundamentals of database administration	Portfolio
619	A/507/0776	Fundamentals of Windows based operating systems	Portfolio
620	H/507/0271	Software development fundamentals	Portfolio
621	K/507/0272	Gaming development fundamentals	Portfolio
622	M/507/0273	HTML5 application development fundamentals	Portfolio

623	H/507/0285	Software testing fundamentals	Portfolio
624	Y/507/0283	Networking fundamentals	Portfolio
625	J/507/0277	IT security fundamentals	Portfolio
626	M/507/0287	Windows development fundamentals	Portfolio
627	K/507/0286	Web development fundamentals	Portfolio
628	F/507/0276	.NET fundamentals	Portfolio
629	L/507/0281	Mobile development fundamentals	Portfolio
800	J/601/3247	Introduction to IT systems development	Online test
851	A/601/3181	Creating an object-oriented computer program	Portfolio
852	T/601/3177	Creating an event-driven computer program	Portfolio
853	L/601/3167	Creating a procedural computer program	Portfolio
854	H/500/7378	User profile administration	Portfolio
855	Y/500/7331	System management	Portfolio
856	F/500/7338	ICT system operation	Portfolio

Where an assignment or vendor certification is not available, evidence from real work or simulated environments will benefit the learner and should be reflective, as well as meet policies and procedures of a work environment, especially where linked to current legislation and the values and principles for good practice in Independent Advocacy.

All Vendor units can only be achieved by taking the relevant Vendor Certification.

*Both assessments must be completed before the unit is issued

When first developed, units 001–014, 060–084, 111 and 225–284 were endorsed by e-skills UK.

Unit 001 Customer support provision

UAN:	**T/601/8296**
Level:	2
Credit value:	9
GLH:	60
Aim:	The aim of this unit is to introduce some of the basic techniques required to network computer systems; the unit will introduce the candidate to standards and protocols.

Learning outcome
The learner will: 1. Provide technical information and support in response to customer requirements
Assessment criteria
The learner can: 1.1 Gather and record/log customer support requirements 1.2 Provide technical support in response to customer requirements 1.3 Record/log outcome of response to customer 1.4 Escalate unresolved requests for technical support to suitable person(s)

Learning outcome
The learner will: 2. Identify potential improvements in the customers' use of resources
Assessment criteria
The learner can: 2.1 Prepare accurate records of existing hardware and software resources 2.2 Gather information on customers' use of existing resources 2.3 Document recommendations

Learning outcome
The learner will: 3. Assist in reviews to identify how automated procedures may improve customers' use of resources
Assessment criteria
The learner can: 3.1 Identify customers' frequently performed tasks 3.2 Gather information to identify potential automated procedures 3.3 Make recommendations on which procedures should be automated

Learning outcome
The learner will: 4. Create routine automated procedures and assist in the creation of complex automated procedures
Assessment criteria
The learner can: 4.1 Complete routine automated procedures 4.2 Select and use more complex automated procedures following an agreed pre-prepared plan 4.3 Check that automated procedures perform required function 4.4 Carry out testing of parts of more complex automated procedures following an agreed plan 4.5 Record details of the automated procedures created

Unit 002 Networking principles

UAN:	**T/601/3289**
Level:	2
Credit value:	6
GLH:	45
Aim:	The aim of this unit is to introduce some of the basic techniques required to network computer systems; the unit will introduce the candidate to standards and protocols.

Learning outcome
The learner will: 1. Know the OSI model and the associated TCP/IP protocol suite
Assessment criteria
The learner can: 1.1 Identify the function of the OSI model layers 1.2 List the protocols that form part of the TCP/IP protocol suite 1.3 List the types of addresses used on networks and why they are used

Learning outcome
The learner will: 2. Know different network topologies and transmission systems
Assessment criteria
The learner can: 2.1 Explain logical network topologies as given in the IEEE802 standards for LANs and WANs 2.2 Identify the following types of network cabling and connectors: • Cat 5 and RJ45 • Cat 5e and RJ45 • Cat 6 and RJ45 • Fibre optic cables and connectors 2.3 Describe the different types of wireless LAN 2.4 Describe the function of the following network devices: • interface controller • repeater • passive, active and intelligent hubs • Bridge • Switch Router • Gateway 2.5 Explain the 5-4-3 rule of network design

Learning outcome
The learner will: 3. Know the advantages and disadvantages of different types of network
Assessment criteria
The learner can: 3.1 List the properties, security and sharing advantages and disadvantages of: • peer to peer networks • client server networks 3.2 List the uses and limitations of a null modem connection

Learning outcome
The learner will: 4. Know media access control methods used in Local Area Networks
Assessment criteria
The learner can: 4.1 List the types of media access control methods used in LANs 4.2 Explain what is meant by a collision and how network systems deal with them 4.3 Explain the difference between a Token bus and a Token ring and how the token operates in each 4.4 Explain the line encoding used in CSMA/CD and CSMA/CA networks 4.5 Identify the limitations of CSMA/CA

Unit 003 Data representation and manipulation for IT

UAN:	**D/601/3206**
Level:	2
Credit value:	7
GLH:	60
Aim:	The aim of this is to introduce numbers in computing and how maths can be used in computing, in real terms.

Learning outcome
The learner will: 1. Manipulate real numbers and integers
Assessment criteria
The learner can: 1.1 Describe the difference between real numbers and integers 1.2 Express numbers in power and scientific notation 1.3 Perform arithmetic on numbers in power and scientific notation including multiplication and division of powers 1.4 Round real numbers and estimate the resulting error 1.5 Describe how real numbers and integers are represented in computer memory

Learning outcome
The learner will: 2. Use co-ordinate systems and vectors, and linear transformations
Assessment criteria
The learner can: 2.1 Describe two-dimensional co-ordinate systems 2.2 Represent simple shapes by finding the co-ordinates of the vertices 2.3 Describe vectors 2.4 Produce the polar representation of vectors 2.5 Offset and scale shapes described by co-ordinates 2.6 Convert between linear to polar co-ordinates 2.7 Describe co-ordinate systems used in programming output devices

Learning outcome
The learner will: 3. Use simple functions and basic algebraic operations
Assessment criteria
The learner can: 3.1 Express simple problems as mathematical equations 3.2 Simplify and change the subject of simple equations 3.3 Describe the concept of a function 3.4 Obtain the equation of a straight line from a graph 3.5 Describe the basic properties of a circle and triangle 3.6 Apply trigonometric and inverse trigonometric functions

Learning outcome
The learner will: 4. Apply Boolean algebra to problem situations
Assessment criteria
The learner can: 4.1 Describe how Binary states can be used to represent physical systems 4.2 Identify and label the inputs and outputs of a binary representation 4.3 Produce a truth table corresponding to a binary representation 4.4 Express a truth table as a Boolean equation 4.5 Simplify a Boolean equation using algebraic methods

Unit 010 Telecommunications principles

UAN:	**J/601/3295**
Level:	2
Credit value:	7
GLH:	60
Aim:	This unit will introduce the principles behind telecommunications and give a better understanding of how communications systems operate.

Learning outcome
The learner will: 1. Understand the electromagnetic spectrum as applied to telecommunications
Assessment criteria
The learner can: 1.1 Describe the physical properties of electromagnetic radiation and the relationship between frequency and wavelength 1.2 List the principal bands of the electromagnetic spectrum and their associated frequencies and wavelengths 1.3 Identify the main telecommunications applications of electromagnetic radiation

Range
1.1 Where possible this should be demonstrated through a practical observation

Learning outcome
The learner will: 2. Know the relationship between telecommunication circuits and transmission lines and their effect on a digital signal
Assessment criteria
The learner can: 2.1 Identify the circuit properties (Resistance, Capacitance, Inductance and Leakance) of alternating current (AC) circuits and describe their effects on transmission lines 2.2 Design an equivalent circuit model of a transmission line using the primary line constants 2.3 Describe characteristic impedance in transmission lines including open circuit, short circuit and matched termination

Range
2.1 Where possible this should be demonstrated through a practical observation

Learning outcome
The learner will: 3. Know how binary information is transmitted as a digital signal
Assessment criteria
The learner can: 3.1 Describe the properties of digital signals including frequency, mark space ratio and triggered timing 3.2 Describe the advantages of digital signals in terms of regeneration, accuracy and recovery 3.3 Explain why digital signals need to modulated onto an analogue carrier 3.4 Use keying to demonstrate how a digital signal is modulated onto an analogue carrier

Range
3. Where possible this should be demonstrated through a practical observation

Learning outcome
The learner will: 4. Understand how an analogue signal is converted to a digital signal
Assessment criteria
The learner can: 4.1 Identify different ways of converting an analogue signal to a digital signal 4.2 Describe linear and non-linear forms of encoding 4.3 Calculate signal to noise quantisation errors 4.4 Explain Aliasing in telecommunications terms and how it can be overcome 4.5 Explain the use, and limitations, of the Nyquist rule in signal sampling

Range
4. Where possible this should be demonstrated through a practical observation

Learning outcome
The learner will: 5. Demonstrate an understanding of signal multiplexing
Assessment criteria
The learner can: 5.1 Describe the following methods of signal multiplexing: • Frequency • Synchronous Time • Asynchronous Time

Range
5. Where possible this should be demonstrated through a practical observation

Unit 011 Principles of ICT system and data security

UAN:	**L/601/3508**
Level:	2
Credit value:	6
GLH:	45
Aim:	This unit will introduce the principles required to understand data security; this is becoming ever important within industry

Learning outcome
The learner will: 1. Know the common types of threat to ICT systems and data
Assessment criteria
The learner can: 1.1 Identify common types of physical threats to ICT systems and data (hardware damage, loss and theft) 1.2 Identify common types of electronic threats to ICT systems and data (e.g. denial of service, data theft or damage, unauthorised use) 1.3 List the security vulnerabilities associated with remote access technologies (including wireless)

Range	
1.1	Hardware threat should be investigated using real world scenario where possible
1.3	Should be investigated using simulation where possible

Learning outcome
The learner will: 2. Know how to protect ICT systems
Assessment criteria
The learner can: 2.1 Identify methods of providing physical access control and security for ICT systems (locks, biometric controls, CCTV, shielding, fire detection and control) 2.2 State methods of providing electronic access control and security for ICT systems (firewalls, virtual networks, secure connection/transfer protocols, secure wireless connection) 2.3 Identify common types of malicious code: • Virus • Trojan • Logic Bomb • Worm • Spyware 2.4 Identify the characteristics of strong passwords

Learning outcome
The learner will: 3. Be aware of the applications of cryptography to ICT systems and data
Assessment criteria
The learner can: 3.1 State how cryptography can be applied to ICT system and data security 3.2 State how Public Key Infrastructure (PKI) operates

Range
3.1 Should be demonstrated if possible or referenced to real world scenarios

Unit 012 Software testing

UAN:	**J/601/3510**
Level:	2
Credit value:	6
GLH:	30
Aim:	This unit introduces the basics of testing strategies and techniques and their application.

Learning outcome
The learner will: 1. Know about testing strategies and techniques
Assessment criteria
The learner can: 1.1 Identify the purpose of unit, integration and system testing of software 1.2 Identify the stages of system testing including alpha, beta, and acceptance testing 1.3 State the differences between functional (black box) and structural (white box) testing 1.4 Describe the contents of a software test plan

Range
1.3 Code samples should be provided in order to perform suitable tests

Learning outcome
The learner will: 2. Contribute to a test process for a software solution
Assessment criteria
The learner can: 2.1 Identify test cases from a software test plan 2.2 Identify the test data and expected results for test cases 2.3 Effectively carry out the actions specified in test cases 2.4 Accurately record results generated by test actions 2.5 Compare and report on actual and expected test results

Underpinning knowledge

The learner will be able to:

- List the essential features of a test log:
  - a test number
  - b date
  - c actual results
  - d record of discrepancies between actual results and expected results
- Describe the importance of designing test data to confirm a program works correctly under normal and exceptional circumstances:
  - a valid
  - b invalid
  - c boundary
- State that the test number must provide a cross reference between a test plan, its corresponding test log and test output (printed, screen print or input/output file)

Unit 013 Systems architecture

UAN:	**M/601/3503**
Level:	2
Credit value:	6
GLH:	50
Aim:	This unit will introduce some of the principles required to understand systems architecture, and also allow the learners to explore systems architecture through practical activities

Learning outcome
The learner will: 1. Know the representation of information within a computer
Assessment criteria
The learner can: 1.1 Outline how number systems and data representation are used to store information in a computer 1.2 Identify the role of input, output and storage devices 1.3 List the characteristics of C.P.U. components and outline the operation of the Fetch Execute Cycle 1.4 Outline the operation of a peripheral device

Range
1.1 Binary and Hexadecimal should be included
1.3 Could be demonstrated through diagrams

Learning outcome
The learner will: 2. Know and use and operating environment
Assessment criteria
The learner can: 2.1 Use operating system interfaces and functions 2.2 Identify the role of process management and concurrent processes in computer operating systems 2.3 Identify how operating system features can contribute to data and system security

Range
2.1 A range of function should be covered including managing system processes

Learning outcome
The learner will: 3. Be aware of the communication processes in distributed operating systems and computer networks
Assessment criteria
The learner can: 3.1 State the function and operation of distributed operating systems 3.2 State the functions of data communications systems in enabling network and distributed systems

Unit 014 Web fundamentals

UAN:	**R/601/3512**
Level:	2
Credit value:	7
GLH:	60
Aim:	The aim of this unit is to introduce learners to the functions of websites allowing them to fully understand how they operate on a network and the Internet

Learning outcome
The learner will: 1. Know web architecture and components
Assessment criteria
The learner can: 1.1 List the hardware and software components which enable the Internet and web 1.2 State the role of the TCP/IP protocol 1.3 State the role of Internet service providers, web hosting services and domain name registrars 1.4 Identify available types of web functionality

Range
1.1 A full list of components should be described covering as much of the ISO 7 layer model as possible

Learning outcome
The learner will: 2. Know about the technologies used to build and operate websites
Assessment criteria
The learner can: 2.1 State the purpose of markup languages and list commonly used examples 2.2 Identify the roles of: • web runtime environments • web application programming languages; and • databases in building websites and web applications 2.3 Identify typical product stack combinations that can be used for web development

Range
2.1 A range of languages should be explored 2.3 The use of mainframes and combinations of development software should be included such as SQL and ASP

Learning outcome
The learner will: 3. Implement specified components of a website
Assessment criteria
The learner can: 3.1 State the components required to produce a website 3.2 Design specified components of a website 3.3 Develop specified components of a website 3.4 Test specified components of a website

Range
3.3 The design will only require a maximum of 3 pages

Unit 060 Drawing and planning software

UAN:	**J/502/4609**
Level:	1
Credit value:	2
GLH:	15
Aim:	The aim of this unit is to introduce some of the principles required in drawing different shape types and use them within planning software.

Learning outcome
The learner will: 1. Input, organise and combine information for drawings or plans
Assessment criteria
The learner can: 1.1 Identify what types of 2D shapes and other elements will be needed 1.2 Identify which template or blank document to use 1.3 Select the appropriate shapes, from those available, to meet needs 1.4 Input the relevant shapes and other elements into existing templates or blank documents so that they are ready for editing and formatting 1.5 Identify what copyright constraints apply to the use of shapes or other elements 1.6 Combine information of different types or from different sources for drawings and plans 1.7 Store and retrieve drawing files effectively, in line with local guidelines and conventions where available

Range
1.1 A range of shapes should be included, including squares, triangles, circles and rectangles 1.4 Include the shapes identified in outcome 1.1

Learning outcome
The learner will: 2. Be able to use tools and techniques to edit, manipulate, format and present drawings or plans
Assessment criteria
The learner can: 2.1 Identify what drafting guides to use so that the shapes and other elements are appropriately prepared 2.2 Use appropriate software tools to manipulate and edit shapes and other elements 2.3 Select and use appropriate software tools to format shapes and other elements 2.4 Check drawings and plans meet needs, using IT tools and making corrections as necessary 2.5 Use appropriate presentation methods and accepted page layouts

Range
2. Drawings and plans should be from real world examples

Unit 061 Design software

UAN:	**M/502/4572**
Level:	1
Credit value:	3
GLH:	20
Aim:	The aim of this unit is to introduce the learner to design application software. In order to achieve this, the learner will identify what designs are needed and then decide upon a design layout to meet those needs. The learner will also learn about styles and where to obtain the details that are required to create the designs. The learner will learn how to store and retrieve their designs correctly.

Learning outcome
The learner will: 1. Obtain, insert and combine information for designs
Assessment criteria
The learner can: 1.1 Identify what designs are needed 1.2 Obtain, input and prepare designs to meet needs 1.3 Identify what generic copyright and other constraints apply to the use of designs 1.4 Combine information of different types or from different sources for designs 1.5 Identify the context in which the designs will be used 1.6 Identify which file format to use for saving and exchanging designs 1.7 Store and retrieve files effectively, in line with local guidelines and conventions where available

Range
1.1 Designs should form part of a real-world project or situation 1.4 Different forms could be types or forms could be differing image types, e.g. .BMP and .JPG

Learning outcome
The learner will: 2. Be able to use design software tools to create, manipulate and edit designs
Assessment criteria
The learner can: 2.1 Use suitable tools and techniques to create designs 2.2 Use appropriate tools and techniques to manipulate and edit designs 2.3 Check designs meet needs, using IT tools and making corrections as necessary

Range	
2	Designs should be from real world situations or scenarios whenever possible
2.3	All work should be proofed

Unit 062 Using email

UAN:	**J/502/4299**
Level:	1
Credit value:	2
GLH:	15
Aim:	The aim of this unit is to work with email software. The learner will compose emails, attach files and send emails following guidelines given. The learner will also learn how to stay safe and protect their computer systems when using email software. The learner will use address book features to simplify the sending process. They will also learn how and when to respond to emails, whilst following organisational guidelines.

Learning outcome
The learner will: 1. Use email software tools and techniques to compose and send messages
Assessment criteria
The learner can: 1.1 Use software tools to compose and format email messages 1.2 Attach files to email messages 1.3 Send email messages 1.4 Identify how to stay safe and respect others when using email 1.5 Use an address book to store and retrieve contact information

Range
1.4 Should include how to deal with SPAM email etc.

Learning outcome
The learner will: 2. Manage incoming email effectively
Assessment criteria
The learner can: 2.1 Follow guidelines and procedures for using email 2.2 Identify when and how to respond to email messages 2.3 Read and respond to email messages appropriately 2.4 Identify what messages to delete and when to do so 2.5 Organise and store email messages 2.6 Respond appropriately to common email problems

Unit 063 Imaging software

UAN:	**J/502/4612**
Level:	1
Credit value:	3
GLH:	20
Aim:	The aim of this unit is to introduce the learner to creating and manipulating images for a given purpose. The learner will explore the purpose of the image to be used or edited, as well as looking at any legislation that restricts the use of images. The learner will also learn about file formats and storing images correctly. The learner will also use appropriate software to create and edit images using the different tools and techniques within the software application.

Learning outcome
The learner will: 1. Obtain, insert and combine information for images
Assessment criteria
The learner can: 1.1 Identify what images are needed 1.2 Obtain, input and prepare images to meet needs 1.3 Identify what generic copyright and other constraints apply to the use of images 1.4 Combine information of different types or from different sources for images 1.5 Identify the context in which the images will be used 1.6 Identify which file format to use for saving and exchanging images 1.7 Store and retrieve files effectively, in line with local guidelines and conventions where available

Range	
1.1	Images can be from a variety of sources including the Internet
1.2	Preparation could include changing the format of the image
1.7	Local guidelines should be clear to the learner

Learning outcome
The learner will: 2. Use imaging software tools to create, manipulate and edit images
Assessment criteria
The learner can: 2.1 Use suitable tools and techniques to create images 2.2 Use appropriate tools and techniques to manipulate and edit images 2.3 Check images meet needs, using IT tools and making corrections as necessary

Unit 064 Using the Internet

UAN:	**T/502/4296**
Level:	1
Credit value:	3
GLH:	20
Aim:	The aim of this unit is to teach the learner how to use the Internet correctly and safely. In order to do this the learner will learn how to connect to the Internet, how to use a web browser effectively and how to improve the performance of a web browser. They will also learn how to search for information on the Internet and learn to use a web browser to communicate information. Finally, the leaner will learn how to protect themselves from online threats and understand any laws governing the use of the Internet.

Learning outcome
The learner will: 1. Connect to the Internet
Assessment criteria
The learner can: 1.1 Identify different types of connection methods that can be used to access the Internet 1.2 Access the Internet or intranet

Learning outcome
The learner will: 2. Use browser software to navigate web pages
Assessment criteria
The learner can: 2.1 Use browser tools to navigate webpages 2.2 Identify when to change browser settings to aid navigation 2.3 Adjust browser settings to meet needs 2.4 Use browser help facilities

Range
2.3 Adjustments should be to the user interface

Learning outcome
The learner will: 3. Use browser tools to search for information from the Internet
Assessment criteria
The learner can: 3.1 Select and use appropriate search techniques to locate information 3.2 Outline how information meets requirements 3.3 Use references to make it easier to find information another time 3.4 Download and save different types of information from the Internet

Range
3.1 Use a range of search criteria

Learning outcome
The learner will: 4. Use browser software to communicate information online
Assessment criteria
The learner can: 4.1 Select and use tools and techniques to communicate information online 4.2 Use browser tools to share information sources with others 4.3 Submit information online using forms or interactive sites 4.4 Identify opportunities to post or publish material to websites

Range
4.1 Tools and techniques could include Blog, Wiki's or forums

Learning outcome
The learner will: 5. Follow and understand the need for safety and security practices when working online
Assessment criteria
The learner can: 5.1 Identify the threats to user safety when working online 5.2 Outline how to minimise Internet security risks 5.3 Work responsibly and take appropriate safety and security precautions when working online 5.4 Keep personal information secure 5.5 Follow relevant laws, guidelines and procedures for the use of the Internet

Unit 065 Desktop publishing software

UAN:	**Y/502/4565**
Level:	1
Credit value:	3
GLH:	20
Aim:	The aim of this unit is to introduce some of the principles behind using desktop publishing software. To do this the learner will identify suitable information and use some of the tools and techniques within the application to produce a professional end product. In the process of doing this the learner will also learn about Copyright laws and how they can restrict the production of documents.

Learning outcome
The learner will: 1. Select and use appropriate designs and page layouts for publications
Assessment criteria
The learner can: 1.1 Identify what types of information are needed 1.2 Identify what page design and layout will be required 1.3 Select and use an appropriate page design and layout for publications in line with local guidelines, where relevant 1.4 Select and use appropriate media for the publication

Learning outcome
The learner will: 2. Input and combine text and other information within publications
Assessment criteria
The learner can: 2.1 Input information into publications so that it is ready for editing and formatting 2.2 Identify copyright constraints on using others' information 2.3 Organise and combine information of different types or from different sources in line with any copyright constraints 2.4 Store and retrieve publication files effectively, in line with local guidelines and conventions where available

Learning outcome
The learner will: 3. Use desktop publishing software techniques to edit and format

publications
Assessment criteria
The learner can: 3.1 Identify what editing and formatting to use for the publication 3.2 Select and use appropriate techniques to edit publications and format text 3.3 Manipulate images and graphic elements accurately 3.4 Control text flow within single and multiple columns and pages 3.5 Check publications meet needs, using IT tools and making corrections as necessary

Unit 066 Presentation software

UAN:	**K/502/4621**
Level:	1
Credit value:	3
GLH:	20
Aim:	In this unit the learner will learn how to identify information that is required for a presentation. They will also learn to select differing layouts and styles depending on their audience. The learner will look at house styles and how to combine their information into their chosen format ready for a presentation. The learner will also edit and modify presentations and select appropriate formats in which to present their final presentation.

Learning outcome
The learner will: 1. Input and combine text and other information within presentation slides
Assessment criteria
The learner can: 1.1 Identify what types of information are required for the presentation 1.2 Select and use different slide layouts as appropriate for different types of information 1.3 Enter information into presentation slides so that it is ready for editing and formatting 1.4 Identify any constraints which may affect the presentation 1.5 Combine information of different forms or from different sources for presentations 1.6 Store and retrieve presentation files effectively, in line with local guidelines and conventions where available

Range	
1.1	Information can come from a variety of sources both printed and electronically
1.6	Local guidelines and conventions must be clear to the learner

Learning outcome
The learner will: 2. Use presentation software tools to structure, edit and format slides
Assessment criteria
The learner can:

2.1 Identify what slide structure to use 2.2 Select and use an appropriate template to structure slides 2.3 Select and use appropriate techniques to edit slides 2.4 Select and use appropriate techniques to format slides

Learning outcome
The learner will: 3. Prepare slides for presentation to meet needs
Assessment criteria
The learner can: 3.1 Identify how to present slides to meet needs and communicate effectively 3.2 Prepare slides for presentation 3.3 Check presentation meets needs, using IT tools and making corrections as necessary

Range
3.1 Slides could be printed or displayed electronically

Unit 067 Spreadsheet software

UAN:	**A/502/4624**
Level:	1
Credit value:	3
GLH:	20
Aim:	The aim of this unit is to introduce some of the techniques used in spreadsheets. The learner will identify numerical data that is required to be entered and use specific formulae to manipulate it as required. The learner will also explore how to present data in an appropriate format for end users, such as charts and graphs, as well as formatting the data correctly. The learner will learn how to save and retrieve files correctly.

Learning outcome
The learner will: 1. Use a spreadsheet to enter, edit and organise numerical and other data
Assessment criteria
The learner can: 1.1 Identify what numerical and other information is needed and how the spreadsheet should be structured to meet needs 1.2 Enter and edit numerical and other data accurately 1.3 Store and retrieve spreadsheet files effectively, in line with local guidelines and conventions where available

Range	
1.1	Numerical and other information can be provided or researched as required
1.2	Accuracy must be checked

Learning outcome
The learner will: 2. Use appropriate formulas and tools to summarise and display spreadsheet information
Assessment criteria
The learner can: 2.1 Identify how to summarise and display the required information 2.2 Use functions and formulas to meet calculation requirements 2.3 Use spreadsheet tools and techniques to summarise and display information

Range
2.2 A range of simple formulas must be used

Learning outcome
The learner will: 3. Select and use appropriate tools and techniques to present spreadsheet information effectively
Assessment criteria
The learner can: 3.1 Select and use appropriate tools and techniques to format spreadsheet cells, rows and columns 3.2 Identify which chart or graph type to use to display information 3.3 Select and use appropriate tools and techniques to generate, develop and format charts and graphs 3.4 Select and use appropriate page layout to present and print spreadsheet information 3.5 Check information meets needs, using spreadsheet tools and making corrections as necessary

Unit 068 Word processing software

UAN:	**L/502/4627**
Level:	1
Credit value:	3
GLH:	20
Aim:	The aim of this unit is to introduce some of the features and functions of word processing software. The learner will identify the types of information that is to be used within the application and then use the information in various formats to produce differing documents that incorporate a range of tools within the software. This will range from images, tables, forms and templates. The learner will also use differing formatting techniques to enhance their documents and make them suitable for printing.

Learning outcome
The learner will: 1. Enter, edit and combine text and other information accurately within word processing documents
Assessment criteria
The learner can: 1.1 Identify what types of information are needed in documents 1.2 Identify what templates are available and when to use them 1.3 Use keyboard or other input method to enter or insert text and other information 1.4 Combine information of different types or from different sources into a document 1.5 Enter information into existing tables, forms and templates 1.6 Use editing tools to amend document content 1.7 Store and retrieve document files effectively, in line with local guidelines and conventions where available

Range
1.2 A range of templates should be used to achieve this outcome 1.3 Other input method could include scanned image, or the use of a secondary input device 1.6 Editing should involve moving portions of content from one page to another 1.7 Candidates should be clear on local guidelines prior to undertaking the task

Learning outcome
The learner will: 2. Structure information within word processing documents
Assessment criteria
The learner can: 2.1 Create and modify tables to organise tabular or numeric information 2.2 Select and apply heading styles to text

Range
2.1 Content for tables could be given to candidates in an unformatted manner

Learning outcome
The learner will: 3. Use word processing software tools to format and present documents
Assessment criteria
The learner can: 3.1 Identify what formatting to use to enhance presentation of the document 3.2 Select and use appropriate techniques to format characters and paragraphs 3.3 Select and use appropriate page layout to present and print documents 3.4 Check documents meet needs, using IT tools and making corrections as necessary

Unit 069 Website software

UAN:	**L/502/4630**
Level:	1
Credit value:	3
GLH:	20
Aim:	The aim of this unit is to introduce basic web design and construction techniques, learners will learn to identify how to correctly lay out and position content, as well as learning how to construct simple web sites.

Learning outcome
The learner will: 1. Plan and create web pages
Assessment criteria
The learner can: 1.1 Identify what content and layout will be needed in the web page 1.2 Identify the purpose of the webpage and intended audience 1.3 Select and use a website design template to create a single web page 1.4 Enter or insert content for web pages so that it is ready for editing and formatting 1.5 Organise and combine information needed for web pages 1.6 Identify copyright and other constraints on using others' information 1.7 Identify what file types to use for saving content 1.8 Store and retrieve web files effectively, in line with local guidelines and conventions where available

Range
1.1 A range of content could be given to learner to select from 1.2 Website should be no longer than 3 pages 1.8 Local guidelines and conventions should be clear to the learner prior to beginning the task

Learning outcome
The learner will: 2. Use website software tools to structure and format web pages
Assessment criteria
The learner can: 2.1 Identify what editing and formatting to use to aid both clarity and navigation 2.2 Select and use website features to help the user navigate simple websites 2.3 Use appropriate editing and formatting techniques 2.4 Check web pages meet needs, using IT tools and making corrections as necessary

Range
2.4 Could be carried out through a professional discussion

Learning outcome
The learner will: 3. Publish web pages to the Internet or an intranet
Assessment criteria
The learner can: 3.1 Upload content to a website 3.2 Respond appropriately to common problems when testing a web page

Range
3.1 The upload could be to local site or Intranet

Unit 070 Database software

UAN:	**H/502/4553**
Level:	1
Credit value:	3
GLH:	20
Aim:	This unit will give the learner an introduction to relational databases. It will introduce some of the key terms used. Learners will learn to run simple queries and generate reports based upon them.

Learning outcome
The learner will: 1. Enter, edit and organise structured information in a database
Assessment criteria
The learner can: 1.1 Identify the main components of a database 1.2 Create a database table for a purpose using specified fields 1.3 Enter structured data into records to meet requirements 1.4 Locate and amend data records 1.5 Respond appropriately to data entry error messages 1.6 Check data meets needs, using IT tools and making corrections as necessary

Range
1.1 This should include understanding the purpose of Table, Forms, Reports and Queries
1.2 Ensure primary and foreign keys are used
1.3 Simple data can be given to the learner

Learning outcome
The learner will: 2. Use database software tools to extract information and produce reports
Assessment criteria
The learner can: 2.1 Identify queries which meet information requirements 2.2 Run simple database queries 2.3 Identify reports which meet information requirements 2.4 Generate and print pre-defined database reports

Range	
2.1	Queries should be simple and do not require calculations
2.4	Reports could be based on the queries from 2.1

Unit 071 Multimedia software

UAN:	**Y/502/4615**
Level:	1
Credit value:	3
GLH:	20
Aim:	Learners will be introduced to the basics of multimedia software through this unit, they will have an opportunity to explore a range of techniques

Learning outcome
The learner will: 1. Plan the content and organisation of multimedia products to meet needs
Assessment criteria
The learner can: 1.1 Use simple techniques to plan the content and organisation of multimedia products 1.2 Identify the type of multimedia outcome to meet requirements 1.3 Identify what is required in the specification 1.4 Identify copyright or other constraints for using others' information

Range
1.1 This could be best served through the creation of a project that begins with this outcome.

Learning outcome
The learner will: 2. Obtain, input and combine content to build multimedia outcomes
Assessment criteria
The learner can: 2.1 Select and use an appropriate input device to enter content for multimedia outcomes 2.2 Combine information of different types or from different sources for multimedia outcomes 2.3 Identify the file format and storage media to use 2.4 Select and use appropriate software to write multimedia files 2.5 Store and retrieve multimedia files effectively, in line with local guidelines and conventions where available

Range
2.2 Information from two different sources will be required
2.5 Local guidelines should be clear to all learners prior to starting the task

Learning outcome
The learner will: 3. Use multimedia software tools to edit and format multimedia content to meet requirements
Assessment criteria
The learner can: 3.1 Select and use appropriate techniques to edit and format multimedia outcomes 3.2 Manipulate images and graphic elements accurately 3.3 Check multimedia outcomes meet needs, using IT tools and making corrections as necessary

Learning outcome
The learner will: 4. Play and present multimedia outcomes
Assessment criteria
The learner can: 4.1 Identify what display device to use for multimedia outcomes 4.2 Use appropriate techniques to navigate and display multimedia outcomes 4.3 Control the playback of multimedia files 4.4 Adjust display settings to meet needs

Unit 072 Drawing and planning software

UAN:	**A/502/4610**
Level:	2
Credit value:	3
GLH:	20
Aim:	The aim of this unit is to introduce the principles required in drawing and planning, learners will investigate then use of shapes and images to produce finished drawings and or plans

Learning outcome
The learner will: 1. Input, organise and combine information for drawings or plans
Assessment criteria
The learner can: 1.1 Identify what types of shapes and other elements will be needed 1.2 Review templates and describe how they need to be changed to meet needs 1.3 Select, input and use the appropriate shapes to meet needs, including importing shapes from other sources 1.4 Select, adapt and use appropriate templates or blank documents 1.5 Identify what copyright constraints apply to the use of shapes or other elements 1.6 Combine information for drawings or plans including importing information produced using other software 1.7 Store and retrieve drawing files effectively, in line with local guidelines and conventions where available

Range
1. This outcome would best be covered by following a given real world scenario

Learning outcome
The learner will: 2. Use tools and techniques to edit, manipulate, format and present drawings or plans
Assessment criteria
The learner can: 2.1 Identify what drafting guides to use so that the shapes and other elements are appropriately prepared 2.2 Select and use appropriate software tools to manipulate and edit shapes and other elements with precision 2.3 Select and use appropriate software tools to format shapes and other elements, including applying styles and colour schemes 2.4 Check drawings or plans meet needs, using IT tools and making corrections as necessary 2.5 Identify and respond to any quality problems with drawings or plans to make sure they meet needs 2.6 Select and use appropriate presentation methods and accepted page layouts

Unit 073 Multimedia software

UAN:	**D/502/4616**
Level:	2
Credit value:	4
GLH:	30
Aim:	The aim of this unit is to introduce learners to some of the basic concepts required in multimedia, learners will have the opportunity to work with audio and visual elements within this unit

Learning outcome
The learner will: 1. Plan the content and organisation of multimedia products to meet needs
Assessment criteria
The learner can: 1.1 Describe the type of multimedia outcome needed and the specification that it must meet 1.2 Select and use appropriate techniques to plan and communicate the content, design and layout of multimedia products 1.3 Identify how the different elements of the content will be sourced and how they will relate in the design layout 1.4 Plan the use of interactive features and transitions to meet needs 1.5 Describe how copyright and other constraints affect use of own and others' information

Range
1.1 Ideally this outcome should be an introduction to a small project
1.2 This could be either formal or informal methods

Learning outcome
The learner will: 2. Obtain, input and combine content to build multimedia outcomes
Assessment criteria
The learner can: 2.1 Select and use an appropriate combination of input device, software and input techniques to obtain and input relevant content for multimedia outcomes 2.2 Combine information of different types or from different sources for multimedia outcomes 2.3 Describe the file format and storage media to use 2.4 Store and retrieve multimedia files effectively, in line with local guidelines and conventions where available

Range
2.1 An appropriate range can be decided by the type of project undertaken
2.2 Information sources could be a mix of audio and visual
2.4 Local guidelines should be clearly explained prior to this task

Learning outcome
The learner will: 3. Use multimedia software tools to edit and format multimedia content to meet requirements
Assessment criteria
The learner can: 3.1 Select and use appropriate techniques to edit and format multimedia outcomes 3.2 Manipulate images and graphic elements accurately 3.3 Check multimedia outcomes meet needs, using IT tools and making corrections as necessary 3.4 Adjust outcomes in response to any identified quality problems

Range
3.1 The editing should be in relation to the project being undertaken
3.2 Accuracy should be according to the project being undertaken
3.4 Quality issues should be in response to feedback given

Learning outcome
The learner will: 4. Play and present multimedia outcomes
Assessment criteria
The learner can: 4.1 Described what combination of display device and software to use for displaying different multimedia file formats 4.2 Select and use appropriate software for displaying multimedia outcomes 4.3 Select and use appropriate navigation techniques and playback controls to suit the files 4.4 Adjust the display settings of the software and display device to present outcomes effectively

Unit 075 Design software

UAN:	**T/502/4573**
Level:	2
Credit value:	4
GLH:	30
Aim:	The aim of this unit is to introduce some of the concepts required for design.

Learning outcome
The learner will: 1. Obtain, insert and combine information for designs
Assessment criteria
The learner can: 1.1 Describe what designs are needed 1.2 Obtain, input and prepare designs to meet needs 1.3 Describe what copyright and other constraints apply to the use of designs 1.4 Use appropriate techniques to organise and combine information of different types or from different sources 1.5 Describe the context in which the designs will be used 1.6 Describe what file format to use for saving designs to suit different presentation methods 1.7 Store and retrieve files effectively, in line with local guidelines and conventions where available

Range	
1.1	This unit could follow a simple project or scenario
1.2	Designs that are partially completed could be given
1.7	Local guidelines should be explained prior to this task

Learning outcome
The learner will: 2. Use design software tools to create, manipulate and edit designs
Assessment criteria
The learner can: 2.1 Identify what technical factors affecting designs need to be taken into account and how to do so 2.2 Select and use suitable techniques to create designs 2.3 Use guide lines and dimensioning tools appropriately to enhance precision 2.4 Select and use appropriate tools and techniques to manipulate and edit for designs 2.5 Check designs meet needs, using IT tools and making corrections as necessary 2.6 Identify and respond to quality problems with designs to make sure that they meet needs

Range	
2.1	Technical factors could include printing large scale designs
2.6	Issues to respond to should be in response to feedback given

Unit 076 Desktop publishing software

UAN:	**A/123/1234**
Level:	2
Credit value:	4
GLH:	30
Aim:	The aim of this unit is to introduce techniques used in desktop publishing, techniques including importing and manipulating content will be used

Learning outcome
The learner will: 1. Select and use appropriate designs and page layouts for publications
Assessment criteria
The learner can: 1.1 Describe what types of information are needed 1.2 Describe how to change page design and layout to increase effectiveness of a publication 1.3 Select, change and use an appropriate page design and layout for publications in line with local guidelines, where relevant 1.4 Select and use appropriate media for the publication

Range
1.1 Information could be provided in the form of a project or scenario
1.3 Local guidelines should be explained prior to starting this exercise

Learning outcome
The learner will: 2. Input and combine text and other information within publications
Assessment criteria
The learner can: 2.1 Find and input information into a publication so that it is ready for editing and formatting 2.2 Organise and combine information for publications in line with any copyright constraints, including importing information produced using other software 2.3 Describe how copyright constraints affect use of own and others' information 2.4 Describe which file format to use for saving designs and images 2.5 Store and retrieve publication files effectively, in line with local guidelines and conventions where available

Range
2.2 Copyright guidelines should be explained in detail 2.5 Local guidelines should be explained prior to beginning this exercise

Learning outcome
The learner will: 3. Use desktop publishing software techniques to edit and format publications
Assessment criteria
The learner can: 3.1 Identify what editing and formatting to use for the publication 3.2 Select and use appropriate techniques to edit publications and format text 3.3 Manipulate images and graphic elements accurately 3.4 Control text flow within single and multiple columns and pages 3.5 Check publications meet needs, using IT tools and making corrections as necessary 3.6 Identify and respond to quality problems with publications to make sure they meet needs

Range
3.6 Quality problems should resolved in response to feedback given

Unit 077 Using email

UAN:	**M/502/4300**
Level:	2
Credit value:	3
GLH:	20
Aim:	The aim of this unit is to introduce the tools and techniques used in email clients

Learning outcome
The learner will: 1. Use email software tools and techniques to compose and send messages
Assessment criteria
The learner can: 1.1 Select and use software tools to compose and format email messages, including attachments 1.2 Determine the message size and how it can be reduced 1.3 Send email messages to individuals and groups 1.4 Describe how to stay safe and respect others when using email 1.5 Use an address book to organise contact information

Learning outcome
The learner will: 2. Manage incoming email effectively
Assessment criteria
The learner can: 2.1 Follow guidelines and procedures for using email 2.2 Read and respond to email messages appropriately 2.3 Use email software tools and techniques to automate responses 2.4 Describe how to archive email messages, including attachments 2.5 Organise, store and archive email messages effectively 2.6 Respond appropriately to email problems

Range
2.1 Guidelines should be explained prior to the exercise

Unit 078 Imaging software

UAN:	**L/502/4613**
Level:	2
Credit value:	4
GLH:	30
Aim:	The aim of this unit is to introduce techniques used in imaging software

Learning outcome
The learner will: 1. Obtain, insert and combine information for images
Assessment criteria
The learner can: 1.1 Describe what images are needed 1.2 Obtain, input and prepare images to meet needs 1.3 Describe what copyright and other constraints apply to the use of images 1.4 Use appropriate techniques to organise and combine information of different types or from different sources 1.5 Describe the context in which the images will be used 1.6 Describe what file format to use for saving images to suit different presentation methods 1.7 Store and retrieve files effectively, in line with local guidelines and conventions where available

Range	
1.2	A range of images can be provided
1.7	Local guidelines should be explained prior to the exercise

Learning outcome
The learner will: 2. Use imaging software tools to create, manipulate and edit images
Assessment criteria
The learner can: 2.1 Identify what technical factors affecting images need to be taken into account and how to do so 2.2 Select and use suitable techniques to create images 2.3 Use guidelines and dimensioning tools appropriately to enhance precision 2.4 Select and use appropriate tools and techniques to manipulate and edit images 2.5 Check images meet needs, using IT tools and making corrections as necessary 2.6 Identify and respond to quality problems with images to make sure that they meet needs

Range
2.6 Quality issues should be resolved in response to feedback given

Unit 079 Using the Internet

UAN:	**A/502/4297**
Level:	2
Credit value:	4
GLH:	30
Aim:	The aim of this unit is to teach learners how to use the Internet effectively including effectively searching and how to submit information safely

Learning outcome
The learner will: 1. Connect to the Internet
Assessment criteria
The learner can: 1.1 Identify different types of connection methods that can be used to access the Internet 1.2 Identify the benefits and drawbacks of the connection method used 1.3 Get online with an Internet connection 1.4 Use help facilities to solve Internet connection problems

Range
1.1 A range of methods should be explored including using Routers and Servers
1.4 Help facilities can include online sources including forums

Learning outcome
The learner will: 2. Use browser software to navigate webpages effectively
Assessment criteria
The learner can: 2.1 Select and use browser tools to navigate webpages 2.2 Identify when to change settings to aid navigation 2.3 Adjust browser settings to optimise performance and meet needs 2.4 Identify ways to improve the performance of a browser

Learning outcome
The learner will: 3. Use browser tools to search for information from the Internet

Assessment criteria
The learner can: 3.1 Select and use appropriate search techniques to locate information efficiently 3.2 Describe how well information meets requirements 3.3 Manage and use references to make it easier to find information another time 3.4 Download, organise and store different types of information from the Internet

Range
3.1 A full range of search expressions need to be employed

Learning outcome
The learner will: 4. Use browser software to communicate information online
Assessment criteria
The learner can: 4.1 Identify opportunities to create, post or publish material to websites 4.2 Select and use appropriate tools and techniques to communicate information online 4.3 Use browser tools to share information sources with others 4.4 Submit information online

Range
4.3 Tools could include blogs and forums

Learning outcome
The learner will: 5. Understand the need for safety and security practices when working online
Assessment criteria
The learner can: 5.1 Describe the threats to system performance when working online 5.2 Work responsibly and take appropriate safety and security precautions when working online 5.3 Describe the threats to information security when working online 5.4 Manage personal access to online sources securely 5.5 Describe the threats to user safety when working online 5.6 Describe how to minimise Internet security risks 5.7 Apply laws, guidelines and procedures for safe and secure Internet use 5.8 Explain the importance of the relevant laws affecting Internet users

Unit 080 Presentation software

UAN:	**M/502/4622**
Level:	2
Credit value:	4
GLH:	30
Aim:	The aim of this unit is to introduce the tools and techniques used in presentation software and how to use them correctly

Learning outcome
The learner will: 1. Input and combine text and other information within presentation slides
Assessment criteria
The learner can: 1.1 Identify what types of information are required for the presentation 1.2 Enter text and other information using layouts appropriate to type of information 1.3 Insert charts and tables into presentation slides 1.4 Insert images, video or sound to enhance the presentation 1.5 Identify any constraints which may affect the presentation 1.6 Organise and combine information of different forms or from different sources for presentations 1.7 Store and retrieve presentation files effectively, in line with local guidelines and conventions where available

Range	
1.1	Information could be provided or a scenario used to cover this criteria
1.7	Local guidelines should be explained prior to this exercise

Learning outcome
The learner will: 2. Use presentation software tools to structure, edit and format slide sequences
Assessment criteria
The learner can: 2.1 Identify what slide structure and themes to use 2.2 Select, change and use appropriate templates for slides 2.3 Select and use appropriate techniques to edit slides and presentations to meet needs 2.4 Select and use appropriate techniques to format slides and presentations 2.5 Identify what presentation effects to use to enhance the presentation 2.6 Select and use animation and transition effects appropriately to enhance slide sequences

Range
2.1 Slide structure should relate to any scenario used

Learning outcome
The learner will: 3. Prepare slideshow for presentation
Assessment criteria
The learner can: 3.1 Describe how to present slides to meet needs and communicate effectively 3.2 Prepare slideshow for presentation 3.3 Check presentation meets needs, using IT tools and making corrections as necessary 3.4 Identify and respond to any quality problems with presentations to ensure that presentations meet needs

Range
3.4 Quality problems should be as a response to feedback given

Unit 081 Spreadsheet software

UAN:	**F/502/4625**
Level:	2
Credit value:	4
GLH:	30
Aim:	The aim of this unit is to introduce the principles used in spreadsheets as well as how to use formulae correctly

Learning outcome
The learner will: 1. Use a spreadsheet to enter, edit and organise numerical and other data
Assessment criteria
The learner can: 1.1 Identify what numerical and other information is needed in the spreadsheet and how it should be structured 1.2 Enter and edit numerical and other data accurately 1.3 Combine and link data across worksheets 1.4 Store and retrieve spreadsheet files effectively, in line with local guidelines and conventions where available

Range	
1.1	Numerical information could be given or sourced by learners
1.4	Local guidelines should be explained prior this exercise

Learning outcome
The learner will: 2. Select and use appropriate formulas and data analysis tools to meet requirements
Assessment criteria
The learner can: 2.1 Identify which tools and techniques to use to analyse and manipulate data to meet requirements 2.2 Select and use a range of appropriate functions and formulas to meet calculation requirements 2.3 Use a range of tools and techniques to analyse and manipulate data to meet requirements

Range
2.3 Tools could include charts and graphs, or any other suitable tools

Learning outcome
The learner will: 3. Select and use tools and techniques to present and format spreadsheet information
Assessment criteria
The learner can: 3.1 Plan how to present and format spreadsheet information effectively to meet needs 3.2 Select and use appropriate tools and techniques to format spreadsheet cells, rows, columns and worksheets 3.3 Select and format an appropriate chart or graph type to display selected information 3.4 Select and use appropriate page layout to present and print spreadsheet information 3.5 Check information meets needs, using spreadsheet tools and making corrections as necessary 3.6 Describe how to find errors in spreadsheet formulas 3.7 Respond appropriately to any problems with spreadsheets

Range
3.7 Any formulae should be verified through manual checking and any problems rectified

Unit 082 Word processing software

UAN:	**R/502/4628**
Level:	2
Credit value:	4
GLH:	30
Aim:	The aim of this unit is to introduce word processing applications and some of the typical tools used within them.

Learning outcome
The learner will: 1. Enter and combine text and other information accurately within word processing documents
Assessment criteria
The learner can: 1.1 Identify what types of information are needed in documents 1.2 Use appropriate techniques to enter text and other information accurately and efficiently 1.3 Select and use appropriate templates for different purposes 1.4 Identify when and how to combine and merge information from other software or other documents 1.5 Select and use a range of editing tools to amend document content 1.6 Combine or merge information within a document from a range of sources 1.7 Store and retrieve document and template files effectively, in line with local guidelines and conventions where available

Range	
1.1	Information could be given in a range of formats or sources
1.7	Local guidelines should be explained prior to this exercise

Learning outcome
The learner will: 2. Create and modify layout and structures for word processing documents
Assessment criteria
The learner can: 2.1 Identify the document requirements for structure and style 2.2 Identify what templates and styles are available and when to use them 2.3 Create and modify columns, tables and forms to organise information 2.4 Select and apply styles to text

Range
2.1 Requirements could be in the form of a scenario, preferably tailored to a real-world scenario

Learning outcome
The learner will: 3. Use word processing software tools to format and present documents effectively to meet requirements
Assessment criteria
The learner can: 3.1 Identify how the document should be formatted to aid meaning 3.2 Select and use appropriate techniques to format characters and paragraphs 3.3 Select and use appropriate page and section layouts to present and print documents 3.4 Describe any quality problems with documents 3.5 Check documents meet needs, using IT tools and making corrections as necessary 3.6 Respond appropriately to quality problems with documents so that outcomes meet needs

Range
3.1 Formatting should be in response to any scenario used 3.6 Problem should be in response to feedback given

Unit 083 Website software

UAN:	**R/502/4631**
Level:	2
Credit value:	4
GLH:	30
Aim:	The aim of this unit is to introduce some of the fundamentals required for website design. Candidates will learn the tools and techniques required to make functional and professional websites.

Learning outcome
The learner will: 1. Create structures and styles for websites
Assessment criteria
The learner can: 1.1 Describe what website content and layout will be needed for each page 1.1 Plan and create web page templates to layout 1.3 Select and use website features and structures to help the user navigate round web pages within the site 1.4 Create, select and use styles to keep the appearance of web pages consistent and make them easy to understand 1.5 Describe how copyright and other constraints may affect the website 1.6 Describe what access issues may need to be taken into account 1.7 Describe what file types to use for saving content 1.8 Store and retrieve files effectively, in line with local guidelines and conventions where available

Range	
1.1	Descriptions should be brief, but describe each page that will be created
1.2	Plans could be hand drawn or created electronically
1.5	Copyright constraints should be detailed fully
1.8	Local guidelines should be clarified prior to undertaking this task

Learning outcome
The learner will: 2. Use website software tools to prepare content for websites
Assessment criteria
The learner can: 2.1 Prepare content for web pages so that it is ready for editing and formatting 2.2 Organise and combine information needed for web pages including across different software 2.3 Select and use appropriate editing and formatting techniques to aid both clarity and navigation 2.4 Select and use appropriate development techniques to link information across pages 2.5 Change the file formats appropriately for content 2.6 Check web pages meet needs, using IT tools and making corrections as necessary

Range	
2.1	Basic unprepared content could be provided for this task
2.2	Information should be combined from multiple sources
2.6	Corrections should be made in response to feedback given

Learning outcome
The learner will: 3. Publish websites
Assessment criteria
The learner can: 3.1 Select and use appropriate testing methods to check that all elements of websites are working as planned 3.2 Identify any quality problems with websites and how to respond to them 3.3 Select and use an appropriate program to upload and publish the website 3.4 Respond appropriately to problems with multiple page websites

Range	
3.1	Websites should function within multiple browsers

Unit 084 Database software

UAN:	**M/502/4555**
Level:	2
Credit value:	4
GLH:	30
Aim:	The aim of this unit is to introduce candidates to the fundamentals of databases; candidates will learn to use many of the tools within database software. Candidates will also learn to construct databases that have integrity.

Learning outcome
The learner will: 1. Create and modify non-relational database tables
Assessment criteria
The learner can: 1.1 Identify the components of a database design 1.2 Describe the field characteristics for the data required 1.3 Create and modify database tables using a range of field types 1.4 Describe ways to maintain data integrity 1.5 Respond appropriately to problems with database tables 1.6 Use database tools and techniques to ensure data integrity is maintained

Range
1.1 Candidates should identify tables, queries, forms and reports
1.6 Multiple tools should be used to ensure data integrity is maintained

Learning outcome
The learner will: 2. Enter, edit and organise structured information in a database
Assessment criteria
The learner can: 2.1 Create forms to enter, edit and organise data in a database 2.2 Select and use appropriate tools and techniques to format data entry forms 2.3 Check data entry meets needs, using IT tools and making corrections as necessary 2.4 Respond appropriately to data entry errors

Learning outcome
The learner will: 3. Use database software tools to run queries and produce reports
Assessment criteria
The learner can: 3.1 Create and run database queries using multiple criteria to display or amend selected data 3.2 Plan and produce database reports from a single table non-relational database 3.3 Select and use appropriate tools and techniques to format database reports 3.4 Check reports meet needs, using IT tools and making corrections as necessary

Range
3.4 Corrections should be made in response to feedback given

Unit 111 Technical fault diagnosis

UAN:	**L/500/7388**
Level:	1
Credit value:	6
GLH:	45
Assessment Method	Portfolio
Aim:	The aim of this unit is to introduce the learner to diagnosing faults. As part of this the learner will begin to explore some of the diagnostic tools that will be required to perform this role. The learner will also learn how to accurately record information connected with the diagnosis process. The learner will also assist in the diagnosis process as well as learning when and how to escalate an issue.

Learning outcome
The learner will: 1. Know the procedures and other information within the diagnostic process that applies to them
Assessment criteria
The learner can: 1.1 Describe relevant parts of the diagnostic process including: a. diagnostic tools to be used b. procedures to be followed c. procedures for information recording individual responsibility and authority escalation procedure d. technical information about the system to be worked on.

Learning outcome
The learner will: 2. Assist in the diagnosis of faults following detailed instructions
Assessment criteria
The learner can: 2.1 Follow detailed instructions to assist with diagnosing faults 2.2 Use designated diagnostic tools 2.3 Accurately gather and record specified information connected with the diagnosis.

Unit 225 Fibre optic cabling in an internal environment

UAN:	**K/501/3957**
Level:	2
Credit value:	6
GLH:	40
Aim:	This unit is concerned with the installation, splicing, connectorisation, termination and testing of fibre optic cable in a typical datacomms environment, characterised by low fibre count cables (typically less than 24 fibres) terminated in patch panels/equipment racks. This would usually take place in an indoor environment involving multimode and singlemode end to end cabling.
Assessment	The outcomes from this unit will be assessed by the following two methods: • Practical activities will be assessed by means of a set assignment for the unit • Underpinning knowledge will be assessed by means of a multiple-choice online test based on the test specification Candidates must successfully complete **both** the **online multiple-choice test and the practical assignment** to achieve the unit.

Learning outcome
The learner will: 1. Work safely with optical fibres in an internal environment
Assessment criteria
The learner can: 1.1 Conduct a risk assessment prior to installation of optical fibres in an internal environment 1.2 Work safely when installing, splicing, terminating and testing optical fibre in an internal environment

Underpinning knowledge
1 State the rules for safe working when undertaking the installation of fibre cables, e.g. • statutory requirements, HASAWA/COSHH or relevant national safety standards • laser safety and the Optical Radiation Directive (ORD) 2 State the rules for safe working with fibre cables when carrying out preparation in terms of: • safe use of cutting and stripping tools • safe handling and containment of cleaning materials • proper disposal of waste material 3 State the rules for safe working and any special precautions when splicing in terms of: • identification of hazardous working conditions • understanding the dangers of high voltage systems employed in fusion splicing machines 4 State the rules for safe working and any special precautions to be observed when terminating fibres onto connectors in terms of: • identification of hazardous working conditions • use of tools and equipment • disposal of waste material • handling fibre cable • use of chemicals for cleaning • use of resins and adhesives

Learning outcome
The learner will: 2. Follow recommended installation procedures
Assessment criteria
The learner can: 2.1 Check cable and components before installation 2.2 Ensure that specified cable laying procedures are followed 2.3 Test laid cable before jointing/termination 2.4 Follow verbal and written work plans and instructions

Underpinning knowledge
1 State the use of fibre optics in LANs 2 Distinguish between the following types of optical fibre: • single-mode • multimode • graded-index • stepped-index 3 State the fibre specifications and parameters: • core/cladding diameters • buffer or secondary (buffer) and primary coating diameters • refractive index • numerical aperture • attenuation • operational wavelengths • operational characteristics of LEDs and lasers • laser enhanced fibres, e.g. principles of reduced attenuation and increased bandwidth for restricted mode launch conditions in multimode fibres 4 State the recommended fibre and cable inspection test methods and documentation: • visual checks and optical • continuity • point defects • length certification • component documentation insertion loss and return loss • return loss and reflectance 5 Identify the component parts of an optical fibre used in communication systems 6 State the use of the following components: • termination enclosures: a glands b couplings c mountings d fibre management tray e grounding/bonding • connectors

- pre-terminated cable assemblies

7 Explain the main types of equipment used for cable installation, e.g. rods, pulling ropes, fuse link protectors, socks, grips, fused connectors and swivels

8 State best practice for undertaking cable installation and fibre management in terms of:

- a cable tensile strength
- b minimum bend radius (MBR)
- c adequate protection and support
- d correct identification and labelling
- e provision of spare cable

9 State the methods of testing laid cable before jointing/termination in relation to:

- a point defects
- b fibre continuity

Learning outcome
The learner will: 3. Prepare fibre optic cable for fibre connectorisation and splicing
Assessment criteria
The learner can: 3.1 Prepare cable for connectorisation and splicing 3.2 Prepare coated fibre for connectorisation and splicing

Underpinning knowledge
1 State the characteristics of cables as indoor/outdoor/universal: • breakout • distribution • loose tube • single ruggedised • single fibre cable 2 State the basic constructional features of fibre optic cable and coatings in relation to: • fibre size • fibre coating • material combinations 3 Select and use cable cutting and stripping tools: • Kevlar cutters • jacket stripper • sheath remover • primary stripper • secondary strippers 4 State the purpose and use of fibre cleaning materials and the techniques involved in relation to: • degreasing solvents • solvent application 5 State the rules and any special precautions to be observed when carrying out preparation in terms of: • correct use of cutting and stripping tools • required fibre lengths for application: a connectorisation b splicing c patching • care in handling optical fibre cable

Learning outcome
The learner will: 4. Be able to splice together optical fibres
Assessment criteria
The learner can: 4.1 Prepare bare fibre for splicing 4.2 Splice fibres using fusion splice techniques 4.3 Splice fibres, using mechanical splice techniques where appropriate

Underpinning knowledge
1 Explain the benefits and criteria for using the main splice methods, e.g. • fusion • mechanical 2 State the working principles of splicing in terms of: • fibre preparation techniques • cleaving methods • splicing methods • splicing on pigtails 3 Explain how to use fibre cleaving tools and the fibre preparation techniques 4 State the possible causes of faults in cleaving caused by: • incorrect cleave angle • hackle • burrs • ingress of dirt • inadequate fibre length • problems with fibre coatings 5 Identify splice equipment according to range and application in relation to: • fusion splice machines (including manual and automatic) • the selection of splicing program for multimode and singlemode fibre 6 Identify mechanical splices, accessories and splice protection housings 7 Identify splice protection systems for working within patch panels 8 Identify potential problems when undertaking splicing and describe possible causes 9 State the performance requirements of splices according to European standards

Learning outcome
The learner will: 5. Be able to terminate fibre optic cables by fitting connectors
Assessment criteria
The learner can: 5.1 Fit a variety of fibre optic connector styles, to a minimum of two cables. At least one of the termination techniques should be pot and polish

Underpinning knowledge

1 State the types and uses of common connectors in current use for appropriate termination methods:

- connectors, e.g.
  - i. Straight Tip (ST)
  - ii. Subscriber Connector (SC)
  - iii. fibre connector (FC) / physical contact (PC)
  - iv. Latch Connector (LC)
- termination methods, e.g.
  - i. epoxy plus polish
  - ii. rapid termination techniques including anaerobic adhesive, pre-glued, pre-polish and crimp types

2 Identify termination tools and materials e.g.

- crimp
- scribe
- curing oven
- polishing tools
- epoxy/syringe
- polishing papers

3 State the fitting procedures for connectors in relation to:

- fibre preparation
- cable termination
- testing

4 State the possible causes of common faults in termination, e.g.

- chip
- crack
- scratch
- pitting
- concentricity error

5 State the performance tests for termination:

- visual inspection by microscope
- Code of Practice inspection criteria defined in current European standards
- insertion loss measurement

Learning outcome
The learner will: 6. Be able to test fibre optic links
Assessment criteria
The learner can: 6.1 Test fibre continuity using a visible light source 6.2 Measure the insertion loss using an infra-red light and power meter 6.3 Test link performance using Optical Time Domain Reflectometer (OTDR) techniques 6.4 Document test results

Underpinning knowledge
1 Explain how to perform loss calculations 2 State the range of test methods and the purpose of testing to measure cable performance in relation to: • fibre and connector loss • insertion loss • individual component loss • fibre continuity • fibre and system lengths 3 State the uses of the following test equipment: • visible light source • light source and power meter • OTDR 4 Explain how to use insertion loss testing equipment and procedures to measure: • connector insertion loss • cabling system losses 5 Identify the following features on an OTDR trace: • fault location of breaks and ends • measurement of fibre loss • splice loss • connector insertion and return loss • distance measurements 6 State typical procedures for testing, e.g. • terminated fibre • unterminated fibre • test directions 7 Explain how to apply and operate test equipment to prevent sources of error by: • calibration • launch stability • test lead connection • spatial resolution • elimination of ghosting • fibre mismatch

	• minimisation of dead zone
8	Document test results and compare with acceptable link and component performance

Unit 226 Fibre optic cabling in an external environment

UAN:	**M/501/3958**
Level:	2
Credit value:	5
GLH:	35
Aim:	This unit is concerned with the installation, splicing, termination and testing of fibre optic cables, typically a multi-element, singlemode fibre cable of at least 24 fibres, used in an external environment.
Assessment	The outcomes from this unit will be assessed using the following assessment methods: • Practical activities will be assessed by means of a set assignment for the unit • Underpinning knowledge will be assessed by means of a multiple-choice online test based on the test specification. Candidates must successfully complete both assessments to achieve the unit.

Learning outcome
The learner will: 1. Work safely with optical fibres in an external environment
Assessment criteria
The learner can: 1.1 conduct a risk assessment prior to installation of optical fibres in an external environment 1.2 work safely when installing, splicing, terminating and testing optical fibre in an external environment.

Underpinning knowledge
1 State the rules for safe working when undertaking installation: a statutory requirements, HASAWA/COSHH and New Roads and Street Works Act (NRSWA) or relevant national safety standards b laser safety and the Optical Radiation Directive (ORD)
2 State the rules for safe working when carrying out preparation in terms of: a cutting and stripping tools b handling and containment of cleaning materials c disposal of waste material
3 State the rules for safe working and any special precautions when splicing in terms of: a identification of hazardous working conditions b use of tools and materials c disposal of waste material d the dangers of high voltage systems employed in fusion splicing machines e use of heat guns when shrinking down cable gland onto joint enclosures
4 State the rules for safe working and any special precautions to be observed when testing with reference to: a identification of hazardous working conditions b correct handling of optical fibre cable and connectors c correct and safe use of test equipment d avoidance of eye-damage from visible and infra-red radiation using lasers and LED based systems.

Learning outcome
The learner will: 2. Follow recommended installation procedures
Assessment criteria
The learner can: 2.1 Check cable and components before installation 2.2 Check that correct cable laying procedures are followed 2.3 Test laid cable before jointing/termination 2.4 Follow verbal or written work plans

Underpinning knowledge
1 Explain the use of fibre optics in the communications network 2 State the fibre specifications and parameters in terms: a nominal core/cladding diameters b buffer or secondary (buffer) and primary coating diameters c refractive index d numerical aperture e attenuation f operational wavelengths including C and L band 3 State the recommended fibre and cable inspection test methods and documentation: a visual checks b continuity c point defects d length verification e component documentation insertion loss f return loss and reflectance 4 State the use of the following components: a termination and joint enclosures i. glands ii. couplings iii. mountings b connectors c cable assemblies 5 Explain the use of installation equipment: a winches, fused connectors and swivels, blowing equipment, gas testing 6 State the requirements for checking cable and components in accordance with relevant European standards 7 State the best practice for undertaking cable installation and fibre management in terms of:

	a	cable tensile strength
	b	minimum bend radius
	c	adequate protection and support
	d	correct identification and labelling
	e	provision of spare cable
8	State the methods of testing laid cable before joints/termination in terms of:	
	a	fibre continuity
	b	OTDR testing

Learning outcome
The learner will: 3. Prepare fibre optic cable for fibre splicing
Assessment criteria
The learner can: 3.1 Prepare cable for splicing 3.2 Prepare coated fibre for splicing

Underpinning knowledge
1 Identify characteristics of cables as indoor, outdoor and universal, e.g. a breakout b distribution c loose tube d single ruggedised e mini loose tube/microsheath f ribbon g blown fibre
2 State basic constructional features of singlemode fibre cable and coatings in relation to: a fibre size and type b fibre coating c material combinations
3 Select and use cable cutting and stripping tools, e.g. a Kevlar cutters b jacket stripper c sheath remover d primary stripper e secondary stripper
4 State the purpose and use of fibre cleaning materials and the techniques involved in relation to: a degreasing solvents b solvent application
5 State the rules and any special precautions to be observed when carrying out preparation in terms of: a correct use of cutting and stripping tools b required fibre lengths for splicing applications i. splicing ii. connectorisation c care in handling fibre cable

Learning outcome
The learner will: 4. Joint fibre optic cables by splicing
Assessment criteria
The learner can: 4.1 Set up working environment for outdoor cable jointing 4.2 Prepare bare fibre for splicing 4.3 Splice fibres using fusion splice techniques 4.4 Organise cables, tubes and fibres into joint housing 4.5 Seal joint enclosure

Underpinning knowledge
1 State the requirements for a cable jointing environment 2 State the working principles of splicing in terms of: a fibre preparation techniques b cleaving methods c splicing methods d splicing on pigtails 3 Explain how to use fibre cleaving tools 4 State the possible causes of faults in cleaving, e.g. a incorrect cleave angle b burrs c ingress of dirt d inadequate fibre length e problems with fibre coatings 5 Identify splice equipment according to range and application in relation to: a fusion splice machines (including manual and automatic) b selection of splicing program 6 Identify mechanical splices, accessories and splice protection housings 7 Identify potential problems when undertaking splicing and describe possible causes 8 Describe the use of splice management and protection systems and procedures for working with multi element cables within a joint housing 9 State the sealing and cable retention methods for joint closure systems 10 State the rules and special precautions for splicing in terms of: a use of tools and materials b identification of acceptable/unacceptable cleaves and splices c handling optical fibre cable.

Learning outcome
The learner will: 5. Terminate fibre optic cables by splicing on pre-terminated pigtails
Assessment criteria
The learner can: 5.1 Set up work environment for cable termination 5.2 Organise cables, tubes and fibres into Optical Distribution Frame (ODF) 5.3 Prepare bare fibre for splicing 5.4 Prepare secondary coated fibre for splicing 5.5 Splice fibres using fusion splice techniques

Underpinning knowledge
1 State a range of connectors suitable for a telecomms environment 2 State the requirements for efficient and effective cable termination 3 State the working principles of splicing in terms of: a fibre preparation techniques b cleaving methods c splicing methods 4 Explain how to use fibre cleaving tools and the correct fibre preparation techniques 5 State the possible causes of faults in cleaving, e.g. a incorrect cleave angle b burrs c ingress of dirt d inadequate fibre length e problems with fibre coating 6 Identify splice equipment according to range and application in relation to: a fusion splice machines (including manual and automatic) b the selection of splicing program 7 State the use of a variety of mechanical splices, accessories and splice protection housings 8 State the use of splice management and protection systems and procedures for working with multi element cables within an ODF

Learning outcome
The learner will: 6. Test fibre optic links
Assessment criteria
The learner can: 6.1 Test fibre continuity using a visible light source 6.2 Measure the insertion loss using an infra-red light and power meter 6.3 Test link performance using OTDR techniques 6.4 Record results of acceptable link and performance with reference to relevant specification

Underpinning knowledge
1 State the range of test methods and the purpose of testing to measure cable performance in relation to: a fibre and connector loss b fibre continuity c splice loss d fibre and system lengths e loss budgets
2 State the use and principles of operation of the following test equipment: a visible light source b light source and power meter c OTDR
3 Explain how to apply and operate an OTDR in terms of: a fault location of breaks and bends b measurement of fibre loss c splice loss d connector insertion and return loss e distance measurements
4 State the procedures for testing in accordance with relevant European standards and test conditions: a terminated fibre b unterminated fibre c test directions
5 Explain how to apply and operate test equipment to prevent sources of error by: a calibration b launch stability c test lead connection d cladding modes e spatial resolution f elimination of ghosting

	g	fibre mismatch
	h	minimisation of dead zone
6	Document test results and compare with acceptable link and component performance	

Unit 227 Copper cabling in an internal environment

UAN:	**F/600/6815**
Level:	2
Credit value:	6
GLH:	40
Aim:	This unit is concerned with the safe installation, procedures and testing of copper communication cables.
Assessment	The outcomes from this unit will be assessed using the following assessment methods: • Practical activities will be assessed by means of a set assignment for the unit • Underpinning knowledge will be assessed by means of a multiple-choice online test based on the test specification. Candidates must successfully complete **both** assessments to achieve the unit.

Learning outcome
The learner will: 1. Work safely with copper cabling in an internal environment
Assessment criteria
The learner can: 1.1 Conduct a risk assessment prior to installation of copper cables in an internal environment 1.2 Work safely when installing, terminating and testing copper cables in an internal environment

Underpinning knowledge
1 Safe working with copper cabling when undertaking installation, e.g. statuary requirements HASAWA/COSHH or relevant national safety standards working in confined spaces
2 Safe working with copper cabling when carrying preparation in terms of use of tools and equipment, personal safety requirements, identification of hazardous work conditions
3 Safe working in terms of electrical safety e.g. compliance with BS7671 or relevant national standard, use of earthing
4 The safe use of battery/electrically powered test equipment and power leads

Learning outcome
The learner will:

2. Understand basic electrical theory and safety with reference to data communications cabling
Assessment criteria
The learner can: 2.1 Use a multi-meter to measure voltage and resistance 2.2 Use Ohm's law to solve simple electrical circuit problems

Underpinning knowledge
1 Distinguish between different electrical conductors and different insulators 2 State the materials that make up electrical conductors and insulators 3 Explain capacitance and inductance and their relationship to a copper cable 4 Recognise the international standard symbols for electrical components 5 State the effects of an electric current: • heating • chemical • magnetic 6 State the SI units of current (ampere), potential difference (volt) and resistance (ohm) 7 State Ohm's law and its use in solving simple electrical circuit problems 8 Describe the relationship between MHz and Mbits 9 Explain the following test parameters: • return loss • equal level far end cross talk (ELFEXT) • powersum calculations • delay skew • propagation delay • attenuation-to-crosstalk ratio (ACR) • length • attenuation • near end cross talk (NEXT) • wire map • dc loop resistance • nominal velocity of propagation (NVP) • bandwidth 10 State the effect of signalling when using copper communications cables with respect to: • basic concept of characteristic impedance (Zo) • the reason for maintaining the twist in copper pairs and their effect on the cable's characteristic impedance • the cable's characteristic impedance of not complying with the minimum bend radius • applying excessive pull tension 11 State the rules for copper cable installation and management in terms of compliance with European and International standards 12 Interpret cable wiring diagrams

Learning outcome
The learner will: 3. Install copper communication cabling, following recommended installation procedures in accordance with current applicable standards
Assessment criteria
The learner can: 3.1 Check cable and components before installation 3.2 Undertake a site survey prior to commencing work 3.3 Check that correct cable laying procedures are followed

Underpinning knowledge
1 Describe the various cable topologies available for the installation of copper cables, e.g. • point to point • star • branching tree • bus • ring • grid • mesh
2 State the different cable types available for use in copper networks, e.g. • coaxial cables • multi-core cables • unshielded twisted pair (UTP) • shielded twisted pair (STP) • foil screen twisted pair (FTP) • supplementary/secondary shielded TP cable types
3 State the relevant classes, standards and categories of cabling including categories 5e and 6 and classes D and E
4 State requirements for: a interpreting wiring diagrams and drawings b fixing cabling communication racks c providing cable supports and wall fixing d fixing horizontal and vertical cables e interpreting cable labelling and colour codes f compliance with appropriate building regulations
5 State the rules and any special precautions to be observed when carrying out installation
6 State the rules and any special precautions to be observed when carrying out a site survey

Learning outcome
The learner will: 4. Terminate copper communication cabling
Assessment criteria
The learner can: 4.1 Terminate hardware in accordance with manufacturer's recommendations and correctly mount into communications panels/wall/floor boxes/cabinets and frames, etc. 4.2 Terminate registered jack (RJ) 45 connectors from at least three vendors on to UTP and FTP cabling

Underpinning knowledge
1 Explain how to use cable preparation and termination tools 2 State how to terminate Cat.5e patch leads 3 State Insulation Displacement Contact (IDC) methods of terminating multi-core copper cables within wiring systems and 110 block wiring systems 4 State the method of terminating Line Jack Units (LJUs) to telephone cable 5 State the rules and any special precautions for termination in terms of: a problems with incorrect cable termination b selection and use of tools and connectors 6 Identify in which situations/environments you would use stranded and solid core cables

Learning outcome
The learner will: 5. Test FTP, UTP and multicore copper links
Assessment criteria
The learner can: 1 Use a range of commercially available cable testing equipment that will test: a FTP and UTP copper cable permanent links b a multi-core cable installation c installations to relevant performance standards i.e. categories 5e and 6, and classes D and E d a telephone cabling system

Underpinning knowledge
1 Explain the importance of testing cabling plant installations 2 State the applications of national and international testing standards 3 Explain the application and use of continuity and loop testing equipment 4 Explain the terms: a split pairs b transposed/crossed pairs c reversed pairs d mixed pairs 5 State the correct methods of measuring the following: a NEXT from both ends of the cable b ACR c return loss (dB) d cable length e (dc) resistance (Ohms) f propagation as a delay in units of ns g cable attenuation (dB) h delay skew i wire maps j FEXT and ELFEXT k powersum calculations 6 State the methods for testing telephone cabling

Unit 228 Maintain ICT equipment and systems 2

UAN:	**K/501/3960**
Level:	2
Credit value:	9
GLH:	70
Aim:	The ability to maintain ICT equipment and systems is a valuable skill in the IT support industry. This unit will enable candidates to identify and fix problems with ICT equipment. Candidates will develop theoretical and practical knowledge of identifying failures of ICT equipment and applying corrective and preventative maintenance. It will also guide candidates in identifying hazards associated with ICT equipment and in establishing a safe working environment.
Assessment	The outcomes from this unit will be assessed using the following assessment methods • Practical activities will be assessed by means of a set assignment for the unit • Underpinning knowledge will be assessed by means of a multiple-choice online test based on the test specification. Candidates must successfully complete **both** assessments to achieve the unit.

Learning outcome
The learner will: 1. Identify hazards associated with ICT equipment and reduce risks to systems and personnel
Assessment criteria
The learner can: 1.1 Apply workplace health and safety procedures including risk assessment 1.2 Use workplace procedures to minimise common workplace hazards and risks 1.3 Comply with safe working practices when in a computer work environment including packing and unpacking static sensitive devices 1.4 Set up an ICT system whilst complying with current regulations and organisational requirements

Underpinning knowledge
1 Identify the people likely to be responsible for managing health and safety, and typical location/content of health and safety procedures 2 Describe factors that affect health and safety at work: a environmental (heating, dust, noise, etc.) b occupational (risk of electric shock, ESD, etc.) c human (training, change of behaviour, carelessness, etc.) 3 Define the main duties of employers and employees according to current health and safety at work legislation, e.g. a safe working practices b co-operation with employer c not to endanger self or others 4 Identify the main legal requirement for the use and disposal of hazardous substances 5 Identify types of substances that are classified 'hazardous to health' 6 State typical health and safety responsibilities of employees (including the care of visitors to an organisation) in relation to: a fire procedures and evacuation b accident reporting procedures c special safety features of the site d actions to be taken in an emergency 7 Explain the difference between a hazard and a risk 8 State the steps needed to carry out a risk assessment by identifying, e.g. a hazards and risks b who might be harmed and how c likelihood of harm occurring d what control methods need to be taken e who would be responsible for putting the controls into practice and when 9 Identify common hazards and risks associated with:

a use and maintenance of equipment

b clothing and jewellery during maintenance activities

c use of materials or substances

d working practices that do not conform to health and safety procedures

e unsafe behaviour

f accidental breakage and spillage

g environmental factors

h hazardous voltages

j workshop tools

10 State the principles of safe use and manual handling for:

a various tools

b lifting/moving base units, monitors, printers etc.

c ICT workstation furniture

11 Explain safety factors to be considered while using a PC, e.g.

a workstation ergonomics

b injuries caused by the repeated use of a PC

c eye strain due to incorrect monitor settings

12 State the importance of using a correctly rated fuse and identify how to select the correct fuse for various items of ICT equipment

13 State the reasons for and the importance of portable appliance testing (PAT)

14 Identify correct fire extinguishers for use on different types of fire:

a powder for fires involving freely burning materials, petrol, oils, gas and electrical equipment

b water for tackling freely burning materials such as paper, cloth, wood and furniture

c Foam for fires involving volatile liquids and freely burning materials such as paper, cloth, wood and furniture

d CO_2 for fires involving an electrical risk like computers, office equipment and generators

15 Describe ESD:

a what static electricity and electrostatic discharge (ESD) is

b how static charge is generated

c materials that can generate a static charge

d typical voltages in ESD

e effects of ESD on sensitive components

f types of damage caused by ESD (intermittent or partial failures, delayed failures, catastrophic failures)

g implications of ESD damaged equipment to an organisation

h static control devices (wrist strap, bench mat, coat, shoes, air ionisers)

j methods of controlling electrostatic discharge in the working environment (charge prevention, grounding, shielding,

neutralisation, education)

k importance of testing antistatic protection devices

16 State the importance of working with regard to:

a professional and ethical standards

b integrity and confidentiality

17 State the importance of being accountable for the quality and effectiveness of your own responses to events.

Learning outcome

The learner will:

2. Identify failures in ICT equipment and apply appropriate fixes

Assessment criteria

The learner can:

2.1 Gather accurate and relevant information on hardware failures

2.2 Diagnose causes of failures for ICT equipment

2.3 Use diagnostic tools to identify faults

2.4 Apply corrective hardware maintenance (fixes) to PCs following established procedures and using recommended parts and materials

2.5 Apply corrective software maintenance (fixes) to PCs following established procedures and using recommended materials

2.6 Check and confirm that fixes have been carried out successfully

2.7 Produce a system fault report and maintain corrective maintenance records

Underpinning knowledge

The candidate will be able to:

1 Identify available sources of information that can assist with failure analysis, e.g.

a error messages

b failure log

c site documentation

d installation log (software and hardware)

e diagnostic utilities

f escalation procedure

2 Identify typical corrective actions necessary to fix hardware and software faults:

a repair

b replace

c upgrade

3 State the typical procedures for reporting corrective actions

4 Identify typical sources of information on carrying out corrective maintenance, e.g.

a websites

b manufacturers' service manuals

c locally produced service manuals

d escalation procedures. e.g. referral to immediate supervisors, experienced personnel

5 Describe types of resource required for corrective maintenance:

a procedures

b availability of parts

c available time

d materials

e expertise

f support

6 Describe steps needed to be taken before applying corrective maintenance, e.g.

a confirmation with procedure and or parts lists in the manufacturer's or supplier's manual

b referral to locally produced service manual

c own knowledge of this or similar problem

d confirmation by supervisor or experienced colleague

e referral to the user

7 Describe tests that can be used to check that corrective maintenance has been carried out successfully

8 State problems which may arise from:

a faulty replacement parts

b unexpected unavailability of equipment from user

c failure of tests

d fault has changed

9 State who should typically be informed when problems arise during corrective maintenance:

a colleagues

b supervisor/manager

c manufacturer

d customer

10 Describe common systems for recording corrective maintenance:

a locally kept records

b maintenance manual

c logs in the equipment itself

d remotely held records

11 Describe why it is important to record corrective maintenance, e.g.

a records can be referred to during any other corrective maintenance

b removes duplication of effort when fault-finding problems

c records the parts used

d can be accessed by the user to ascertain if contract/maintenance of equipment is being carried out

e to ensure service level commitments are being met

12 Describe what is meant by:

a service operations

b an event

c a system administrator

d operations schedules

e event logs

f processing:

i batch

ii online

iii real time

iv transaction

g software, hardware and network infrastructure

13 Describe the importance of service operations and event management to an organisation and identify their role in ensuring the provision of IT systems, services and assets within an organisation

14 State the service operations that can be carried out remotely

15 Identify who are the:

a customers

b internal providers

c external providers

16 Identify who needs to authorise actions to be taken

17 Describe the importance of conducting tasks effectively and efficiently and in line with procedures and schedules

18 Describe the potential implications to an organisation of work not being conducted in a timely and efficient manner

19 Source, gather and collate information relating to tasks and events to respond to queries

20 Describe the importance of referencing the service level information during service operations and recording all activities.

Learning outcome
The learner will: 3. Apply preventative maintenance to ICT systems
Assessment criteria
The learner can: 3.1 Apply preventative maintenance using the recommended procedures, materials and parts 3.2 Maintain different types of hardware 3.3 Maintain function of hardware by applying software fixes 3.4 Check the equipment to confirm that the preventative maintenance procedures have been carries out successfully 3.5 Produce a report of problems encountered while carrying out preventative maintenance and maintain preventative maintenance records

Underpinning knowledge
The candidate will be able to: 1 identify available sources of information that can assist with failure analysis, e.g. a error messages b failure log c site documentation d installation log (software and hardware) e diagnostic utilities f escalation procedure 2 Identify typical corrective actions necessary to fix hardware and software faults: a repair b replace c upgrade 3 State the typical procedures for reporting corrective actions 4 Identify typical sources of information on carrying out corrective maintenance, e.g. a websites b manufacturers' service manuals c locally produced service manuals d escalation procedures e.g. referral to immediate supervisors, experienced personnel 5 Describe types of resource required for corrective maintenance: a procedures b availability of parts c available time d materials e expertise

f support

6 Describe steps needed to be taken before applying corrective maintenance, e.g.
- a confirmation with procedure and or parts lists in the manufacturer's or supplier's manual
- b referral to locally produced service manual
- c own knowledge of this or similar problem
- d confirmation by supervisor or experienced colleague
- e referral to the user

7 Describe tests that can be used to check that corrective maintenance has been carried out successfully

8 State problems which may arise from:
- a faulty replacement parts
- b unexpected unavailability of equipment from user
- c failure of tests
- d fault has changed

9 State who should typically be informed when problems arise during corrective maintenance:
- a colleagues
- b supervisor/manager
- c manufacturer
- d customer

10 Describe common systems for recording corrective maintenance:
- a locally kept records
- b maintenance manual
- c logs in the equipment itself
- d remotely held records

11 Describe why it is important to record corrective maintenance, e.g.
- a records can be referred to during any other corrective maintenance
- b removes duplication of effort when fault-finding problems
- c records the parts used
- d can be accessed by the user to ascertain if contract/maintenance of equipment is being carried out
- e to ensure service level commitments are being met

12 Describe what is meant by:
- a service operations
- b an event
- c a system administrator
- d operations schedules
- e event logs

f processing:
  i batch
  ii online
  iii real time
  iv transaction
g software, hardware and network infrastructure

13 Describe the importance of service operations and event management to an organisation and identify their role in ensuring the provision of IT systems, services and assets within an organisation
14 State the service operations that can be carried out remotely
15 Identify who are the:
  a customers
  b internal providers
  c external providers
16 Identify who needs to authorise actions to be taken
17 Describe the importance of conducting tasks effectively and efficiently and in line with procedures and schedules
18 Describe the potential implications to an organisation of work not being conducted in a timely and efficient manner
19 Source, gather and collate information relating to tasks and events to respond to queries
20 Describe the importance of referencing the service level information during service operations and recording all activities.

Unit 229 Install and configure ICT equipment and operating systems

UAN:	**J/501/3979**
Level:	2
Credit value:	9
GLH:	70
Aim:	The aim of this unit is to introduce candidates to a range of ICT hardware equipment and software. Candidates will learn to install and configure hardware and software as part of this unit

Learning outcome
The learner will: 1. Be able to prepare hardware/equipment for installation
Assessment criteria
The learner can: 1.1 Carry out pre-checks of the work area 1.2 Check hardware/equipment for installation including: damage to new and compatibility with existing equipment 1.3 Use the correct tools/resources to carry out the installation 1.4 Produce reports on any problems encountered 1.5 Install hardware/equipment

Range
1.1 Pre-checks should include health and safety checks 1.3 Tools should also be used correctly following health and safety guidelines

Learning outcome
The learner will: 2. Be able to install and configure hardware/equipment
Assessment criteria
The learner can: 2.1 Install hardware/equipment in both standalone and networked configurations to relevant industry safety standards 2.2 Configure hardware/equipment according to manufacturer's instructions. 2.3 Resolve any problems with the installation

Learning outcome
The learner will: 3. Be able to test installed hardware/equipment
Assessment criteria
The learner can: 3.1 Carry out industry standard pre-checks for installed hardware prior to installation of applications software 3.2 Carry out industry standard post-test on hardware/equipment following installation 3.3 Identify and resolve failures from POST indications 3.4 Produce test reports following an installation

Learning outcome
The learner will: 4. Be able to prepare, carry out and document the installation and upgrade of an operating system
Assessment criteria
The learner can: 4.1 Prepare for the installation of an operating system (OS) including: a. checking materials and equipment required b. backing up existing data c. doing a virus scan on the installation media d. inspecting system suitability for installation of an OS 4.2 Install OS software or upgrades according to instructions and installation plan, including applying OS patches/upgrades/service packs and user specific settings to the system 4.3 Install relevant device drivers, system protection software according to given instructions 4.4 Check that the system functions satisfactorily 4.5 Maintain installation and software records 4.6 Produce reports of any problems encountered during installation

Learning outcome
The learner will: 5. Be able to configure and test an installed operating system
Assessment criteria
The learner can: 5.1 Adjust OS software settings according to instructions, and document changes made. 5.2 Restore standard default settings of the OS. 5.3 Prepare test plans for an OS from a standard testing procedure and test OS functionality following an installation. 5.4 Resolve any conflicts/errors that exist in an OS configuration. 5.5 Produce test/installation reports.

Unit 230 Install, configure and maintain software

UAN:	**A/501/3980**
Level:	2
Credit value:	5
GLH:	30
Aim:	Candidates will learn how to install configure and maintain software correctly following prescribed guidelines and manufacturer's instructions

Learning outcome
The learner will: 1. Prepare, carry out and document the installation of software
Assessment criteria
The learner can: 1.1 Check availability of recommended resources before installing software 1.2 Perform data backup prior to carrying out a new installation 1.3 Carry out necessary checks pre and post installation 1.4 Complete registration documentation, installation and problem records 1.5 Install software according to manufacturer's instructions and given installation plan

Range	
1.1	Assessors can make recommendations for this task
1.5	Installation plans should be provided prior beginning this this task

Learning outcome
The learner will: 2. Be able to configure installed software
Assessment criteria
The learner can: 2.1 Modify ICT software by adding or removing components 2.2 Configure software to restore default settings 2.3 Upgrade software configuration according to instructions 2.4 Document changes made to software

Learning outcome
The learner will: 3. Be able to test and install software and resolve problems
Assessment criteria
The learner can: 3.1 Prepare a software test plan 3.2 Test software following installation including a) in response to a reported problem, b) using simple initial corrective actions, c) using utility software 3.3 Repair damaged software by reinstalling software components 3.4 Report outcome of repair procedures and provide a testing report

Range
3.2 A range of problems should be created for candidates to explore

Learning outcome
The learner will: 4. Be able to operate installed software
Assessment criteria
The learner can: 4.1 Open different software applications on a workstation including individual files within software applications 4.2 Enter data into a file 4.2 Save a file to a default location using both the same and different file names 4.4 Print test data from a software application 4.5 Close files and shut down software applications 4.6 Adjust basic settings of software to suit individual needs

Learning outcome
The learner will: 5. Uninstall standard application software
Assessment criteria
The learner can: 5.1 Record registration details of software to be uninstalled 5.2 Carry out any required back up of data before software is uninstalled 5.3 Uninstall software 5.4 Check the integrity of a system after the removal of software 5.5 Complete software records

Unit 231 Testing ICT systems

UAN:	**J/501/3982**
Level:	2
Credit value:	5
GLH:	45
Aim:	The aim of this unit is to introduce candidates to some of the tools and techniques used in testing ICT systems and software.

Learning outcome
The learner will: 1. Use typical diagnostic and test procedures
Assessment criteria
The learner can: 1.1 Use current commercially available diagnostic and testing software to investigate the operation of system hardware 1.2 Use diagnostic, test and configuration utilities built into a current commercially available, non-network, operating system 1.3 Use diagnostic and configuration utilities built into a typical system 1.4 Use anti-virus software to: • scan for viruses • configure to update virus scan engine and virus definitions • scan disks • check email attachments 1.5 Use security software to scan for and deal with: • spyware • adware • other malware 1.6 Use test equipment

Range	
1.1	Commercially available could include manufacturers software and or freeware
1.6	Test equipment could include on board test software

Learning outcome
The learner will: 2. Apply standard test procedures to PC systems and peripherals
Assessment criteria
The learner can: 2.1 Gather relevant information for testing devices/equipment 2.2 Comply with standard procedures (for both hardware and software) to test equipment for correct operation 2.3 Assist with performing more complicated tests on equipment 2.4 Produce a test results report 2.5 Perform automated testing routines

Range
2.1 Relevant information should include system specification, and details of faults reported, actions taken 2.5 Automated routines could involve scripted macros

Learning outcome
The learner will: 3. Interpret test results to identify faulty components and apply simple fixes
Assessment criteria
The learner can: 3.1 Interpret test data from standard test procedures comparing expected and actual results 3.2 Identify erroneous test results and take action to correct test conditions 3.3 Confirm from test results that a system functions within acceptable limits 3.4 Apply typical fault fixes on hardware and software according to test results 3.5 Record information using locally created documentation

Unit 232 ICT systems monitoring and operation

UAN:	**R/501/3984**
Level:	2
Credit value:	6
GLH:	36
Aim:	The aim of this unit is to monitor the operation of ICT systems and operate and maintain the peripherals as well as performing back up procedures.

Learning outcome
The learner will: 1. Be able to monitor the operation of ICT systems
Assessment criteria
The learner can: 1.1 Use designated tools to monitor the operation and performance of ICT systems 1.2 Carry out routine operator maintenance on ICT systems according to prescribed schedules 1.3 Identify failures of ICT systems reported by system monitoring tools 1.4 Report on ICT systems loss of performance 1.5 Maintain and update operational records

Learning outcome
The learner will: 2. Be able to operate and maintain systems and peripherals
Assessment criteria
The learner can: 2.1 Select, prepare, load and unload consumables/media for system peripherals (tape drive, disk drives, scanner, printer, etc.) To meet operational requirements 2.2 Configure system peripherals to meet operational requirements and to suit the consumables/media selected 2.3 Rectify common operator-level problems in the operation of system peripherals 2.4 Accurately report any problems which cannot be rectified by the operator 2.5 Perform routine operator maintenance on ICT systems according to prescribed schedules 2.6 Maintain and update operational and system maintenance records 2.7 Fix failures of ICT systems to meet operational requirements

Learning outcome
The learner will: 3. Be able to perform back-up and restoration of data
Assessment criteria
The learner can: 3.1 Use system utilities to manage and protect computer file storage 3.2 Select and use back-up media for use to meet prescribed schedules 3.3 Check and control system back ups 3.4 Perform system back-up operations 3.5 Maintain prescribed back-up records 3.6 Control the physical storage of system media and documentation 3.7 Restore files from back-up media

Unit 233 ICT repair centre procedure

UAN:	**Y/501/3985**
Level:	2
Credit value:	5
GLH:	43
Aim:	The aim of this unit is to introduce candidates to the principles behind working in a repair centre, candidates will learn many of the techniques used in this industry

Learning outcome
The learner will: 1. Be able to use test equipment and diagnostic software to determine the condition of equipment
Assessment criteria
The learner can: 1.1 Use standard safety measures to protect against common hazards associated with the handling and testing of electronic equipment 1.2 Use test equipment 1.3 Use diagnostic software 1.4 Conduct appropriate tests to identify the source of the reported failures 1.5 Perform pre-use safety and serviceability checks and correctly configure the test equipment 1.6 Produce records of tests and other checks 1.7 Use the results of tests and other evidence (e.g. Sensory – smell, touch, sound etc.), to determine the condition of the suspect items of hardware 1.8 Perform standard post-installation functional tests on system components and sub-assemblies to confirm serviceability

Range	
1.1	A range of health and safety techniques should be demonstrated including the safe use of ICT hardware and tools
1.5	Test equipment could include anti-static devices

Learning outcome
The learner will: 2. Be able to dismantle and re-assemble common types of ICT hardware
Assessment criteria
The learner can: 2.1 Take safety measures to prevent damage to equipment and individuals during the dismantling/re-assembly of ICT equipment 2.2 Select and use tools 2.3 Dismantle a PC base unit to module level, while considering health and safety issues 2.4 Follow manufacturer's or locally produced instructions to fault fix components by assessing the condition of each component and taking necessary action 2.5 Re-assemble a PC base unit to working condition 2.6 Dismantle and reassemble major components of peripherals

Learning outcome
The learner will: 3. Be able to identify and apply remedial solutions for failures in equipment
Assessment criteria
The learner can: 3.1 Use the results of testing procedures to identify remedial solutions 3.2 Select the most appropriate solution for hardware and software problems 3.3 Apply remedial actions to PC systems including peripherals 3.4 Install software and data to enable the functional testing of equipment 3.5 Perform standard post installation functional tests for replaced components to confirm serviceability of: • new components • system(s) affected by replacement component(s) 3.6 Perform a full functional test of equipment before delivery to the customer and document the results 3.7 Maintain centre and customer documentation.

Range
3.7 Documentation could be provided for candidates

Unit 234 Create automated procedures for ICT operating systems

UAN:	**K/501/3991**
Level:	2
Credit value:	5
GLH:	44
Aim:	The aim of this unit is to introduce candidates to the need for automated procedures and the correct methods to produce them

Learning outcome
The learner will: 1. Explain the functions of an operating system
Assessment criteria
The learner can: 1.1 Describe the modes of operation for operating systems 1.2 Describe the following functions of an operating system: • resources allocation and scheduling • memory management • file management • input/output control, including interrupt handling • user interface (e.g. command language, graphical user interface) • security (e.g. passwords, access rights) 1.3 State that a multi-user system allows several users to share access 1.4 List common utility programs (e.g. text editor, sort, debugger, file/directory management (copy, delete, rename))

Range
1.1 A range of operating should be included including Microsoft and Linux versions

Learning outcome
The learner will: 2. Describe multiprogramming/multitasking systems concepts
Assessment criteria
The learner can: 2.1 State the use of common terms 2.2 Describe how the operating system allocates memory 2.3 Describe virtual memory management techniques 2.4 State how storage protection is used to avoid corrupting the code or data of another program 2.5 Describe the advantages of pre-emptive allocation of resources by an operating system 2.6 State the circumstances under which deadlock occurs 2.7 Describe how a logical error in a program can cause a system to deadlock or crash 2.8 State circumstances under which data can be lost 2.9 Describe spooling 2.10 Describe how shared data is locked to prevent multiple updates occurring at the same time

\Learning outcome
The learner will: 3. Describe file management concepts
Assessment criteria
The learner can: 3.1 Describe how files are organised into directory structures 3.2 List the typical information held by an operating system for a file 3.3 Describe how an operating system allocates free areas on a disk 3.4 State what contiguous storage means 3.5 Describe the management of non-contiguous storage of files on disk 3.6 Describe why disk space becomes fragmented 3.7 Describe how a fragmented disk affects performance 3.8 Describe the access methods for files 3.9 List the advantages of using random access files 3.10 Describe the structure of different file types

Learning outcome
The learner will: 4. Describe the software development environment
Assessment criteria
The learner can: 4.1 Identify the differences between high level and low-level programming languages 4.2 State that each programming language has a set of grammatical rules (syntax) defining how keywords, symbols, expressions and statements may be structured and combined 4.3 State that source code is created using a text editor and contains program instructions written in a programming language 4.4 Describe how a compiler translates the source code into object code and identifies all syntax errors found 4.5 State when a linker is used 4.6 Identify the differences between a compiler and an interpreter 4.7 State that a compiled program cannot be run until all syntax errors have been removed 4.8 Describe the portability problems associated with running software on computers with different architectures 4.9 Describe how debug tools are used to trace program execution and display the values in variables at run time 4.10 List the advantages of an Integrated Development Environment that contains all the tools required for the development of software

Learning outcome
The learner will: 5. Create automated procedures
Assessment criteria
The learner can: 5.1 Interpret a problem specification 5.2 Select and use commands from a command language, constructs for iteration and selection 5.3 Test for error conditions before running a subsequent job 5.4 Use wildcards to identify a group of files 5.5 Accept and use parameters typed at the command prompt 5.6 Use comments to document the code 5.7 Create automated procedures to run one or more processes 5.8 Test the operation of an automated procedure and print a listing

Unit 235 Install, configure and test ICT networks

UAN:	**H/501/3990**
Level:	2
Credit value:	9
GLH:	75
Aim:	The aim of this is to introduce candidates to the principles used in networking, candidates will explore a range of configurations as well as learn the principles of testing Networks

Learning outcome
The learner will: 1. Identify network concepts and terminology
Assessment criteria
The learner can: 1.1 check availability of resources recommended in software installation instructions 1.2 perform data backup prior to carrying out a new installation 1.3 virus check installation software 1.4 install software according to manufacturer's instructions and given installation plan 1.5 check that the system functions after installation of software 1.6 complete registration documentation and/or installation records 1.7 report any problems encountered

Learning outcome
The learner will: 2. Configure installed software
Assessment criteria
The learner can: 2.1 modify software configuration according to instructions and document the changes made 2.2 configure to restore default settings 2.3 add and remove components of installed software 2.4 upgrade existing software by • downloading from the Internet/LAN • using upgrade supplied on disk.

Range
2.1 Changes should be made according to a given scenario

Learning outcome
The learner will: 3. Test and install software and resolve problems
Assessment criteria
The learner can: 3.1 prepare a software test plan, including • system being used • tests/monitoring to be undertaken • diagnostics to be used • expected results • recording of results 3.2 test software following installation, 3.3 test software in response to a reported problem 3.4 use simple initial corrective actions to resolve problems 3.5 use utility software, including • system monitor, file checker etc, supplied with operating system • a proprietary utilities package 3.6 repair damaged software by reinstalling software components 3.7 report outcome of repair procedures and provide a testing report

Learning outcome
The learner will: 4. Operate installed software
Assessment criteria
The learner can: 4.1 open different software applications on a workstation 4.2 open individual files within software applications 4.3 enter data into a file 4.4 save a file to a default location using both the same and different file names 4.5 print test data from software applications 4.6 close files and shut down software applications 4.7 adjust basic settings of software to suit individual needs

Learning outcome
The learner will: 5. Uninstall standard application software
Assessment criteria
The learner can: 5.1 record registration details of software to be uninstalled 5.2 carry out any required back up of data before software is uninstalled 5.3 uninstall software 5.4 check the integrity of a system after the removal of software 5.5 complete software records

Unit 270 Basic principles of communications systems

UAN:	**M/600/9063**
Level:	2
Credit value:	3
GLH:	25
Aim:	The aim of this unit is to introduce communications devices and the methods in which they work, candidates will explore a range of communications devices and techniques

Learning outcome
The learner will: 1. Identify safe working practices in communications systems
Assessment criteria
The learner can: 1.1 State the rules for safe working including: • undertaking installation • preparing cutting and stripping tools, safe handling and containment of cleaning materials and disposing of waste materials • terminating cables

Learning outcome
The learner will: 2. Describe the basic principles of SI units and symbols
Assessment criteria
The learner can: 2.1 Identify basic SI units 2.2 Identify names and symbols for preferred SI prefixes 2.3 Identify waves and wave motion 2.4 Define amplitude, wavelength, frequency and the unit of frequency 2.5 State the relationship between velocity, frequency and wavelength

Learning outcome
The learner will: 3. Describe the basic principles of communications systems
Assessment criteria
The learner can: 3.1 List common terms used in communications systems 3.2 Identify basic communications systems including information source, information destination and transmission/transfer link 3.3 Outline the basic principles of cable systems 3.4 Identify the properties of differing types of transmission links 3.5 Identify passive and active equipment and/or networks 3.6 Identify various methods of communicating over a channel 3.7 Identify types of information carried by communications systems 3.8 List the systems available for communication 3.9 Categorise signals into audio, video and data types 3.10 Distinguish between baseband and broadband 3.11 Recognise that analogue information can be converted to digital signals and vice versa

Learning outcome
The learner will: 4. Describe the basic principles of data communication
Assessment criteria
The learner can: 4.1 State that data networks allow computers or other data terminals to exchange information 4.2 State the advantages and disadvantages of digital communication 4.3 State the advantages and disadvantages of analogue communications 4.4 Identify analogue and digital signals 4.5 Identify the type of coding typically used on digital networks 4.6 List the differences between bits and bytes 4.7 State the meaning of bit error rate (BER) and give typical figures for copper and optical fibre systems 4.8 Explain the difference between serial and parallel methods of transmitting data 4.9 Explain why modems are required for computer communication 4.10 State the main categories of computer networks 4.11 Identify the basic topologies of computer networks

Unit 284 Business concepts

UAN:	**A/502/1108**
Level:	2
Credit value:	4
GLH:	30
Aim:	The aim of this unit is to understand how different types of organisations are affected by different functions, factors, financial and legal requirements

Learning outcome
The learner will: 1. Know different types of organisations and the key functions within them
Assessment criteria
The learner can: 1.1 Identify different types of organisations 1.2 Identify key functions that are required within organisations 1.3 Identify the structure of an organisation

Learning outcome
The learner will: 2. Understand how the external environment creates the need for organisations to change
Assessment criteria
The learner can: 2.1 Provide evidence of external factors affecting an organisation 2.2 Identify an external factor as an opportunity or a threat

Learning outcome
The learner will: 3. Be able to describe the main legal and regulatory issues for organisations
Assessment criteria
The learner can: 3.1 Identify some of the actions that organisations can take to comply with the Data Protection Act

Learning outcome
The learner will:

4. Know the essential financial operations within organisations
Assessment criteria
The learner can: 4.1 Identify the costs and benefits in a cost benefit analysis table 4.2 Create a cost benefits analysis table in a given scenario 4.3 Identify the payback period 4.4 Calculate the return on investment using a given formula

Unit 600 Computer Games Development

UAN:	**A/601/3164**
Level:	2
Credit value:	4
GLH:	28
Aim:	The aim of this unit is to introduce the learner to computer game development. In order to do this the learner will explore the various hardware and software components that are required in the development of computer games. They will also look at the different features of a range of existing computer games. The learner will propose a plan for developing a sample game and then move into planning and developing elements of that game

Learning outcome
The learner will: 1. Know computer game components and the computer games industry
Assessment criteria
The learner can: 1.1 Identify the hardware and software components of a video game system 1.2 Identify the activities required to develop modern computer games 1.3 Describe the features of an existing computer game

Learning outcome
The learner will: 2. Know how to develop a computer game specification
Assessment criteria
The learner can: 2.1 Contribute to the production of a pre-production proposal document for a computer game project 2.2 Identify the components required to develop a computer game 2.3 Contribute to the productions of an implementation plan for a computer game development

Learning outcome
The learner will: 3. Be able to implement a component of a computer game
Assessment criteria
The learner can: 3.1 Design a component of a computer game 3.2 Develop a component of a computer game

Unit 601 Data modelling

UAN:	**A/601/3200**
Level:	2
Credit value:	6
GLH:	45
Aim:	The aim of this unit is to introduce some of the concepts behind data modelling. The learner will learn about the basic concepts of data modelling including entities, attributes and relationships. The learner will also learn the objectives of normalisation. The learner will use this knowledge whilst working with a simple database structure.

Learning outcome
The learner will: 1. Know the basic concepts of logical data modelling
Assessment criteria
The learner can: 1.1 identify entities, attributes and relationships 1.2 state the objectives of data normalisation 1.3 state the purpose of keys

Learning outcome
The learner will: 2. Be able to use simple data modelling techniques to create logical data models
Assessment criteria
The learner can: 2.1 identify and name entities, assigning the correct type and size 2.2 identify entity relationships 2.3 use a standard notation to create a logical data model

Unit 603 Introduction to IT systems development

UAN:	**J/601/3247**
Level:	2
Credit value:	6
GLH:	50
Aim:	The aim of this unit is to introduce the learner to systems development methodologies. First the learner is taught to understand the role of IT systems in our society and understand the need to develop systems. In order to do this the learner will learn the importance of the systems development life cycle. The learner will also understand the advantages and disadvantages of different types of software options and the importance of quality assurance.

Learning outcome
The learner will: 1. Understand IT Systems and the roles of IT personnel
Assessment criteria
The learner can: 1.1 Explain the role of IT Systems in society 1.2 Describe the major components of a contemporary IT System 1.3 Describe the roles of personnel in the development, operation and use of IT System

Learning outcome
The learner will: 2. Understand IT Systems Development Life Cycle (SDLC) models
Assessment criteria
The learner can: 2.1 Describe top down, bottom up and integrated approaches to IT Systems development 2.2 Explain the purposes of the initiation, analysis, design and implementation phases of the IT SDLC 2.3 Identify the advantages and disadvantages of the traditional ('waterfall') SDLC model. 2.4 Describe two other SDLC models, identifying the type of development for which they are suited

Learning outcome
The learner will: 3. Understand IT Systems Development Life Cycle (SDLC) concepts and processes
Assessment criteria
The learner can: 3.1 Describe the advantages and disadvantages of the following solution types: • packaged ('off the shelf') • bespoke • combination of packaged and bespoke • upgrade 3.2 Explain the importance of quality assurance and meeting customer requirements during the IT SDLC and the means by which they can be achieved 3.3 Describe the applicability of the following methods of gathering information: • interviews • observations • questionnaires • examination of records and documents

Unit 604 Practical fundamentals of ICT

UAN:	**A/507/0177**
Level:	1
Credit value:	9
GLH:	49
Aim:	This unit introduces learners to the fundamentals of personal computers. It covers basic concepts and terminology related to their operation and allows learners to develop skills to set up a workstation. It also allows learners to develop skills to install software and consider security requirements of a personal computer. This unit covers the content of CompTIA Strata Functionality.

Learning outcome
The learner will: 1. Be able to use personal computers and their peripherals.
Assessment criteria
The learner can: 1.1 define IT terminology 1.2 identify risks associated with the **upgrading** of personal computers 1.3 identify differences between different types of **peripherals** 1.4 set up a PC workstation 1.5 use the PC to operate peripherals.

Range
upgrading (technologies and equipment) **peripherals** (connector types, monitor types, keyboard, mouse, printer)

Learning outcome
The learner will: 2. Be able to manage software installations.
Assessment criteria
The learner can: 2.1 install software 2.2 remove software 2.3 upgrade software 2.4 configure operating system 2.5 explain digital rights management 2.6 explain the function of software tools.

Learning outcome
The learner will: 3. Be able to manage files.
Assessment criteria
The learner can: 3.1 identify issues related to folder and file management 3.2 create folders 3.3 delete folders 3.4 rename folders 3.5 move folders 3.6 assign folder structure 3.7 create files 3.8 delete files 3.9 rename files 3.10 move files.

Learning outcome
The learner will: 4. Know how to manage IT security requirements.
Assessment criteria
The learner can: 4.1 recognise security risks 4.2 identify procedures to prevent security risks 4.3 recognise security breaches 4.4 identify access control methods 4.5 identify ways to resolve security breaches 4.6 identify IT related legislation.

Unit 605 Fundamentals of IT technology

UAN:	**F/507/0178**
Level:	1
Credit value:	7
GLH:	38
Aim:	This unit introduces learners to the fundamentals of computer hardware. It covers the characteristics and functions of input, storage and peripheral hardware. Learners will gain knowledge of compatibility issues and common errors and how to carry out preventative maintenance. This unit covers the content of CompTIA Strata Technology.

Learning outcome
The learner will: 1. Know safety issues.
Assessment criteria
The learner can: 1.1 recognise safety hazards 1.2 identify safety guidelines.

Learning outcome
The learner will: 2. Understand personal computer hardware.
Assessment criteria
The learner can: 2.1 operate computer devices 2.2 describe the characteristics of storage devices 2.3 explain the functions of storage devices 2.4 describe the characteristics of peripheral devices 2.5 explain the functions of peripheral devices 2.6 describe the characteristics of core input devices 2.7 explain the functions of core input devices.

Learning outcome
The learner will: 3. Understand hardware compatibility issues.
Assessment criteria
The learner can: 3.1 identify compatibility issues 3.2 recognise operational problems caused by hardware 3.3 use procedures to minimise **risks.**

Range
risks (data loss, loss of service, damage to equipment)

Learning outcome
The learner will: 4. Know how to use maintenance products.
Assessment criteria
The learner can: 4.1 identify preventative maintenance products 4.2 describe how to use maintenance products.

Unit 606 Principles and concepts of cloud computing

UAN:	**A/507/0180**
Level:	2
Credit value:	8
GLH:	40
Aim:	Learners will gain basic knowledge of the Cloud computing principles and concepts and their role in businesses. They will develop knowledge and some understanding of how cloud services are adopted by businesses. This unit covers the content of CompTIA Cloud Essentials.

Learning outcome
The learner will: 1. Understand the characteristics of cloud services.
Assessment criteria
The learner can: 1.1 define cloud computing 1.2 define cloud computing terminology 1.3 describe the relationship between cloud computing and virtualisation 1.4 identify early examples of cloud computing 1.5 distinguish between different types of clouds.

Learning outcome
The learner will: 2. Be able to create a cloud infrastructure.
Assessment criteria
The learner can: 2.1 identify types of organisations that might benefit from cloud computing 2.2 compare cloud computing with outsourcing 2.3 explain how the characteristics of clouds and cloud services relate to business operations 2.4 explain how the characteristics of cloud computing enhance business value.

Learning outcome
The learner will: 3. Understand the technical perspectives of cloud computing.

Assessment criteria
The learner can: 3.1 describe the technical differences between private and public types of clouds 3.2 explain how the **features** of cloud computing are deployed 3.3 explain technical threats associated with cloud computing 3.4 explain how to mitigate for technical threats associated with cloud computing 3.5 describe the impact of cloud computing on application architecture 3.6 describe the impact of cloud computing on the application-development process.

Range
features (networking, automation and self-service, federation, standardisation)

Learning outcome
The learner will: 4. Understand how cloud services are adopted.
Assessment criteria
The learner can: 4.1 explain steps that lead to a successful adoption of cloud computing services 4.2 describe the skills required in an organisation adopting cloud computing 4.3 describe the critical success factors for an organisation adopting cloud computing 4.4 describe approaches for migrating applications.

Learning outcome
The learner will: 5. Understand the impact of cloud computing on organisations.
Assessment criteria
The learner can: 5.1 describe the impact cloud computing has on IT service management in an organisation 5.2 describe how IT service management in an organisation changes as a result of implementing cloud computing 5.3 describe how to explore the potential impact of cloud computing in an organisation 5.4 explain the effect of integrating cloud computing into an organisation's existing compliance risk and regulatory framework 5.5 explain the implications of direct cost for IT departments 5.6 explain the implications of cost allocations for IT departments 5.7 explain how to maintain strategic flexibility for information communication technology.

Unit 607 ICT fundamentals

UAN:	**J/507/8508**
Level:	2
Credit value:	20
GLH:	112
Aim:	The unit addresses a wide range of topics that introduce learners to the fundamental knowledge and skills of an entry-level IT professional including networking, security, virtualisation and desktop imaging and deployment. These include the ability to assemble components based on customer requirements, install, configure and maintain devices, PCs and software for end users and the ability to safely diagnose, resolve and document common hardware and software issues. Learners will also develop the skills needed to provide appropriate customer support. This unit covers the content of CompTIA A+ - both parts.

Learning outcome
The learner will: 1. Understand application security.
Assessment criteria
The learner can: 1.1 describe types of personal computer systems 1.2 state computer hardware components 1.3 state computer software components 1.4 describe hardware configurations for task-specific computers 1.5 describe the purpose of tools used with personal computer components 1.6 describe the purpose of software used with personal computer components.

Learning outcome
The learner will: 2. Be able to assemble a desktop computer to meet requirements.
Assessment criteria
The learner can: 2.1 explain the features of safe working conditions 2.2 assemble computer 2.3 boot the computer 2.4 configure components in a computer system to meet a customer's requirements 2.5 upgrade components in a computer system to meet a customer's requirements.

Learning outcome
The learner will: 3. Be able to use preventative maintenance techniques.
Assessment criteria
The learner can: 3.1 describe the benefits of preventive maintenance for personal computers 3.2 identify preventive maintenance techniques for operating systems 3.3 apply preventive maintenance techniques for operating systems

Learning outcome
The learner will: 4. Be able to install operating systems.
Assessment criteria
The learner can: 4.1 explain the purpose of operating systems 4.2 explain client-side virtualization 4.3 use tools to perform specific tasks within a Graphic User Interface (GUI) 4.4 install operating systems.

Learning outcome
The learner will: 5. Know networks and networking technologies.
Assessment criteria
The learner can: 5.1 describe types of networks 5.2 describe networking concepts 5.3 describe networking technologies 5.4 describe physical components of a network 5.5 describe network topologies 5.6 describe Ethernet standards 5.7 identify technologies used to establish connectivity 5.8 identify preventive maintenance techniques used for networks

Learning outcome
The learner will: 6. Understand the components of a basic laptop.
Assessment criteria
The learner can: 6.1 describe the purpose of laptop features 6.2 describe laptop display components 6.3 describe how to configure laptop power settings 6.4 describe laptop wireless communication technologies 6.5 describe the installation of laptop components 6.6 describe the removal of laptop components 6.7 identify preventive maintenance techniques for laptops

Learning outcome
The learner will: 7. Understand the capabilities of mobile devices.
Assessment criteria
The learner can: 7.1 explain mobile device hardware 7.2 describe the features of mobile operating systems 7.3 compare methods for securing mobile devices.

Learning outcome
The learner will: 8. Be able to network computers and mobile devices.
Assessment criteria
The learner can: 8.1 establish basic network connectivity 8.2 configure email for a mobile device 8.3 connect a computer to a network 8.4 apply preventive maintenance techniques on a network.

Learning outcome
The learner will: 9. Be able to configure printers.
Assessment criteria
The learner can: 9.1 describe the features that are common to most printers 9.2 describe different types of printers 9.3 describe printer sharing procedures 9.4 share a printer 9.5 describe preventive maintenance techniques for a printer 9.6 install a printer 9.7 configure a printer.

Learning outcome
The learner will: 10. Know security requirements.
Assessment criteria
The learner can: 10.1 describe security threats 10.2 identify security procedures 10.3 identify preventive maintenance techniques for security.

Learning outcome
The learner will: 11. Understand the roles and responsibilities of the IT professional.
Assessment criteria
The learner can: 11.1 explain why good communication skills are a critical part of IT work 11.2 explain legal and ethical issues that arise in the IT industry 11.3 explain behaviours required in response to legal and ethical issues.

Learning outcome
The learner will: 12. Be able to troubleshoot problems.
Assessment criteria
The learner can: 12.1 identify the steps of the troubleshooting process 12.2 troubleshoot computer components and peripherals 12.3 troubleshoot operating systems 12.4 troubleshoot networks 12.5 troubleshoot laptops 12.6 troubleshoot printers 12.7 troubleshoot mobile devices 12.8 troubleshoot security.

Unit 617 Fundamentals of Windows based server administration

UAN:	**R/507/0234**
Level:	2
Credit value:	10
GLH:	55
Aim:	This unit provides the underpinning knowledge to install, configure and administer a Windows server. It offers learning about specific aspects of a server including the role of a Server, use of Active Directories, server performance management and server storage. The learner will also have an opportunity to demonstrate application of the knowledge. This unit is linked to Microsoft's MTA Windows Server Administration Fundamentals.

Learning outcome
The learner will: 1. Know the fundamentals of a server.
Assessment criteria
The learner can: 1.1 describe how **device drivers are managed** 1.2 describe how **services are managed** 1.3 identify **server installation options**.

Range
device drivers are managed (installation, removal, disabling, update/upgrade, rollback, troubleshooting, Plug and Play, driver signing) **services are managed** (service status, startup types, recovery options, service accounts, dependencies) **server installation options** (correct version, partitioning, interactive install, unattended install, automated install, upgrade, firmware updates, minimal vs full)

Learning outcome
The learner will: 2. Know the roles of a server.
Assessment criteria
The learner can: 2.1 identify **application servers** 2.2 describe **web services** 2.3 describe **remote access services** 2.4 describe **file services** 2.5 describe **print services** 2.6 describe **server virtualisation**.

Range
application servers (mail, database, collaboration, monitoring, threat management) **web services** (WWW, FTP, adding components, sites, ports, SSL, certificates), **remote access services** (remote assistance, remote administration tools, remote desktop services, licensing, Virtual Private Network, multiple ports) **file services** (permissions, rights, auditing, sharing) **print services** (local printers, network printers, printer pools, Web printing, driver deployment, print job management) **server virtualisation** (virtualisation modes, virtual hard drives, virtual memory, virtual networks, checkpoints, physical to virtual, virtual to physical)

Learning outcome
The learner will: 3. Know types of server storage.
Assessment criteria
The learner can: 3.1 identify **storage technologies** 3.2 describe advantages and disadvantages of storage technologies 3.3 identify **RAID** 3.4 describe **disk types**.

Range
storage technologies (local (SATA, SCSI, IDE), NAS, SAN, fibre channel, iSCSI, NFS) **RAID** (types, combinations, hardware, software) **disk types** (basic, dynamic, mount points, file systems, VHD, distributed file systems)

Learning outcome
The learner will: 4. Know what active directory does.
Assessment criteria
The learner can: 4.1 describe **user accounts** 4.2 describe **groups** 4.3 describe **organisational units** 4.4 describe **containers** 4.5 describe **directory infrastructure** 4.6 describe **group policy**.

Range
user accounts (domain, local, profiles) **groups** (types, scopes, nesting) **organisational units** (purpose, delegation) **containers** (purpose, delegation) **directory infrastructure** (domain controllers, forests, roles, domains, trusts, functional levels, namespace, sites, replication) **group policy** (processing, management, computer policies, user policies, local policies)

Learning outcome
The learner will: 5. Know what is involved in server performance management.
Assessment criteria
The learner can: 5.1 identify **server hardware components** 5.2 describe how to **monitor** server performance.

Range
server hardware components (memory, disk, processor, network, removable drives, graphic cards, cooling, power usage, ports) **monitor** (methodology, procedures, tools, logs, alerts)

Learning outcome
The learner will: 6. Know what is involved in sever maintenance.
Assessment criteria
The learner can: 6.1 describe the startup process 6.2 describe how **business continuity is maintained** 6.3 identify **updates** required to maintain server integrity 6.4 describe troubleshooting methodology.

Range
business continuity is maintained (backup and restore, disaster recovery, clustering, data redundancy, UPS) **updates** (software, driver, operating systems, service packs, critical, security, definitions, update services)

Learning outcome
The learner will: 7. Be able to administer windows based servers.
Assessment criteria
The learner can: 7.1 configure a windows based server 7.2 configure **storage** 7.3 configure **active directory** 7.4 troubleshoot a windows based **server**.

Range
server (configure also means install) (install, upgrade ADDS, DNS, DHCP) **storage** (network drives, RAID, VHDs) **active directory** (users, groups, organisational units, group policy) **server** (performance, access issues, services)

Unit 618 Fundamentals of database administration

UAN:	**M/507/0774**
Level:	2
Credit value:	8
GLH:	40
Aim:	This unit covers concepts and technologies pertaining to Database Administration. Learners will gaining knowledge about relational databases, queries, stored procedures, and the security requirement for databases and the data stored in them. And be able to show some of those skills in practice. This unit is linked to Microsoft's MTA Database Administrator Fundamentals with a small practical exercise to demonstrate application of knowledge.

Learning outcome
The learner will: 1. Know core database concepts.
Assessment criteria
The learner can: 1.1 describe the **structure of a database** 1.2 describe relational database concepts 1.3 describe **Data Manipulation Language (DML)** 1.4 define Data Definition Language (DDL) 1.5 describe how T-SQL can be used to create database objects.

Range
structure of a database (tables, columns, rows, fields, records) **database concepts** (purpose, needs, management) **Data Manipulation Language (DML)** (definition, role)

Learning outcome
The learner will: 2. Know how to create database objects.
Assessment criteria
The learner can: 2.1 Select data types 2.2 Identify SQL syntax required to create tables in a database 2.3 Describe how to create views 2.4 Describe how to create stored **functions**.

Range
functions (select, insert, update, delete)

Learning outcome
The learner will: 3. Know how to manipulate data.
Assessment criteria
The learner can: 3.1 describe how to **select data** 3.2 describe how to use INSERT queries 3.3 describe how to **update data** 3.4 describe how to **delete data.**

Range
select data (use SELECT queries, use joins, combine results) **update data** (use UPDATE statements, using a table) **delete data** (from single and multiple tables, maintain data and referential integrity)

Learning outcome
The learner will: 4. Know how data is stored in a database.
Assessment criteria
The learner can: 4.1 describe levels of normalisation 4.2 describe how to normalise a database to third normal form 4.3 describe the reason for keys in a database 4.4 select primary keys 4.5 select data type for keys 4.6 select fields for composite keys 4.7 describe the relationship between foreign and primary keys 4.8 describe the purpose of **indexes** in a database.

Range
indexes (clustered, non-clustered)

Learning outcome
The learner will: 5. Know database administration.
Assessment criteria
The learner can: 5.1 Describe the importance of database security 5.2 Identify database objects that can be secured 5.3 Identify database objects that should be secured 5.4 Describe the roles of user accounts 5.5 Describe types of **database backup** 5.6 Describe how to restore a database.

Range
database backup (full, incremental, differential, partial)

Learning outcome
The learner will: 6. Be able to create and configure a database.
Assessment criteria
The learner can: 6.1 create **database objects** 6.2 manipulate **data** 6.3 configure **database** 6.4 implement **database security**.

Range
database objects (data types, tables, views, stored functions) **data** (SELECT, INSERT, UPDATE, DELETE) **database** (normalise, primary keys, foreign keys, clustered indexes) **database security** (authentication, backup)

Unit 619 Fundamentals of Windows based operating systems

UAN:	**A/507/0776**
Level:	2
Credit value:	8
GLH:	42
Aim:	This unit has been designed to help a learner build an understanding of these topics: Operating System Configurations, Installing and Upgrading Client Systems, Managing Applications, Managing Files and Folders, Managing Devices, and Operating System Maintenance. Learners are expected to be able to demonstrate this understanding, so that on successful completion of this unit they will be able to: • understand operating system configurations • install and upgrade client systems • manage applications • manage files and folders • manage devices • understand operating system maintenance This unit is linked to the Microsoft Official Academic Course (MOAC) and Exam for the Microsoft Technical Associate (MTA) Windows Operating System Fundamentals.

Learning outcome
The learner will: 1. Know operating system configurations
Assessment criteria
The learner can: 1.1 describe **control panel** configuration options 1.2 describe how to configure **desktop settings** 1.3 describe the function of native applications guidance whichever is built in 1.4 describe the function of **native tools**

Range
control panel (administrative tools, accessibility options) **desktop settings** (profiles, display settings, shortcuts) **native tools** (configuration, mobility, remote management and assistance)

Learning outcome
The learner will: 2. Know the requirements for installing client systems.
Assessment criteria
The learner can: 2.1 identify operating system edition requirements 2.2 identify upgrade paths 2.3 identify application compatibility 2.4 understand installation **types** 2.5 identify requirements for virtualized clients.

Range
types (removable media, network, cloud)

Learning outcome
The learner will: 3. Know how to manage applications.
Assessment criteria
The learner can: 3.1 describe application **installations** 3.2 identify user account control **settings** 3.3 describe how to remove malicious software 3.4 describe how **services are managed** 3.5 describe application virtualization.

Range
installations (local, network, application removal) **settings** (standard user, administrative user, prompts, levels) **services are managed** (service status, startup types, recovery options, service accounts, dependencies)

Learning outcome
The learner will: 4. Know how to manage file systems.
Assessment criteria
The learner can: 4.1 describe file systems 4.2 describe **file sharing** 4.3 describe print sharing 4.4 describe **encryption options** 4.5 describe how to **configure libraries**.

Range
file sharing (security permissions, share permissions, effective permissions, mapping drives) **encryption options** (full disk encryption, encrypting file systems) **configure libraries** (offline files, multiple local locations, network locations).

Learning outcome
The learner will: 5. Know how to manage devices.
Assessment criteria
The learner can: 5.1 describe how to **connect devices** 5.2 describe **types of storage** 5.3 describe **printing options** 5.4 describe **system devices.**

Range
connect devices (plug and play, printers, third party software) **types of storage** (disk types, device types, drive types, cloud storage, security) **printing options** (local printers, network printers, print queues, print-to-file, Internet printing) **system devices** (video, audio, input, device management)

Learning outcome
The learner will: 6. Know operating system maintenance.
Assessment criteria
The learner can: 6.1 describe backup and recovery methods 6.2 describe native maintenance tools 6.3 identify **updates** required to maintain operating system integrity.

Range
updates (software, driver, operating systems, service packs, critical, security, definitions, hotfixes)

Learning outcome
The learner will: 7. Be able to configure Windows based operating systems
Assessment criteria
The learner can: 7.1 **configure** a Windows based Operating System (OS) 7.2 manage applications 7.3 **customise** a Windows based operating system to meet requirements 7.4 **configure file** systems 7.5 manage devices 7.6 **maintain** a Windows based **operating system**.

Range
configure Operating System (OS) (installation, upgrade) **customise** Operating System (OS) (desktop, taskbar, start menu, networking) **configure file** system (compression, encryption, libraries) **maintain** Operating System OS (backup, restore)

Unit 620 Software development fundamentals

UAN:	**H/507/0271**
Level:	2
Credit value:	10
GLH:	61
Aim:	This unit has been designed to help a learner build an understanding of these topics: Core Programming, Object-Oriented Programming, General Software Development, Web Applications, Desktop Applications, and Databases. Learners are expected to be able to demonstrate this understanding, so that on successful completion of this unit they will be able to: • understand core programming • understand object-oriented programming • understand general software development • understand web applications • understand desktop applications • understand databases This unit is linked to the Microsoft Official Academic Course (MOAC) and Exam for the Microsoft Technical Associate (MTA) Software Development Fundamentals.

Learning outcome
The learner will: 1. Know the fundamentals of core programming.
Assessment criteria
The learner can: 1.1 describe how information is stored in computer memory 1.2 describe memory size requirements for data storage types 1.3 describe computer **decision structures** 1.4 identify **methods for handling repetition** 1.5 describe how errors are handled.

Range
decision structures (IF, multiple, decision tables, evaluating expressions, flowcharts) **methods for handling repetition** (For loops, While loops, Do. While loops, recursion)

Learning outcome
The learner will: 2. Know what is involved in object orientated programming.
Assessment criteria
The learner can: 2.1 describe the **fundamentals of classes** 2.2 describe how to create a class 2.3 describe how to use classes in code 2.4 describe the concepts of object-oriented programming (inheritance, polymorphism, encapsulation).

Range
fundamentals of classes (properties, methods, events, constructors)

Learning outcome
The learner will: 3. Know requirements for software development.
Assessment criteria
The learner can: 3.1 describe phases of application life cycle management 3.2 interpret application specifications 3.3 identify algorithms (arrays, stacks, queues, linked lists, sorting) 3.4 describe performance implications of data structures 3.5 select a data structure to meet requirements.

Learning outcome
The learner will: 4. Know requirements for web application development.
Assessment criteria
The learner can: 4.1 identify functions of **web technologies** 4.2 describe **web application development** 4.3 describe how to **host webpages** 4.4 describe how to access web services from client applications 4.5 describe the implementation of Web services (SOAP, Web Service Definition Language (WSDL)).

Range
web technologies (HTML, CSS, JavaScript) **web application development** (page life cycle, event model, state management, client-side vs server-side programming) **host webpages** (virtual directories, Web server)

Learning outcome
The learner will: 5. Know the requirements to create desktop applications.
Assessment criteria
The learner can: 5.1 describe how to create desktop applications (SDI, MDI, UI design, visual inheritance) 5.2 describe **console based applications** 5.3 describe **windows based system services**.

Range
console based applications (capabilities, characteristics) **windows based system services** (capabilities, characteristics)

Learning outcome
The learner will: 6. Know how to store and use data.
Assessment criteria
The learner can: 6.1 describe **relational database management systems** 6.2 describe database **query methods** 6.3 describe methods to connect to **data stores**.

Range
relational database management systems (capabilities, characteristics, design, ERDs, normalisation) **query methods** (SQL, creating and accessing stored procedures) **data stores** (flat file, XML, in-memory object)

Learning outcome
The learner will: 7. Be able to create applications and store data.
Assessment criteria
The learner can: 7.1 create a program 7.2 create an object-oriented program 7.3 create a web-based application 7.4 create a desktop-based application 7.5 create a database.

Unit 621 Gaming development fundamentals

UAN:	**K/507/0272**
Level:	2
Credit value:	8
GLH:	45
Aim:	This unit has been designed to help a learner build an understanding of these topics: Game Design, Hardware, Graphics, and Animation. Learners are expected to be able to demonstrate this understanding, so that on successful completion of this unit they will be able to: • understand game design • understand hardware • understand graphics • understand animation.

Learning outcome
The learner will: 1. Know key aspects of game design.
Assessment criteria
The learner can: 1.1 compare game **platforms** 1.2 compare game **genres** 1.3 describe how **game design** motivates the player 1.4 describe game **user interface** 1.5 describe artificial intelligence (AI) 1.6 differentiate between tool creation and game programming 1.7 describe how to **capture user data** 1.8 describe the architecture of an XNA game 1.9 describe **XNA hierarchy**.

Range
platforms (console, mobile, PC) **genres** (MMORPG, fantasy, sports, role playing, card, board, action) **game design** (quests, tasks, activities, how to win, game goals) **user interface** (UI layout and concepts, asset management, game state, gamer services) **capture user data** (save and restore user data, save and restore game state, handle input states, store data, manage game state) **XNA hierarchy** (initialisation, update loop, drawing)

Learning outcome
The learner will: 2. Know types of gaming hardware and their management.
Assessment criteria
The learner can: 2.1 select an **input device** 2.2 select an **output device** 2.3 describe how to **configure games in a network** 2.4 describe how to **manage game performance**.

Range
input device (mouse, keyboard, motion sensing, console, mobile) **output device** (screen, television, hand-held, local speakers, surround sound) **configure games in a network** (setting up Web services, TCP, UDP, basic management, no network access) **manage game performance** (CPUvs GPU, reach vs HiDef)

Learning outcome
The learner will: 3. Know how to create gaming graphics.
Assessment criteria
The learner can: 3.1 describe **rendering engines** 3.2 plan for **game state** 3.3 describe how to draw **objects.**

Range
rendering engines (DirectX, video and audio compression, resolution) **game state** (scene hierarchy engine, gametime to handle frame rate variations, games' main loop, graphics pipeline, game flow, loading, menus, save-load, configuration) **objects** (sprites, bitmaps, vector graphics, lighting, blending, text, textures, 3D geometry, parallax mapping, shaders, sprite font)

Learning outcome
The learner will: 4. Know how to implement gaming animation.
Assessment criteria
The learner can: 4.1 describe how to **animate** characters 4.2 describe how to **transform** objects 4.3 describe how to **manage collisions**.

Range
animate (movement, lighting, projections, shading, textures, sprite) **transform** forming, deforming, moving, point distances, planes, interpolation, scale, rotation) **manage collisions** (per pixel and rectangle collisions, collision detection, collision response, fundamentals of physics simulation)

Learning outcome
The learner will: 5. Be able to create games.
Assessment criteria
The learner can: 5.1 design game mechanics 5.2 design game dynamics 5.3 create a game user interface 5.4 create gaming animation.

Unit 622 HTML5 application development fundamentals

UAN:	**M/507/0273**
Level:	2
Credit value:	8
GLH:	41
Aim:	This unit has been designed to help a learner build an understanding of these topics: Manage the Application Life Cycle, Build the User Interface by Using HTML5, Format the User Interface by Using CSS, Code by Using JavaScript. Learners are expected to be able to demonstrate this understanding, so that on successful completion of this unit they will be able to: • manage the Application Life Cycle • build the User Interface by Using HTML5 • format the user interface by using CSS • code by Using JavaScript This unit is linked to the Microsoft Official Academic Course (MOAC) and Exam for Microsoft Technical Associate (MTA) HTML5 Application Development Fundamentals.

Learning outcome
The learner will: 1. Know how to manage the application life cycle.
Assessment criteria
The learner can: 1.1 describe **platform fundamentals** 1.2 describe how to manage the **state** of an application 1.3 describe how to debug a HTML5 touch enabled application 1.4 describe how to test a HTML5 touch enabled application 1.5 describe how to publish an application to a store.

Range
platform fundamentals (packaging and the runtime environment) **state** (session state, app state, persist state)

Learning outcome
The learner will: 2. Know how to build the user interface using HTML5.
Assessment criteria
The learner can: 2.1 identify HTML5 tags to display text content 2.2 identify HTML5 **tags to display graphics** 2.3 identify HTML5 tags to play **media** 2.4 identify HTML5 tags to **organise content** 2.5 identify HTML5 tags to organise forms 2.6 Identify HTML5 tags for input 2.7 Identify HTML5 tags for validation.

Range
tags to display graphics (Canvas, SVG) **media** (video, audio) **organise content** (tables, lists, sections)

Learning outcome
The learner will: 3. Know how to format the user interface using CSS.
Assessment criteria
The learner can: 3.1 describe core **CSS concepts** 3.2 describe how to **arrange user interface (UI) content** using CSS 3.3 describe how to **manage the flow of text** content using CSS 3.4 describe how to create **graphic effects** using CSS.

Range
CSS concepts (separate presentation from content, manage content flow, manage positioning of individual elements, basic CSS styling) **arrange user interface (UI) content** (flexible box, grid layouts, proportional scaling, templates) **manage the flow of text** (regions, columns, hyphenation, positioned floats) **graphic effects** (rounded corners, shadows, transparency, background gradients, typographic, 2D and 3D transformations)

Learning outcome
The learner will: 4. Know how to code using JavaScript.
Assessment criteria
The learner can: 4.1 describe how to **manage Java Script** 4.2 describe how to **update the UI** using JavaScript 4.3 identify JavaScript animation code 4.4 describe **how to access data** using JavaScript 4.5 identify code that responds to touch 4.6 identify HTML5 **API** code 4.7 describe how to access **system resources**.

Range
manage Java script (use of functions, use of libraries) **update the UI** (locating elements, responding to events, showing and hiding elements, updating content of elements, adding elements) **how to access data** (send and receive data, transmit complex objects, parsing, accessing databases and indexed DB, loading and saving files, App Cache) **API** (GeoLocation, Web Workers, Web Sockets) **system Resources** (operating systems, system devices)

Learning outcome
The learner will: 5. Be able to create HTML5 based web applications.
Assessment criteria
The learner can: 5.1 build user interface using HTML5 5.2 format user interface using CSS 5.3 access data using JavaScript.

Unit 623 Software testing fundamentals

UAN:	**H/507/0285**
Level:	2
Credit value:	8
GLH:	39
Aim:	This unit has been designed to help a learner build an understanding of these topics: test methodologies. It also focuses on working with software bugs, creating and managing software tests, and even test automation. Learners are expected to be able to demonstrate this understanding, so that on successful completion of this unit they will be able to: • understand test methodologies • understand how to manage software bugs • understand how to create and manage software tests • understand the basics of test automation.

Learning outcome
The learner will: 1. Know what the testing fundamentals are.
Assessment criteria
The learner can: 1.1 describe **software testing** 1.2 describe **system components** 1.3 describe **fundamentals of programming** 1.4 describe application **life cycle** management.

Range
software testing (measuring software quality, testing benefits) **system components** (hardware, software, network, interaction and dependencies) **fundamentals of programming** (data types, programming languages, algorithms) **life cycle** (agile, waterfall, spiral)

Learning outcome
The learner will: 2. Know what is meant by testing methodology.
Assessment criteria
The learner can: 2.1 describe **testing techniques** 2.2 describe **testing levels** 2.3 describe **testing types**.

Range
testing techniques (manual, automated, white box, black box) **testing levels** (unit, component, integration) **testing types** (functional, performance structural, regression, security, stress, accessibility, usability, localisation)

Learning outcome
The learner will: 3. Know how to create software tests.
Assessment criteria
The learner can: 3.1 describe **user-centric testing** 3.2 describe **software testability** 3.3 describe **test plan components** 3.4 describe **feature tests** 3.5 define **scope of test cases**.

Range
user-centric testing (business needs and issues, customer requirements, scenarios) **software testability** (test driven development, testing hooks) **test plan components** (test schedule, scope, methodology, scenarios, tools) **feature tests** (boundary conditions, level of details, validity) **scope of test cases** (boundary conditions, level of details, validity)

Learning outcome
The learner will: 4. Know how to manage software testing projects.
Assessment criteria
The learner can: 4.1 describe **testing milestones** 4.2 describe the **agile process** 4.3 describe how to **work with distributed teams** 4.4 define **test reports**.

Range
testing milestones (process fundamentals, exit criteria, sign off) **agile process** (scrum, Kanban, sprint management) **work with distributed teams** (communication, risk management, schedule management, delivery process) **test reports** (communication, risk management, schedule management, delivery process)

Learning outcome
The learner will: 5. Know how to manage bugs.
Assessment criteria
The learner can: 5.1 describe how to detect software defects 5.2 describe how to **log bugs** 5.3 describe how to **manage bugs.**

Range
log bugs (priority, severity, dependency, reproducing steps) **manage bugs** (triage, resolution, closing, monitoring, reporting)

Learning outcome
The learner will: 6. Know how to automate software testing.
Assessment criteria
The learner can: 6.1 describe **test automation** 6.2 define test **automation strategies** 6.3 describe how to **write automated tests** 6.4 describe how to **manage test scripts**.

Range
test automation (benefits, process, suitability) **automation strategies** (code coverage, logging, automation priority) **write automated tests** (logic, error handling, commenting, virtual machines) **manage test scripts** (build verification test, lab management)

Learning outcome
The learner will: 7. Be able to test software.
Assessment criteria
The learner can: 7.1 create software tests 7.2 manage software testing projects 7.3 manage bugs 7.4 automate software testing.

Unit 624 Networking fundamentals

UAN:	**Y/507/0283**
Level:	2
Credit value:	9
GLH:	47
Aim:	This unit has been designed to help a learner build an understanding of these topics: Network Infrastructures, Network Hardware, and Protocols and Services. Learners are expected to be able to demonstrate this understanding, so that on successful completion of this unit they will be able to: • understand network infrastructures • understand network hardware • understand protocols and services This unit is linked to the Microsoft Official Academic Course (MOAC) and Exam for the Microsoft Technical Associate (MTA) Networking Fundamentals.

Learning outcome
The learner will: 1. Know key aspects of network infrastructures.
Assessment criteria
The learner can: 1.1 describe differences between the Internet, intranet and extranet 1.2 describe **Local Area Networks (LANs)** 1.3 describe **Wide Area Networks (WANs)** 1.4 describe **wireless networking** 1.5 describe **wireless security** 1.6 describe **network topologies**.

Range
Local Area Networks (LANS) (perimeter networks, addressing, VLANs, wired, wireless) **Wide Area Networks (WANS))** (types, characteristics) **wireless networking** (types, characteristics) **wireless security** (keys, SSID, MAC filters) **network topologies** (star, mesh, ring, access methods)

Learning outcome
The learner will: 2. Know network hardware.
Assessment criteria
The learner can: 2.1 describe how **switches function** 2.2 describe how **routers function** 2.3 describe **media types** 2.4 describe **media type characteristics** 2.5 explain **factors** affecting media types.

Range
switches function (number and type of ports, number of uplinks, managed, unmanaged, VLAN capabilities, Layer 2, Layer 3, security options, hardware redundancy, switching types, MAC table, hubs vs switches) **routers function** (directly connected routes, static routing, dynamic routing, default routes, routing table, NAT, transmission speeds, software routing) **media types** (fibre optic, UTP, STP, wireless) **media type characteristics** (media segment length and speed) **factors** (external interference, electricity, interception)

Learning outcome
The learner will: 3. Know networking protocols.
Assessment criteria
The learner can: 3.1 describe the OSI model guidance, what happens at each layer and how it supports the relationship between protocols and services 3.2 describe **IPv4** 3.3 describe **IPv6** 3.4 describe how to use **TCP/IP** tools.

Range
IPv4 (addressing, subnetting, NAT, static IP, gateway, APIPA, network classes) **IPv6** (addressing, tunneling, dual ip stack, subnetmask, gateway, packets) **TCP/IP tools** (ping, tracert, pathping, Telnet, IPconfig, netstat)

Learning outcome
The learner will: 4. Know networking services.
Assessment criteria
The learner can: 4.1 describe names resolution process 4.2 describe **networking services**.

Range
networking services (DHCP, IPsec, remote access)

Learning outcome
The learner will: 5. Be able to set up networks.
Assessment criteria
The learner can: 5.1 set up a **network** 5.2 configure **network hardware** 5.3 configure network protocols 5.4 troubleshoot networking.

Range
network (LAN, wireless) **network hardware** (switches, routers, network media)

Unit 625 IT security fundamentals

UAN:	**J/507/0277**
Level:	2
Credit value:	8
GLH:	43
Aim:	This unit has been designed to help a learner build an understanding of these topics: Security Layers, Operating System Security, Network Security, Security Software. Learners are expected to be able to demonstrate this understanding, so that on successful completion of this unit they will be able to: • understand security layers • understand operating system security • understand network security • understand security software This unit is linked to the Microsoft Official Academic Course (MOAC) and Exam for the Microsoft Technical Associate (MTA) Security Fundamentals.

Learning outcome
The learner will: 1. Know key aspects of security layers.
Assessment criteria
The learner can: 1.1 describe **core security principles** 1.2 describe how threat and risk impact upon core security principles 1.3 describe **physical security** 1.4 describe **Internet security** 1.5 describe **types of wireless security** 1.6 describe advantages and disadvantages of **types of wireless security.**

Range
core security principles (confidentiality, integrity, availability, least privilege, social engineering, attack surface,) **physical security** (site security, computer security, removable devices and drives, mobile device security) **internet security** (browser settings, zones, secure Web sites) **types of wireless security** (keys, SSID, MAC filters)

Learning outcome
The learner will: 2. Know requirements and issues of operating system security.
Assessment criteria
The learner can: 2.1 describe **user authentication** 2.2 describe how to configure **permissions** 2.3 describe password policies 2.4 describe audit policies 2.5 describe **encryption options** 2.6 describe **types of malware.**

Range
user authentication (multifactor, smart cards, remote authentication, PKI, certificates, biometrics, time skew, password reset, administrative privileges) **permissions** (security, share, inheritance, effective, basic, advanced, taking ownership, delegation) **encryption options** (EFS, full disk encryption, PKI, VPN, certificates, algorithms, public/private keys, encryption software, token devices) **types of malware** (buffer, overflow, worms, Trojans, spyware, viruses, keyloggers)

Learning outcome
The learner will: 3. Know requirements to establish network security.
Assessment criteria
The learner can: 3.1 describe **types of firewall** 3.2 describe **network access protection** 3.3 describe **network isolation** 3.4 describe how to maintain **protocol security.**

Range
types of firewall (hardware, software, stateful, stateless, secure content management, unified threat management) **network access protection** (purpose, requirements) **network isolation** (VLANs, routing, honeypot, NAT, perimeter network, VPN, IPsec, server and domain isolation) **protocol security** (spoofing, IPsec, tunnelling, sniffing, DNSsec, common attack methods)

Learning outcome
The learner will: 4. Know protection options of system security.
Assessment criteria
The learner can: 4.1 describe **client protection options** 4.2 describe **email protection options** 4.3 describe **server protection options.**

Range
client protection options (anti-virus, built-in settings, updates, encrypting offline folders, application restrictions) **email protection options** (anti-spam, anti-virus, spoofing, phishing, pharming, client vs server protection, sender policy framework, PTR records) **server protection options** (separation of services, hardening, updates, disabling unsecure protocols, security analysis software)

Learning outcome
The learner will: 5. Be able to configure security for IT systems.
Assessment criteria
The learner can: 5.1 configure operating system security 5.2 configure network security 5.3 configure service security.

Unit 626 Windows development fundamentals

UAN:	**M/507/0287**
Level:	2
Credit value:	8
GLH:	38
Aim:	This unit has been designed to help a learner build an understanding of these topics: Windows Programming Basics, Creating Windows Forms Applications, Creating Windows Services Applications, Accessing Data in a Windows Forms Application, and Deploying a Windows Application. Learners are expected to be able to demonstrate this understanding, so that on successful completion of this unit they will be able to: • understand Windows programming basics • create Windows services applications • create Windows services applications • access data in a Windows forms application • deploy a Windows application.

Learning outcome
The learner will: 1. Know how to create Windows applications.
Assessment criteria
The learner can: 1.1 identify types of Windows applications 1.2 describe user interface (UI) design principles 1.3 describe how to create Windows-based applications.

Learning outcome
The learner will: 2. Know how to create Windows Form applications.
Assessment criteria
The learner can: 2.1 describe how to **manage events** 2.2 describe forms inheritance in applications 2.3 describe how to **manage controls** 2.4 describe how to implement user input 2.5 describe how to validate user input 2.6 identify issues in code 2.7 describe how to debug a Windows based application.

Range
manage events (creating events, handling events) **manage controls** (create new controls, extend controls)

Learning outcome
The learner will: 3. Know how to create Windows Services applications.
Assessment criteria
The learner can: 3.1 describe how to create a Windows Services application 3.2 describe how to create installers for Windows Services application.

Learning outcome
The learner will: 4. Know how to access data in Windows form applications.
Assessment criteria
The learner can: 4.1 describe how to connect a Windows based application to a database 4.2 describe **databound controls.**

Range
databound controls (how data is bound to controls, how to display data, validating databound items)

Learning outcome
The learner will: 5. Know how to deploy Windows applications.
Assessment criteria
The learner can: 5.1 describe methods of deploying Windows applications 5.2 select a method for deploying Windows applications 5.3 describe how to create **setup projects** for applications.

Range
Setup projects (specify custom actions, create special folders, security requirements, program file location)

Learning outcome
The learner will: 6. Be able to create Windows applications.
Assessment criteria
The learner can: 6.1 design a user interface 6.2 create a Windows Form application 6.3 create a Windows Services application 6.4 create an Installer for a Windows application 6.5 connect a Windows application to a database 6.6 create a Setup project for an application.

Unit 627 Web development fundamentals

UAN:	**K/507/0286**
Level:	2
Credit value:	8
GLH:	43
Aim:	This unit has been designed to help a learner build an understanding of these topics: Programming Web Applications, Working with Data and Services, Troubleshooting and Debugging Web Applications, Working with Client-Side Scripting, and Configuring and Deploying Web Applications. Learners are expected to be able to demonstrate this understanding, so that on successful completion of this unit they will be able to: • program web applications • work with data and services • troubleshoot and debug web applications • work with client-side scripting • configure and deploy web applications. This unit is linked to the Microsoft Official Academic Course (MOAC) and Exam for the Microsoft Technical Associate (MTA) Web Development Fundamentals.

Learning outcome
The learner will: 1. Know how to programme web applications
Assessment criteria
The learner can: 1.1 describe how to **customise** web pages 1.2 describe intrinsic objects 1.3 describe different **types of state** 1.4 describe how state is stored 1.5 describe how **events** control page flows 1.6 describe **controls** required for a scenario 1.7 describe configuration files

Range
customise (layout, appearance, HTML, CSS, embedding images, navigation, tables) **types of state** (session state, view state, control state, application state) **events** (application and page life cycle events, page events, control events, application events, session events, cross-page posting) **control** (user, server, Web, validation)

Learning outcome
The learner will: 2. Know how to use data for webpages.
Assessment criteria
The learner can: 2.1 read XML data 2.2 write XML data 2.3 select a data object to meet requirements 2.4 describe how to call a service from a Web page 2.5 describe **datasource controls** 2.6 describe binding controls 2.7 describe how to manage data connections.

Range
datasource controls (LinqDataSource, ObjectDataSource, XmlDataSource, SqlDataSource)

Learning outcome
The learner will: 3. Know how to troubleshoot web applications.
Assessment criteria
The learner can: 3.1 describe how to **debug a web application** 3.2 describe how to troubleshoot http web application errors.

Range
debug a web application (custom error pages, error information, tracing)

Learning outcome
The learner will: 4. Know client-side scripting code and its purpose.
Assessment criteria
The learner can: 4.1 describe the purpose of client-side scripting 4.2 identify client-side scripting code 4.3 describe **AJAX concepts**.

Range
AJAX concepts (ASP.NET AJAX implementation, working with client-side libraries, EnablePartialRendering, Triggers, ChildrenAsTriggers, Scripts, Services, UpdateProgress, Timer, ScriptManagerProxy, extender controls)

Learning outcome
The learner will: 5. Know how to configure web applications.
Assessment criteria
The learner can: 5.1 describe how to **configure secure access** 5.2 describe how to configure **reference assemblies** 5.3 describe how to publish web applications 5.4 describe **application pools.**

Range
configure secure access (authentication, authorization, impersonation) **reference assemblies** (local assemblies, shared assemblies, for project, for solutions) **application pools** (purpose, effects on Web applications)

Learning outcome
The learner will: 6. Be able to create a web based application.
Assessment criteria
The learner can: 6.1 program a **web application** 6.2 use events to control page flows 6.3 connect a web application to a database 6.4 troubleshoot a web application 6.5 configure a web application.

Range
web application (layout, appearance, HTML, CSS, embedding images, navigation, tables)

Unit 628 .NET fundamentals

UAN:	**F/507/0276**
Level:	2
Credit value:	9
GLH:	49
Aim:	This unit has been designed to help a learner build an understanding of these topics: .NET Framework Concepts, Namespaces and Classes in the .NET Framework, .NET Code Compilation, I/O Classes in the .NET Framework, Security, .NET Languages, and Memory Management. Learners are expected to be able to demonstrate this understanding, so that on successful completion of this unit they will be able to understand: • .NET framework concepts • namespaces and classes in the .NET Framework • NET code compilation • I/O Classes in the .NET Framework • security • .NET Languages • memory management

Learning outcome
The learner will: 1. Know .NET framework concepts.
Assessment criteria
The learner can: 1.1 describe application settings 1.2 describe event handling in the **.NET** 1.3 describe structured **exception handling** in the .NET framework.

Range
NET framework (event-driven programming model, event handlers, raising events, implementing delegates) **exception handling** (error handling concepts, exceptions, exception types)

Learning outcome
The learner will: 2. Know key components in the .NET framework.
Assessment criteria
The learner can: 2.1 describe .NET class **hierarchies** 2.2 describe **object orientated concepts** in the .NET framework 2.3 describe .NET namespaces 2.4 describe **class libraries** 2.5 describe **data types** in the .NET framework 2.6 describe **generics**.

Range
hierarchies (system classes, classification of classes, logical organisation of classes) **object orientated concepts** (inheritance, polymorphism, interfaces) **class libraries** (logical grouping of classes, logic of class libraries, importance of class libraries, purpose) **data types** (intrinsic data types, values types, reference types, boxing, unboxing, .NET collection classes) **generics** (infrastructure, interfaces, delegates, contravariant, covariant, methods, verifiability, constraints)

Learning outcome
The learner will: 3. Know the requirements of .NET code compilation.
Assessment criteria
The learner can: 3.1 describe how source code is compiled 3.2 describe strong naming 3.3 describe **version control** 3.4 describe **assemblies** 3.5 describe metadata.

Range
version control (how .NET applications are versioned, how to run different versions on the same computer) **assemblies** (.NET assemblies, shared assemblies)

Learning outcome
The learner will: 4. Know Input/Output (I/O) classes in the .NET framework.
Assessment criteria
The learner can: 4.1 describe .NET **file classes** 4.2 describe console I/O 4.3 describe **XML classes** in the .NET framework.

Range
file classes (read/write, stream readers and writers) **XML classes** (XMLReader, XMLWriter, SML Schemas)

Learning outcome
The learner will: 5. Know how to secure a .NET application.
Assessment criteria
The learner can: 5.1 describe **System Security namespace** 5.2 describe **code access security.**

Range
system security namespace (permissions, cryptography) **code access security** (authentication, authorisation, access control, policies)

Learning outcome
The learner will: 6. Know key aspects of .NET languages.
Assessment criteria
The learner can: 6.1 describe **language interoperability** 6.2 describe **type safety**.

Range
language interoperability (calling code in one language from another language, .NET language parity) **type safety** (memory type safety, type safety in classes, strong types, security policies)

Learning outcome
The learner will: 7. Know what is involved in memory management.
Assessment criteria
The learner can: 7.1 describe **resource allocation** 7.2 compare managed and unmanaged applications.

Range
Resource allocation (garbage collection, memory allocation, stack vs heap)

Learning outcome
The learner will: 8. Be able to create .NET applications.
Assessment criteria
The learner can: 8.1 create a class library in the .NET framework 8.2 compile a source code 8.3 secure a .NET application 8.4 create a .NET application.

Unit 629 Mobile development fundamentals

UAN:	**L/507/0281**
Level:	2
Credit value:	8
GLH:	41
Aim:	This unit has been designed to help a learner build an understanding of these topics: Work with Physical Devices, Use Data with Mobile Services, Use a Mobile Application Development Environment, Develop Mobile Applications. Learners are expected to be able to demonstrate this understanding, so that on successful completion of this unit they will be able to: • work with physical devices • use data with mobile services • use a mobile application development environment • develop mobile applications.

Learning outcome
The learner will: 1. Understand mobile phone capabilities.
Assessment criteria
The learner can: 1.1 define phone **tools** 1.2 identify device sensors 1.3 describe Application Programming Interface (APIs) 1.4 identify built-in hardware 1.5 compare **devices** 1.6 identify ways to save energy.

Range
tools (development, testing, connecting) **devices** (features, API levels, number of touch points, networking capabilities)

Learning outcome
The learner will: 2. Understand the use of data with mobile devices.
Assessment criteria
The learner can: 2.1 describe how mobile devices integrate with databases 2.2 describe how to **minimise** data traffic 2.3 describe the benefits of database server replication 2.4 describe benefits of **data storage locations** 2.5 describe how to access native APIs 2.6 describe how to manage offline situations.

Range
minimise (for performance, for cost) **data storage locations** (local, isolated, remote)

Learning outcome
The learner will: 3. Understand the mobile application development environment.
Assessment criteria
The learner can: 3.1 describe mobile device design (concepts, globalisation, localisation, optimisation, architecture) 3.2 describe mobile **networking concepts** 3.3 evaluate development tools for mobile applications 3.4 describe how to create a deployment package 3.5 describe how to **debug mobile applications** 3.6 identify code errors 3.7 identify code to meet requirements 3.8 distinguish between programming languages.

Range
networking concepts (server/cloud communication, multicast, HTTP requests, use of web services, throttling, notifications, wireless network) **debug mobile applications** (create a test environment, test, debug)

Learning outcome
The learner will: 4. Understand how to develop mobile applications.
Assessment criteria
The learner can: 4.1 describe how to **manage** the application life cycle 4.2 describe mobile device **APIs** 4.3 explain the use of **mobile device controls** 4.4 describe how to **build** a User Interface (UI).

Range
Manage (preserving application state, tombstoning, balancing code, responsive applications, visible status, storing passwords) **API's** (navigation services, geolocation, Forms, Canvas and Media for HTML5, manipulation events) **mobile device controls** (native controls, custom controls, UI, notifications, to enhance application functionality) **build** (system theme, colour, orientation, graphic layering, integrating images and media, UI standards and guidelines

Learning outcome
The learner will: 5. Be able to create mobile applications.
Assessment criteria
The learner can: 5.1 create a mobile application 5.2 connect a mobile application to a database 5.3 create a deployment package 5.4 build a user interface.

Unit 800 Introduction to IT systems development

UAN:	**J/601/3247**
Level:	2
Credit value:	6
GLH:	50
Aim:	The aim of this unit is to introduce the learner to systems development methodologies. Firstly, the learner is taught to understand the role of IT systems in our society and understand the need to develop systems. In order to do this the learner will learn the importance of the systems development life cycle. The learner will also understand the advantages and disadvantages of different types of software options and the importance of quality assurance.

Learning outcome
The learner will: 1. Understand IT Systems and the roles of IT personnel
Assessment criteria
The learner can: 1.1 Explain the role of IT Systems in society 1.2 Describe the major components of a contemporary IT System 1.3 Describe the roles of personnel in the development, operation and use of IT System

Learning outcome
The learner will: 2. Understand IT Systems Development Life Cycle (SDLC) models
Assessment criteria
The learner can: 2.1 Describe top down, bottom up and integrated approaches to IT Systems development 2.2 Explain the purposes of the initiation, analysis, design and implementation phases of the IT SDLC 2.3 Identify the advantages and disadvantages of the traditional ('waterfall') SDLC model 2.4 Describe two other SDLC models, identifying the type of development for which they are suited

Learning outcome
The learner will: 3. Understand IT Systems Development Life Cycle (SDLC) concepts and processes
Assessment criteria
The learner can: 3.1 Describe the advantages and disadvantages of the following solution types: • packaged ('off the shelf') • bespoke • combination of packaged and bespoke • upgrade 3.2 Explain the importance of quality assurance and meeting customer requirements during the IT SDLC and the means by which they can be achieved 3.3 Describe the applicability of the following methods of gathering information: • interviews • observations • questionnaires • examination of records and documents

Unit 851 Creating an object-oriented computer program

UAN:	**A/601/3181**
Level:	2
Credit value:	7
GLH:	60
Aim:	This unit teaches concepts of object-orientated programming. Learners will gain an understanding of some of the features of an object-driven environment, such as using standard input and output commands and using the integrated development environment effectively.

Learning outcome
The learner will: 1. Be able to implement software using object-oriented programming
Assessment criteria
The learner can: 1.1 select, declare and initialise variable and data structure types and sizes to meet given requirements 1.2 define relationships between objects 1.3 implement object behaviours using control structures 1.4 declare file structures 1.5 use standard input/output commands 1.6 use operators and predefined functions 1.7 make effective use of an integrated development environment (ide)

Learning outcome
The learner will: 2. Be able to refine an object-oriented program to improve quality
Assessment criteria
The learner can: 2.1 follow an agreed standard for naming, comments and code layout 2.2 implement data validation for inputs 2.3 implement opportunities error handling and reporting 2.4 create on-screen help to assist the users of a computer program

Learning outcome
The learner will: 3. Be able to test the operation of an object-oriented driven program
Assessment criteria
The learner can: 3.1 use of the debugging facilities available in the ide 3.2 determine expected test results from given test data 3.3 compare actual results against expected results to identify discrepancies

Unit 852 Creating an event-driven computer program

UAN:	**T/601/3177**
Level:	2
Credit value:	7
GLH:	60
Aim:	This unit teaches concepts of event-driven programming. Learners will gain an understanding of some of the features of an event-driven environment, such as using standard input and output commands and using the integrated development environment effectively.

Learning outcome
The learner will: 1. Be able to implement software using event-driven programming
Assessment criteria
The learner can: 1.1 declare and initialise variable and data structure types and sizes to implement given requirements 1.2 assign properties to screen components 1.3 associate events, including parameter passing, to screen components 1.4 implement event handling using control structures 1.5 declare file structures 1.6 use standard input/output commands to implement design requirements 1.7 use of operators and predefined functions 1.8 use an integrated development environment (IDE)

Learning outcome
The learner will: 2. Be able to refine an event-driven program to improve quality
Assessment criteria
The learner can: 2.1 follow an agreed standard for naming, comments and code layout 2.2 implement data validation for inputs 2.3 implement error handling and reporting 2.4 create documentation for the support and maintenance of a computer program

Learning outcome
The learner will: 3. Be able to test the operation of an event-driven program
Assessment criteria
The learner can: 3.1 use the debugging facilities available in the ide 3.2 determine expected test results from given test data 3.3 compare actual test results against expected results to identify discrepancies

Unit 853 Creating a procedural computer program

UAN:	**L/601/3167**
Level:	2
Credit value:	7
GLH:	60
Aim:	This unit teaches the concepts of procedural programming. Learners will gain an understanding of some of the features of a procedural environment, such as using standard input and output commands and using the integrated development environment effectively.

Learning outcome
The learner will: 1. Be able to implement software using procedural programming.
Assessment criteria
The learner can: 1.1 select, declare and initialise variable and data structure types and sizes to meet given requirements 1.2 implement control structures 1.3 declare file structures 1.4 use standard input/output commands 1.5 use operators and predefined functions 1.6 correctly use parameter passing mechanisms

Learning outcome
The learner will: 2. Be able to refine a procedural programme to improve quality
Assessment criteria
The learner can: 2.1 follow an agreed standard for naming, comments and code layout 2.2 implement data validation for inputs 2.3 implement error handling and reporting 2.4 create documentation to assist the users of a computer programme

Learning outcome
The learner will: 3. Be able to test the operation of a procedural programme
Assessment criteria
The learner can: 3.1 use available debugging tools 3.2 determine expected test results from given test data 3.3 compare actual test results against expected results to identify discrepancies

Unit 854 User profile administration

UAN:	**H/500/7378**
Level:	2
Credit value:	6
GLH:	55
Aim:	The aim of this unit is to teach the learner how to create and modify user profiles. In order to this the learner will be taught how to create a user identifier and how to work with passwords (and the frequency with which they need to be modified). The learner will also learn the differences between different user types. The learner will have an opportunity to modify existing user account settings.

Learning outcome
The learner will: 1. Know how to assist in the administration of user profiles
Assessment criteria
The learner can: 1.1 describe how to make changes to user profiles such as: a. user identifier (e.g. username); b. password and related information (e.g. change frequency); c. allowed system access (e.g. times, locations) d. allowed access to facilities (e.g. data, software)

Learning outcome
The learner will: 2. Be able to assist in the administration of user profiles
Assessment criteria
The learner can: 2.1 make specified changes to user profiles

Unit 855 System management

UAN:	**Y/500/7331**
Level:	2
Credit value:	6
GLH:	55
Aim:	The aim of this unit is to introduce some of the concepts behind managing computer systems. The learner will learn how the configuration of a computer system can affect the management of computer systems. The learner will also learn the importance of asset management. The learner will have an opportunity to use what they have learnt and modify a computer system according to given guidelines.

Learning outcome
The learner will: 1. Know how to assist in administering a system
Assessment criteria
The learner can: 1.1 describe how to use specified system configuration facilities. 1.2 explain what ICT asset and configuration information is to be recorded such as: a. physical attributes (e.g. manufacturer, type, revision, serial number, location, value); b. configuration (e.g. physical and logical addresses, options set, connections).

Learning outcome
The learner will: 2. Be able to change system configurations
Assessment criteria
The learner can: 2.1 make specified changes to system configuration 2.2 gather and record ICT asset and configuration information for specified items.

Unit 856 ICT system operation

UAN:	**F/500/7338**
Level:	2
Credit value:	9
GLH:	45
Aim:	The aim of this unit is to teach the learner typical ICT operations. In order to do this the unit will teach the learner to identify relevant parts of the operating procedures including monitoring, escalations and obtaining work permissions. This unit will also teach the learner how to use specified parts of IT systems and how to minimise loss through their actions.

Learning outcome
The learner will: 1. Know the relevant parts of the operating system
Assessment criteria
The learner can: 1.1 describe the relevant parts of operating procedures a. required service levels (e.g. availability, quality) b. routine maintenance c. monitoring d. data integrity (e.g. backups, anti-virus) e. consumables use, storage & disposal f. health & safety g. escalation h. information recording and reporting i. obtaining work permissions j. security & confidentiality. 1.2 describe the functionality of relevant parts of the system.

Learning outcome
The learner will: 2. Be able to operate specified parts of the system
Assessment criteria
The learner can: 2.1 operate specified parts of the system a. operating specified system parts following procedures b. recognising, resolving or escalating system faults c. gathering and recording specified operational information 2.2 assess and minimize risks related to your own actions such as. a. loss or corruption of data b. loss of service c. damage to equipment

Relationships to other qualifications

Links to other qualifications

These qualifications have connections to the:

- City & Guilds Level 1 and Level 2 ITQ for IT Users (7574)
- City & Guilds Level 2 ICT Professional Competence (4520-01, 02 and 03)
- City & Guilds Level 2 Communications Cabling (3666/3667)

Literacy, language, numeracy and ICT skills development

These qualifications can develop skills that can be used in the following qualifications:

- Functional Skills (England) – see **www.cityandguilds.com/functionalskills**
- Essential Skills (Northern Ireland) – see **www.cityandguilds.com/essentialskillsni**
- Essential Skills Wales – see **www.cityandguilds.com/esw**

Appendix 1 Sources of general information

The following documents contain essential information for centres delivering City & Guilds qualifications. They should be referred to in conjunction with this handbook. To download the documents and to find other useful documents, go to the Centre Document Library on www.cityandguilds.com or click on the links below:

Quality Assurance Standards: Centre Handbook

This document is for all approved centres and provides guidance to support their delivery of our qualifications. It includes information on

- Centre quality assurance criteria and monitoring activities
- Administration and assessment systems
- Centre-facing support teams at City & Guilds / ILM
- Centre quality assurance roles and responsibilities.

The Centre Handbook should be used to ensure compliance with the terms and conditions of the Centre Contract.

Quality Assurance Standards: Centre Assessment

This document sets out the minimum common quality assurance requirements for our regulated and non-regulated qualifications that feature centre assessed components. Specific guidance will also be included in relevant qualification handbooks and/or assessment documentation.

It incorporates our expectations for centre internal quality assurance and the external quality assurance methods we use to ensure that assessment standards are met and upheld. It also details the range of sanctions that may be put in place when centres do not comply with our requirements, or actions that will be taken to align centre marking/assessment to required standards. Additionally, it provides detailed guidance on the secure and valid administration of centre-assessments.

Access arrangements - When and how applications need to be made to City & Guilds provides full details of the arrangements that may be made to facilitate access to assessments and qualifications for candidates who are eligible for adjustments in assessment.

The Centre Document Library also contains useful information on such things as:

- Conducting examinations
- Registering learners
- Appeals and malpractice

Useful contacts

Please visit the Contact Us section of the City & Guilds website, *Contact us*

About City & Guilds

As the UK's leading vocational education organisation, City & Guilds is leading the talent revolution by inspiring people to unlock their potential and develop their skills. We offer over 500 qualifications across 28 industries through 8500 centres worldwide and award around two million certificates every year. City & Guilds is recognised and respected by employers across the world as a sign of quality and exceptional training.

City & Guilds Group

The City & Guilds Group is a leader in global skills development. Our purpose is to help people, organisations and economies develop their skills for growth. We work with education providers, employers and governments in over 100 countries across the world to help people, businesses and economies grow by shaping skills systems and supporting skills development.

The Group is made up of City & Guilds, ILM, Kineo, The Oxford Group, Gen2, and Intertrain. Together we set the standard for professional and technical education and corporate learning and development around the world.

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