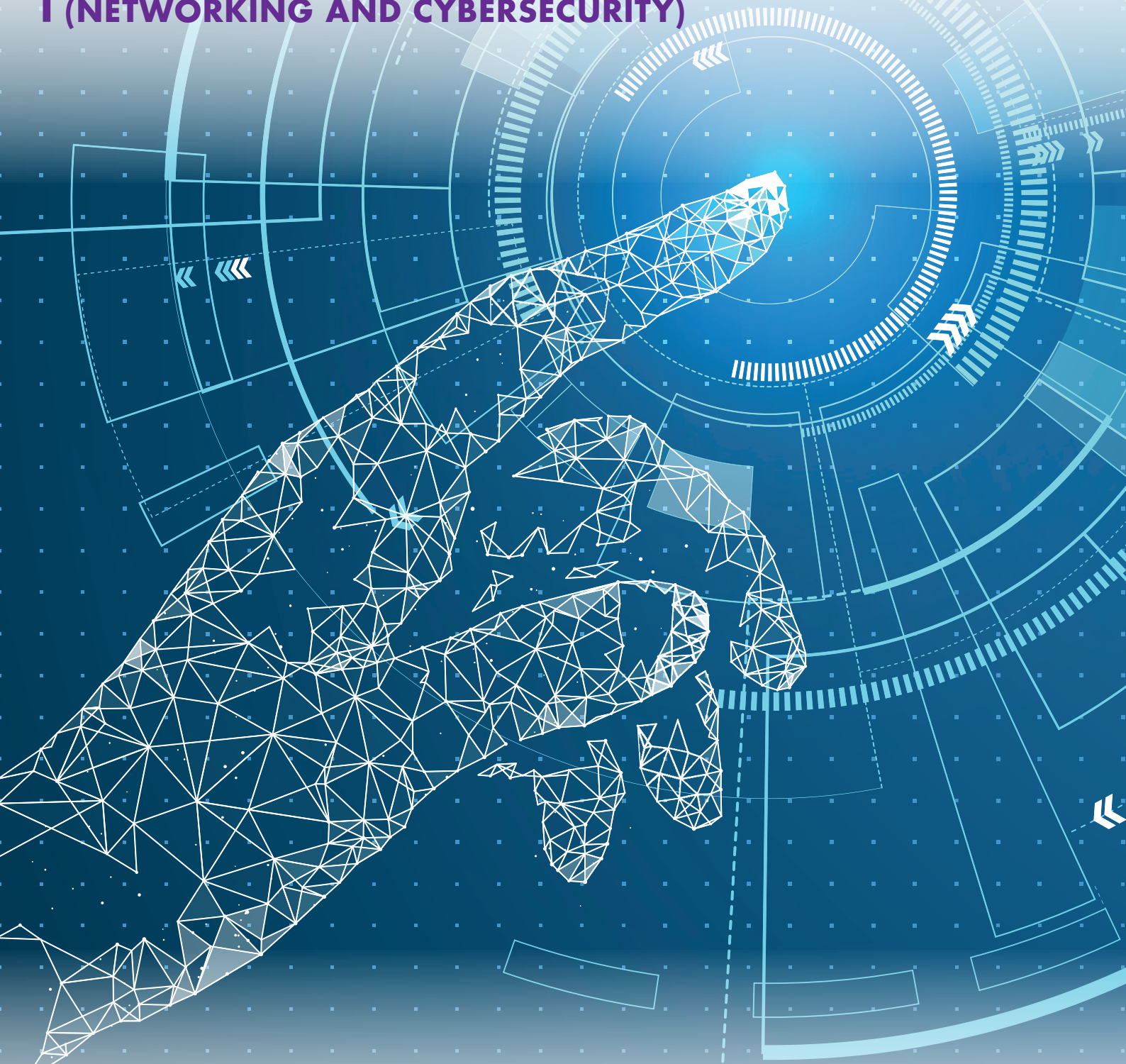
BTEC

BTEC Level 2 Technical Diploma in

DIGITAL TECHNOLOGY

(NETWORKING AND CYBERSECURITY)



SPECIFICATION

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BTEC

Pearson BTEC Level 2 Technical Diploma in Digital Technology (Networking and Cybersecurity)

Specification

First teaching September 2017

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This specification is Issue 3. Key changes are listed in the summary table on the page after next of the document. We will inform centres of any changes to this issue. The latest issue can be found on the Pearson website: qualifications.pearson.com

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Welcome

With a track record built over 30 years of learner success, BTEC qualifications are widely recognised and respected. They provide progression to the workplace, either directly or via study at higher levels. Proof comes from YouGov research, which shows that 62% of large companies have recruited employees with BTEC qualifications.

Why are BTECs so successful?

BTECs embody a fundamentally learner-centred approach to the curriculum, with a flexible, unit-based structure. In these new BTEC Level 2 Technicals, the focus is on the development of technical, practical and transferable work-related skills, and sector-specific knowledge. The development of these skills is key for learners to progress to work or to an Apprenticeship.

When creating the BTEC Level 2 Technicals, we worked with employers to ensure that the qualifications meet their needs. Employers are looking for recruits with the appropriate technical knowledge, and technical and transferable skills essential for employment.

The BTEC Level 2 Technicals meet these requirements through:

- a range of occupationally-related qualifications, each with a clear purpose, so that there is a qualification to suit each learner's plan for career progression
- up-to-date content that is closely aligned with employers' needs for a skilled future workforce
- assessments chosen to help learners progress to the next stage. This means that some assessments are set by the centre to meet local needs, while others are set and marked by Pearson. This ensures that there is a core of skills and understanding common to all learners. For example, an externally-set test can be used to check that learners are confident in using technical knowledge to carry out a certain job.

We provide a wealth of support, both resources and people, to ensure that learners and their tutors have the best possible experience during their course. See *Section 11 Resources and support* for details of the support we offer.

A word to learners…

BTEC Level 2 Technicals will demand a lot of practical work from you. You will need to:

- complete a range of units
- be organised
- take some assessments that Pearson will set and mark
- take other assessments that will demonstrate your technical and practical skills
- keep a portfolio of your assignments.

But you can feel proud to achieve a BTEC because, whatever your plans in life – whether you decide to go on to work or to an Apprenticeship – success in your BTEC Level 2 Technical qualification will help you to progress to the next stage in your life.

Good luck, and we hope you enjoy your course.

Collaborative development

Students completing their BTEC Technical Diploma in Digital Technology (Networking and Cybersecurity) will be aiming to go on to employment, often via the stepping stone of higher education. It was, therefore, essential that we developed these qualifications in close collaboration with experts from professional bodies, businesses and universities, and with the providers who will be delivering the qualifications.

To ensure that the content meets providers' needs and provides high-quality preparation for progression, we engaged experts. We are very grateful to all the university and further education lecturers, teachers, employers, professional body representatives and other individuals who have generously shared their time and expertise to help us develop these new qualifications. In addition, professional bodies and businesses have provided letters of support confirming that these qualifications meet their entry requirements. These letters can be viewed on our website.

Summary of Pearson BTEC Level 2 Technical Diploma in Digital Technology (Networking and Cybersecurity) specification Issue 4 changes

Summary of changes made between the previous issue and this current issue	Page number
The wording in *Section 8 Teacher/centre malpractice* has been updated to clarify suspension of certification in certain circumstances.	Pages 89, 90
The wording under *Section 10 Understanding the qualification grade* has been updated to clarify current practice in ensuring maintenance and consistency of qualification standards.	Page 94

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Pearson BTEC Level 2 Technicals

Introduction

BTEC Level 2 Technicals are intermediate qualifications for post-16 learners who want to specialise in a specific occupation, occupational area or technical role. They prepare learners for work or an Apprenticeship by giving them the opportunity to develop sector-specific knowledge, technical and practical skills, and to apply these skills in work-related environments. The qualifications also provide progression to Level 3 Tech Level qualifications.

Developed in close conjunction with leading employers, BTEC Level 2 Technicals develop transferable workplace skills, such as good communication and the ability to work in a team, which employers have identified as essential for gaining employment in the sector and for progression once the learner is working.

At the core of these qualifications is the concept of preparing young people for the working world. Through practical activities and occupationally-fit-for-purpose assessments, learners will gain the skills and behaviours needed for sustainable employment.

BTEC Level 2 Technicals are designed to be used flexibly, depending on their size and scope:

- as part of a full-time 16–19 study programme, alongside mathematics and English GCSEs and/or Functional Skills, work placement and enrichment activities
- as the technical qualification within an Apprenticeship or off-the-job training for those already in work
- as a roll-on, roll-off programme for those entering an Apprenticeship or employment.

Pearson has developed the BTEC Level 2 Technicals suite to meet the Department for Education (DfE) requirements for qualifications to be offered as Technical Certificates for 16–19-year-olds.

This specification contains the information you need to deliver the Pearson BTEC Level 2 Technical Diploma in Digital Technology (Networking and Cybersecurity) (QN 603/0878/3). The specification signposts you to additional handbooks and policies. It includes all the units for this qualification.

This qualification is a part of the BTEC Level 2 Technicals suite for the Digital Technology sector. Other BTEC Level 2 Technicals available for this sector include the:

- Pearson BTEC Level 2 Technical Certificate in IT Support
- Pearson BTEC Level 2 Technical Diploma in Digital Technology (Data Management)
- Pearson BTEC Level 2 Technical Diploma in Digital Technology (Digital Applications).

1 Pearson BTEC Level 2 Technical Diploma in Digital Technology (Networking and Cybersecurity)

Purpose

Who is the qualification for?

This qualification is for learners who want to start a career in digital technology. It is designed for post-16 learners and can be taken as part of a wider study programme. It is an ideal qualification for learners intending to progress directly to employment in digital technology or IT, or to an IT apprenticeship.

What does the qualification cover?

The qualification has been developed in consultation with employers in the IT sector. This means that it will enable learners to develop the skills and behaviours that give them the best opportunity to be successful in applying for work.

All the content of the qualification is mandatory and relates directly to the skills, knowledge and behaviours expected by employers in the IT sector. The areas learners will cover include:

- understanding IT network features and functions, common practices in network security, and the function and features of the main network appliances
- setting up new equipment and upgrading existing systems
- IT service solutions and the issues encountered in IT solutions in an organisation
- use of ethical hacking techniques to test the security of a network
- creating and maintaining a network.

Learners will also cover broader skills in literacy and numeracy, which will help them to progress. Learners will develop other transferable technical and practical skills in communication (working with colleagues, customers and clients), and research and project work (giving them the opportunity to show reflective practice by suggesting different approaches to solving a problem).

What could this qualification lead to?

Achieving this qualification will give learners an advantage when applying for a job in IT. The types of jobs they will be ready for are:

- junior network engineer
- network support.

The qualification gives learners a sound basis to progress to a Level 3 qualification, when studied in a full study programme, such as the BTEC Level 3 Extended Diploma in Computing, BTEC Level 3 Extended Diploma in IT or a Level 3 digital apprenticeship.

About the IT sector

Organisations increasingly rely on computer systems in all areas of their operations and decision-making processes. Therefore, it is critical to ensure that IT systems run correctly and that they are regularly maintained. IT support, or technical support, is a service that helps to do this, as well as helping with specific problems with computer technology. IT support technicians may install and configure computer systems, diagnose hardware and software faults, and solve technical and applications problems, either over the phone or in person, and/or monitor and maintain the computer systems and networks of an organisation. Organisations need IT support to ensure that their digital products, services and systems work effectively.

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2 Structure

Total Qualification Time (TQT)

For all regulated qualifications, Pearson specifies a total number of hours that it is estimated learners will require to complete and show achievement for the qualification: this is the Total Qualification Time (TQT). Within TQT, Pearson identifies the number of Guided Learning Hours (GLH) that we estimate a centre delivering the qualification might provide. Guided learning means activities such as lessons, tutorials, online instruction, supervised study and giving feedback on performance, that directly involve tutors and assessors in teaching, supervising and invigilating learners. Guided learning includes the time required for learners to complete external assessment under examination or supervised conditions.

In addition to guided learning, other required learning directed by tutors or assessors will include private study, preparation for assessment and undertaking assessment when not under supervision, such as preparatory reading, revision and independent research.

The Pearson BTEC Level 2 Technical Diploma in Digital Technology (Networking and Cybersecurity) is a qualification that has:

- Total Qualification Time: 445 hours
- Guided Learning Hours: 360 hours.

Centres should take note of these hours in planning their programme but should also use their professional judgement to determine the provision of guided learning and study time across the units.

Qualification structure

Learners are required to complete and achieve all the units included in this qualification.

Pearson BTEC Level 2 Technical Diploma in Digital Technology (Networking and Cybersecurity)				
Unit number	**Unit title**	**GLH**	**Type**	**How assessed**
1	Set up and Configure Technology Systems	**60**	Mandatory	Internal
2	Exploring Current and Emerging Technologies	**60**	Mandatory	Internal
3	Security Protection and Risk Management	**60**	Mandatory	External
5	IT Service Solutions	**60**	Mandatory	External
8	Networking Tools and Applications	**60**	Mandatory	Internal
11	Installing and Maintaining Networks	**60**	Mandatory	Internal

This qualification has 100% mandatory content and 33% external assessment.

Qualification and unit content

Pearson has developed the content of this qualification in collaboration with employers and representatives from relevant professional bodies and further education providers.

The content has been mapped to the National Occupational Standard IT/Technology Infrastructure Design and Planning Level 2 ESKITP4082. In this way, we have ensured that content is up to date and that it includes the knowledge, technical and practical skills and behaviours required to work in the sector and occupational area.

All units in this qualification are mandatory, which provides a balance of breadth and depth, ensuring that all learners develop the technical and practical skills required in the occupational area. Learners are then given the opportunity to develop a range of transferable skills and attributes expected by employers. It is expected that learners will apply their learning to relevant employment and sector contexts during delivery, and that they will have opportunities to engage meaningfully with employers.

BTECs have always required applied learning that brings together knowledge and understanding (the cognitive domain) with practical and technical skills (the psychomotor domain). This is achieved through learners performing practical, work-related tasks that encourage the development of appropriate work-related behaviours (the affective domain) and transferable skills. Transferable skills are those such as communication, teamwork and planning, and completing tasks to high standards, all of which are valued in the workplace.

Our approach provides rigour and balance and promotes the ability to apply learning immediately in new contexts.

Some of the units within the specification may contain references to legislation, policies, regulations and organisations, which may not be applicable in the country you deliver this qualification in (if teaching outside of England), or which may have gone out of date during the lifespan of the specification. In these instances, it is possible to substitute such references with ones that are current and applicable in the country you deliver subject to confirmation by your Standards Verifier.

Assessment

Assessment is designed to fit the purpose and objective of the qualification. It includes a range of assessment types and styles suited to skills and occupationally-based qualifications at this level.

External assessment

In this qualification, there are two external assessments, which assess units that contribute 33% of the total qualification GLH. The external assessments for this qualification take the form of a task that allows learners to apply their skills and knowledge in context to a realistic work-based activity, and an onscreen test that includes a variety of onscreen question types that allows learners to apply their knowledge to several work-related contexts. The external assessments are linked to *Unit 3: Security Protection and Risk Management* and *Unit 5: IT Service Solutions*, as indicated in the qualification structure on the previous page.

These methods have been used to externally assess the units because they are best suited to draw out the evidence to exemplify the expectations of the units and to provide sufficient evidence of achievement of the purpose of the units.

The external assessments are taken under specified conditions, then marked by Pearson and a grade awarded. Learners must achieve the external units at Pass grade or above to achieve the qualification. Learners are permitted to resit the external assessments once during their programme by taking a new assessment.

For further information on external assessment see *Section 7 External assessment*.

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Internal assessment

Units 1, *2*, *8* and *11* are assessed through internal assessment. Internal assessment allows learners to apply technical knowledge and demonstrate mastery of practical and technical skills through realistic tasks and activities. This style of assessment promotes deep learning through ensuring the connection between knowledge and practice.

Internal assessment is through assignments that are subject to external standards verification. We provide suggestions in each unit for setting assignments. This means that you can adapt materials to your local contexts and assess assignments that provide the valid and rigorous final assessment for each unit.

You will make grading decisions based on the requirements and supporting guidance given in the units. Learners must achieve all the internal units at Pass grade or above to achieve the qualification. For further information on internal assessment, including resubmissions, see *Section 6 Internal assessment*.

Synoptic internal assessment

There is one internal unit that provides the main synoptic assessment for this qualification. This synoptic assessment is designed to take place towards the end of the programme and draws on the learning throughout. The design of this assessment ensures that there is sufficient stretch and challenge, enabling the assessment of sector-related knowledge and technical and practical skills at the end of the learning period.

The synoptic assessment for this qualification is based on *Unit 11: Installing and Maintaining Networks*, and takes the form of a vocational activity in which learners have to manage and test the security of a network. In completing this activity, learners will use the skills they have developed in other units to use networking tools and techniques effectively in order to provide a robust networking solution.

In delivering the unit, you need to encourage learners to draw on their broader learning so that they are prepared for the assessment.

Language of assessment

Assessment of the internal and external units for this qualification will be available in English. All learner work must be in English. A learner taking the qualifications may be assessed in British sign language where it is permitted for the purpose of reasonable adjustment. For information on reasonable adjustments see *Section 8 Administrative arrangements*.

Grading of the qualification

Achievement in the qualification requires a demonstration of depth of study in each unit, assured acquisition of the practical skills required for employment in the specific sector and successful development of transferable skills.

Units are assessed using a grading scale of Distinction, Merit, Pass and Unclassified. All units in the qualification contribute proportionately to the overall qualification grade.

The qualification is graded using a scale of PP to DD. Please see *Section 10 Understanding the qualification grade* for more details.

The relationship between qualification grading scales and unit grades will be subject to regular review as part of Pearson's standards monitoring processes on the basis of learner performance and in consultation with key users of the qualification.

Employer involvement

Employer involvement in the delivery and/or assessment of technical qualifications provides a clear 'line of sight' to work, enriches learning, raises the credibility of the qualification in the eyes of employers, parents and learners, and furthers collaboration between the learning and skills sector and industry.

You need to ensure that all learners have the opportunity to undertake meaningful activity involving employers during their course.

Examples of 'meaningful activity' include:

- structured work experience or work placements that develop skills and knowledge relevant to the qualification/industry
- project(s), exercise(s) and/or assessments/examination(s) set with input from industry practitioner(s)
- units delivered or co-delivered by an industry practitioner(s); this could take the form of masterclasses or guest lectures
- industry practitioners operating as 'expert witnesses' who contribute to the assessment of a learner's work of practice, operating within a specified assessment framework; this may be a specific project(s), exercise(s) or all assessments for a qualification

Meaningful employer involvement, as defined above, must be with employers from the IT sector and should contribute significantly to at least one mandatory unit.

In some units, we have suggested how employers could become involved in the delivery and/or assessment of this qualification. These units are listed below.

- *Unit 1: Set Up and Configure Technology Systems* – industry specialists acting as expert witnesses when learners are setting up and configuring systems.
- *Unit 2: Exploring Current and Emerging Technologies* – masterclasses from local employers who will demonstrate how they are using technology in their organisation to achieve business objectives.
- *Unit 8: Networking Tools and Applications* – work experience in a local organisation in first line support.
- *Unit 11: Installing and Maintaining Networks* – local employers' business materials as exemplars in terms of networking.

These are suggestions only and there will be other possibilities at local level. Centres may choose to use other approaches but must ensure that they meet the requirement for meaningful employer involvement as defined above. Centres must have an employer involvement plan in place at the start of the programme. It must detail their approach to employer involvement and how it will add value to the delivery and assessment of the qualification.

Each centre's approach to employer involvement will be monitored in two ways. It will be monitored at centre level as part of the annual quality-management review process and captured as part of the standards verification process that addresses centre strategy for delivery, assessment and quality assurance, when we will ask you to show evidence of how employer involvement is provided for all learners. You will need to show evidence in order to gain reporting clearance for certification. It will also be monitored at programme level as part of the standards verification process to confirm that plans for employer involvement meet the requirements of the specification. These approaches are designed to ensure that additional activities can be scheduled where necessary so that learners are not disadvantaged, see *Section 9 Quality assurance*.

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3 Units

Understanding your units

The units in this specification set out our expectations of assessment in a way that helps you to prepare your learners for assessment. The units help you to undertake assessment and quality assurance effectively.

Each unit in the specification is set out in a similar way. There are two types of unit format:

- internal units
- external units.

This section explains how the units work. It is important that all tutors, assessors, internal verifiers and other staff responsible for the programme read and are familiar with the information given in this section.

Internal units

Section	Explanation
Unit number	The number is in a sequence for the qualification.
Unit title	This is the formal title of the unit and appears on certificates.
Level	All units are at Level 2 on the national framework.
Unit type	This says if the unit is mandatory or optional for the qualification. See *Section 2 Qualification structure* for details.
Assessment type	This says how the unit is assessed – i.e. whether it is external, internal or synoptic internal. See *Section 2 Qualification structure* for details.
GLH	Units have a GLH value of 60. This indicates the numbers of hours of teaching, directed activity and assessment expected. It also shows the weighting of the unit in the final qualification grade.
Unit in brief	A brief formal statement on the content of the unit that is helpful in understanding its role in the qualification. You can use this in summary documents, brochures etc.
Unit introduction	This is designed with learners in mind. It indicates why the unit is important, how learning is structured and how learning might be applied when progressing to employment or higher education.
Learning aims	These help to define the scope, style and depth of learning of the unit. You can see where learners should be developing and demonstrating their skills or where they should be actively researching or reviewing.
Unit summary	This section helps tutors to see at a glance the main content areas against the learning aims and the structure of the assessment. The forms of evidence given are suitable to fulfil the requirements.
Content	This section sets out the required teaching content of the unit. Content is compulsory except when shown as 'e.g.'. Learners should be asked to complete summative assessment only after the teaching content for the unit or learning aim(s) has been covered.

Section	Explanation
Assessment criteria	Each learning aim has assessment criteria to explain the achievement required to obtain Pass, Merit and Distinction grades.
Essential information for assessment decisions	This information gives guidance for each learning aim or assignment of the expectations for Pass, Merit and Distinction standard. This section contains examples and essential clarification. It is important that this is used carefully alongside the assessment criteria.
Assessment activity	This section provides information, suggested scenarios and tasks for summative assessment activities.
Further information for tutors and assessors	The section gives you information to support the delivery and assessment of the unit.
Delivery guidance	This section offers suggestions of ways of delivering the unit. It offers ideas on practical activities in a sector context that can be used to help develop relevant skills and to encourage progress.
Essential resources	Any specific resources that you need to be able to teach and assess are listed in this section. For information on support resources see *Section 11 Resources and support*.
Links to other units	This section shows you the main relationships of units to other units. This can help you to structure your programme and make the best use of available materials and resources.
Employer involvement	This section gives you information on the units that can be used to give learners involvement with employers. It will help you to identify the kind of involvement that is likely to be successful.

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External units

Section	Explanation
Unit number	The number is in a sequence for the qualification.
Unit title	This is the formal title of the qualification and appears on certificates.
Level	All units are at Level 2 on the national framework.
Unit type	This says if the unit is mandatory or optional for the qualification. See *Section 2 Qualification structure* for details.
Assessment type	This says how the unit is assessed – i.e. whether it is external, internal or synoptic internal. See *Section 2 Qualification structure* for details.
GLH	Units have a GLH value of 60. This indicates the numbers of hours of teaching, directed activity and assessment expected. It also shows the weighting of the unit in the final qualification grade.
Unit in brief	A brief formal statement on the content of the unit.
Unit introduction	This is designed with learners in mind. It indicates why the unit is important, how learning is structured and how learning might be applied when progressing to employment or higher education.
Summary of assessment	This sets out the type of external assessment used and the way in which it is used to assess achievement.
Assessment outcomes	These show the hierarchy of knowledge, understanding, skills and behaviours assessed. For tested units, they include information on how this hierarchy relates to command terms in sample assessment materials (SAMs).
Essential content	For external units all the content is obligatory, the depth of content is indicated in the assessment outcomes and sample assessment materials (SAMs). The content will be sampled through the external assessment over time, using the variety of questions or tasks shown.
Grade descriptors	We use grade descriptors when making judgements on grade boundaries. You can use them to understand what we expect to see from learners at particular grades.
Key terms typically used in assessment	These definitions will help you to analyse requirements and to prepare learners for assessment.
Links to other units	This section shows the main relationships of units to other units. This section can help you to structure your programme and make the best use of available materials and resources.
Employer involvement	This section gives you information on the units that can be used to give learners involvement with employers. It will help you to identify the kind of involvement that is likely to be successful.

Units

This section contains all the units developed for this qualification.

Unit 1: Set Up and Configure Technology Systems 13
Unit 2: Exploring Current and Emerging Technologies 25
Unit 3: Security Protection and Risk Management 35
Unit 5: IT Service Solutions 45
Unit 8: Networking Technologies and Applications 55
Unit 11: Installing and Maintaining Networks 65

Unit 1: Set Up and Configure Technology Systems

Level: **2**

Unit type: **Mandatory**

Assessment type: **Internal**

Guided learning hours: **60**

Unit in brief

Learners develop the skills needed to install, configure and test a computer system to a given user requirement.

Unit introduction

Every organisation uses computers to complete daily tasks such as making contact with clients, collecting and reporting data and information, managing payments, training staff, and solving a range of product- and service-related problems, as these tasks can often be completed more effectively by computers. To complete these tasks, businesses use a variety of different types of computer, such as desktops, laptops, tablets and mobile phones, depending on their needs.

In this unit, you will identify the basic components of a computer system and learn how these components are selected and put together to install and configure technology systems – computer systems and mobile devices for a range of users' needs, as well as testing for functionality. You will learn about how operating systems work and the differences between types of operating system and the different functions of programs and applications that enable them to be installed and configured on a computer system. You will learn how to connect and disconnect a variety of peripheral devices, and the basics of computer safety and security in the workplace.

This unit will help you develop the skills needed for an entry-level position in a range of occupational areas in IT, where an understanding of how computers function is key to the role, as well as allowing you to progress to further IT qualifications.

Learning aims

In this unit you will:

A Install, configure and test hardware in a computer system to meet user requirements

B Install, configure and test software in computer systems and mobile devices to meet user requirements

C Apply appropriate security measures to computer systems and mobile devices.

Unit summary

Learning aim	Key teaching areas	Summary of suggested assessment evidence
A Install, configure and test hardware in a computer system to meet user requirements	**A1** Types of internal computer hardware component **A2** Types of computer peripheral **A3** Connectors and ports **A4** Networking devices and connection processes	Video evidence/screenshots and other documentary evidence of learners installing, configuring and testing computer systems and software, supported by observation records from tutors.
B Install, configure and test software in computer systems and mobile devices to meet user requirements	**B1** Functions of an operating system **B2** Types of operating system **B3** Software programs and their purpose **B4** Common application software features and functions **B5** Set-up and configuration of mobile devices	
C Apply appropriate security measures to computer systems and mobile devices	**C1** Safety measures **C2** Security and backup procedures	

Key teaching areas in this unit include:

Sector skills	Knowledge	Transferable skills/behaviours
• Installing, configuring and testing of hardware • Installing, configuring and testing of software • Connecting and testing of network • Installing, configuring and testing of operating systems • This unit is aligned, in part, to the CompTIA A+ Vendor qualification	• Types of hardware • Types of peripheral • Proprietary and open-source applications • Operating systems	• Communication • Managing information • Working with others

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Unit content

Knowledge and sector skills

Learners need to be aware that computer hardware, software and networking components will differ depending on their uses and users' needs. They will also need to be aware that a computer system is made up of hardware components, peripherals, connectors and ports, and network devices.

Learning aim A: Install, configure and test hardware in a computer system to meet user requirements

Learners will identify the main components and purpose of computer hardware peripherals, network, connectors and ports, and develop the skills and understanding to use these components and peripherals to set up a work station. Learners will need to carry out testing to ensure the computer system meets the user's requirements.

A1 Types of internal computer hardware component

Internal computer hardware components and their purpose.

- Central processing unit (CPU).
- Random-access memory (RAM).
- Power supply.
- Storage devices (optical drive, hard drive, solid-state drive).
- Expansion cards (video, audio, network cards, modem).
- Motherboard.
- System cooling (case fans, CPU fans, liquid cooling).

A2 Types of computer peripheral

Wired and wireless peripherals and their purposes.

- Input devices, e.g. keyboard, pointing devices, scanner, microphone, webcam.
- Output devices, e.g. printer, display devices, speakers.
- Input and output devices, e.g. Smart TV, touchscreen display.

A3 Connectors and ports

Types of connector and port and their uses, including:

- video
- eSATA
- ThunderboltTM
- USB
- RJ-45
- RJ-11
- audio
- power
- HDMI.

A4 Networking devices and connection processes

Network devices and their uses.

- Network devices:
  - routers (wired/wireless)
  - switches
  - hubs
  - nodes and links.
- Network connection processes:
  - apply/verify connection for devices
  - install drivers
  - set server identity and encryption type
  - apply admin and user passwords.

Learning aim B: Install, configure and test software in computer systems and mobile devices to meet user requirements

Learners will identify the main functions of software programs, operating sysytems and mobile devices. They will develop the skills needed to set up a work station and mobile device. Learners will need to carry out testing to ensure the computer system and mobile device meets the user's requirements.

B1 Functions of an operating system

- Boot up.
- Central processing.
- Resource and device management.
- Memory and sharing.
- Functionality monitoring.
- Directories for programs and storage.
- Displays and user machine interface.

B2 Types of operating system

Learners need to be aware of the compatibility of hardware and software when selecting an operating system.

- Mobile.
- Workstation (types).
- Open source.

B3 Software programs and their purpose

Method and purpose of software processes.

- Install/uninstall.
- Version identification.
- Licensing.
- Updating.

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B4 Common application software features and functions

- Productivity software, e.g. word processing, email and presentation software, pdf viewers/creators.
- Browsers, e.g. Firefox®, Google Chrome™, Internet Explorer®.
- Collaborative software (types, examples and purposes), e.g. document storage and sharing, video conferencing.
- Messaging, e.g. Skype®, Google Hangouts™
- Utility software, e.g. security/malware, diagnostics, compression software.
- Specialised software, e.g. graphic design, medical/scientific, financial.
- Open source versus commercial.
- Common file types and purposes, e.g. documents, audio, images, compression formats.

B5 Set-up and configuration of mobile devices

- Connection set-up.
- Synchronisation.
- Email configuration.
- Bluetooth® pairing.
- Locking/unlocking and security.
- Downloading apps.

Learning aim C: Apply appropriate security measures to computer systems and mobile devices

C1 Safety measures

- Disposal methods, e.g. Restriction of Hazardous Substances Directive (RoHS), cathode ray tube (CRT) monitors, scanners, batteries, ink/toner, hard drives.
- Power, e.g. energy-efficient devices, power profiles, power limitations, international power differences.
- Device placement, e.g. airflow, humidity, temperature, dust accumulation, electromagnetic interference (EMI).
- Electrostatic discharge concepts.
- Ergonomic concepts, e.g. keyboard and mouse placement, sitting positions, monitor-level placement.

C2 Security and backup procedures

- Basic security threats: malware, viruses, firewall.
- Basic security practices, e.g. password management, device hardening, Wi-Fi, authentication.
- Backup procedures, e.g. scheduling, frequency, storage mediums.

Transferable skills

Communication

- Communicating with users and colleagues, identifying and resolving problems.

Managing information

- Document management: using technical guides, maintaining logbooks.

Working with others

- Working with users to ensure their requirements are met.

Assessment criteria

Pass	Merit	Distinction
Learning aim A: Install, configure and test hardware in a computer system to meet user requirements		
A.P1 Install hardware in a computer system safely to meet user requirements.	**A.M1** Install and configure hardware in a computer system safely, considering relevant factors to meet user requirements and testing for functionality.	**AB.D1** Set up, install and configure computer systems and mobile devices to meet user requirements confidently, considering all relevant factors and suggesting suitable alternative methods and components.
Learning aim B: Install, configure and test software on computer systems and mobile devices to meet user requirements		
B.P2 Install software to meet user requirements.	**B.M2** Install and configure software to meet user requirements, considering relevant factors and testing for functionality.	
Learning aim C: Apply appropriate security measures to computer systems and mobile devices		
C.P3 Apply security measures to a computer system and mobile device.	**C.M3** Apply security measures to computer systems and mobile devices, considering relevant factors and testing for functionality and ensuring backup of systems.	**C.D2** Apply security measures to computer systems and mobile devices, thoroughly considering all relevant factors, testing for functionality and ensuring full backup of systems.

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Essential information for assessment decisions

Learning aims A and B

For distinction standard, learners will:

- consistently demonstrate that they can safely and independently set up and install a technology system for both computer systems and mobile devices as requested by users. They will demonstrate that they can use appropriate components and processes and ensure that the system is ready for use and meets user requirements. They will show initiative and confidence when setting up a computer system, and demonstrate control over the choice and use of components. They will consider other factors such as available components and special requirements of users such as a left-handed user. They will configure software and hardware to meet all specific user requirements, e.g. keyboard settings, date and time, screen resolutions. They will carry out comprehensive testing to demonstrate that everything has been installed correctly and functions well. They will identify errors and resolve them. They will provide training for the user on the installed hardware and show initiative by suggesting alternative solutions that meet users' needs.

For merit standard, learners will:

- demonstrate that they can safely install and configure the requested/required hardware and software for a computer system and mobile device, with some guidance. They will decide what components to use but may need assistance. Learners will install and configure the operating systems and configure the hardware and software to meet most of the user requirements, e.g. date/time but might not be able to meet specific users' requirements. They will consider some other factors such as special requirements for left-handed users. Learners will test that the hardware has been installed properly and functions well but may not be able to fix all errors. Learners will provide some guidance (training) on the use of the installed hardware.

For pass standard, learners will:

- demonstrate that they can install hardware and software for a computer system and mobile device that partially meets users' needs but might have to ask for advice on installing and configuring. Learners will identify some of the components needed but may not know how to install them all correctly, they may often need guidance. They will configure the hardware and software to meet some of the user requirements and test that the hardware has been installed correctly and functions well. They may need to ask for advice when fixing errors. Learners will provide some guidance (training) on the use of the installed hardware.

Learning aim C

For distinction standard, learners will:

- consistently demonstrate that they can independently apply appropriate security and safety measures when installing hardware and software for different computer systems and mobile devices for multiple users. They will apply and adapt the security and safety measures for different users and include all the relevant security measures while being mindful of the current and relevant threats, considering multiple users and different hardware that could be affected. They will be thorough in ensuring that the system is backed up after every installation and schedule regular backups.

UNIT 1: SET UP AND CONFIGURE TECHNOLOGY SYSTEMS

For merit standard, learners will:

- demonstrate that they can apply the appropriate security and safety measures when installing hardware and software for computer systems and mobile devices but may need some assistance. Learners will include all the relevant security measures and be aware of some of the threats that could affect the hardware and software installed and the users' requirements. They will ensure the system is backed up regularly.

For pass standard, learners will:

- demonstrate that they can apply appropriate security and safety measures when installing hardware and software for a computer system and mobile device, often referring to guidelines. Learners will implement basic security measures and back up a system, although they may ask for advice.

Assessment activity

The summative assessment activity takes place after learners have completed their formative development. The activity should be practical, be set in a realistic scenario and draw on learning from the unit, including the transferable skills. You will need to give learners a set period of time and number of hours in which to complete the activity. *Section 6* gives information on setting assignments and there is further information on our website.

A suggested structure for summative assessment is shown in the *Unit summary* section, along with suitable forms of evidence. This is for illustrative purposes only and can therefore be adapted to meet local needs or to assess across units where suitable opportunities exist. The information in the *Links to other units* section will be helpful in identifying opportunities for assessment across units.

The following scenario could be used to produce the required evidence for this unit. Centres are free to use comparable scenarios or other forms of evidence, provided that they meet the assessment requirements of the unit.

Suggested scenario

You are working as a customer support technician in a medium-sized company spread over three sites. You need to provide support to the employees who work on desktops and laptops. The employees use both standard office software, as well as more specialised software.

The technology systems are being upgraded and you have been asked to help with the upgrade of the different devices. You will set up, install and configure different technology systems for different individual users, ensuring that all company and user requirements are met. You will then test that the systems function well and that all security and safety measures have been applied and correct administration accounts, permissions and passwords have been set up for each individual. You will be observed by your tutor carrying out this work and you must also keep photographic/video evidence of the work you carry out and put it together in a portfolio for assessment.

If a retake is necessary, an alternative example must be used. The following is an example of a retake assessment activity.

You have been asked by a local business to set up and configure a new office as they are expanding. There will be two new PCs for new members of staff, as well as two existing ones that are being upgraded to be in line with the new hardware and software; these are being used by staff that are moving from another office. You will need to test the systems and ensure that all security and safety measures have been applied. You will provide support to the users who are being upgraded by giving them information on changes as well as providing any specialist software and requirements where applicable.Your tutor will observe you undertaking these tasks and you must also keep photographic/video evidence of the work you have carried out.

Further information for tutors and assessors

Delivery guidance

The following are examples of practical activities and workshops that tutors could use when developing sector and transferable skills in the delivery of this unit. Wherever possible, practical activities should be used to help learners develop both personal and sector skills in preparation for the final assessment. These suggestions are not intended as a definitive guide to cover the full GLH of the unit.

Introduction to unit Tutors introduce the unit by explaining the different ways organisations use computers and why. Learners will be shown the different types of computer, their purpose, and the hardware, software and operating systems available for each type of computer. Learners need to appreciate that computers can perform a variety of tasks. It would be useful to illustrate the tasks carried out by different types of computer using online videos or case studies. Learners could be given a template in which they identify the variety of computer systems and their purposes, operating systems and the different programs and applications and what they can do. This could be done in a whole-group setting or smaller groups could be given different videos/case studies on different job titles and feed back their findings to the rest of the class. The plenary would help learners to appreciate that the areas of computer hardware, networks and software overlap considerably in the context of this unit, and that jobs in this field are required in every organisation that uses computers. **Suggested time:** about 3 hours.
Activity: Usage and components of computer systems – hardware, peripherals, connectors and ports and network devices Tutors demonstrate effective health and safety practice and give individual learners the opportunity to follow those processes by removing and replacing hardware devices under supervision. Learners will be guided through any installation of software or configuration required by the new hardware. They should then be guided through how to test the system effectively to ensure the changes are working correctly. They will investigate the changes to the system after the hardware has been installed and appreciate the effect of upgrading devices. Learners will practice setting up a local area network (LAN) and then the tutor will provide scenarios for that LAN to look at potential security issues and how to mitigate those issues. **Suggested time:** about 6 hours.
Activity: Installing and configuring operating systems and software programs Learners investigate and experiment with a range of different system software, including operating systems and software tools. Learners should appreciate the need for compatibility between the operating system/software and the platform it is running on. They will then conduct detailed investigations into selected aspects of system software as a research project. They will investigate and experiment with a range of application software and software utilities, testing that the installation and configuration of software meets the requirements. **Suggested time:** about 4 hours.
Activity: Applying security measures Learners investigate the different security measures available for the different technology systems and follow backup procedures. Learners practise applying security settings to different devices and backup procedures – password, administration accounts and permissions. **Suggested time:** about 4 hours.

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Essential resources

For this unit, learners will need access to suitable hardware, software and network components, as indicated in the unit content.

Links to other units

This unit has strong links to:

- Unit 2: Exploring Current and Emerging Technologies
- Unit 3: Security Protection and Risk Management.

Employer involvement

This unit would benefit from employer involvement in the form of:

- masterclasses that provide specific technical knowledge from industry specialists on setting up and configuring technology systems
- industry specialists acting as expert witnesses when learners are carrying out the IT tasks.

Unit 2: Exploring Current and Emerging Technologies

Level: **2**

Unit type: **Mandatory**

Assessment type: **Internal**

Guided learning hours: **60**

Unit in brief

Learners investigate current and emerging technologies and how organisations use them to meet their business needs.

Unit introduction

Technology is increasingly central to the way businesses and organisations function. It is used to communicate with customers and clients in ways that would have been impossible many years ago. It allows them to analyse data to identify trends in their market, expand their client base and become more cost-effective.

In this unit, you will explore current and emerging technologies and how they are used across organisations. You will investigate a particular organisation, finding out about the technology it uses, how it has influenced its business operations and how it is used to meet its business needs. You will also find out how it plans to use any new or emerging technology.

This unit will help you develop knowledge and skills needed for an entry-level position in a range of occupational areas in IT, where an understanding of current and emerging technologies and how they are used are key to the role. It will also allow you to progress to further IT qualifications.

Learning aims

In this unit you will:

A Explore current and emerging technologies and their purposes

B Investigate how an organisation uses technology to meet its needs.

Unit summary

Learning aim	Key teaching areas	Summary of suggested assessment evidence
A Explore current and emerging technologies and their purposes	**A1** Mobile technology **A2** Intelligent computer **A3** Internet of Things (IoT) **A4** Cloud technology	A report on types of current and emerging technologies and their uses.
B Investigate how an organisation uses technology to meet its needs	**B1** Why organisations invest in technology **B2** The types of technology that organisations use **B3** How organisations assess if technology has met their needs	Case study on how a selected organisation uses technology to meet their business objectives.
Key teaching areas in this unit include:		
Sector skills	**Knowledge**	**Transferable skills/behaviours**
• Use of technologies • Investigating organisations	• Current and emerging technologies and their uses for business needs and development	• Communication • Managing information

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Unit content

Knowledge and sector skills

Learning aim A: Explore current and emerging technologies and their purposes

Learners explore current and emerging technologies, the roles they could play in organisations and possible future technological trends. The following content does not preclude teaching any current or emerging technology that is not listed below.

A1 Mobile technology

- How it is used in different sectors, e.g. retail, banking, entertainment, social media.
- Development and use of smart devices/smartphone apps.
- Emerging mobile technology and its future use.

A2 Intelligent computer

- Automation, e.g. driverless cars and trains.
- Robotics: used in motor/manufacturing industry, retail, telehealth.
- Global Positioning System (GPS).
- Computer-aided design (CAD).
- Voice control, e.g. security, navigation (in cars), to support disabilities.
- Use of drones, e.g. military, surveillance, weather, pilot school, agriculture, network rail (field maintenance).
- Artificial intelligence – medical diagnosis, in the finance industry artificial neural networks are used to detect frauds.
- Augmented reality – retail, medical, education, gaming.
- Virtual reality – use of gaming technology in medicine, car and construction industry, aviation.
- Use of social media such as YouTube™ (vlogs) in organisations, businesses.

A3 Internet of Things (IoT)

- Connecting devices over the internet – consumer usage, enterprise deployment, online connectivity.
- Enabling technologies, e.g. Bluetooth®, radio-frequency identification (RFID), near field communication (NFC)
- Development of wearable technology – Fitbit®, smart watches, smart glasses.

A4 Cloud technology

The development and use of:

- Software as a Service (SaaS)
- Infrastructure as a Service (IaaS)
- Platform as a Service (PaaS)
- Data as a Service (DaaS).

Learning aim B: Investigate how an organisation uses technology to meet its needs

Learners investigate how an organisation uses technology, how it decides on which technology to adopt and the benefits and risks that it brings.

B1 Why organisations invest in technology

Organisations invest in current and emerging technology as a way of:

- improving productivity
- meeting business goals
- improving efficiency
- increasing cost-effectiveness
- achieving increased growth
- innovating
- improving agility and competitiveness
- global communication
- increasing promotion and sales
- having a wider consumer reach
- providing instant customer service.

B2 The types of technology that organisations use

- Organisations select technology based on a number of considerations:
  - business type, e.g. product, service
  - needs and/or benefits of the customers/clients
  - hardware/software/network requirements
  - particular security issues.
- They do this through:
  - a feasibility study (based on organisation's needs, market research)
  - as part of the digital strategy/digital policies or business plan
  - feedback from stakeholders, customers, employees.

B3 How organisations assess if technology has met their needs

- Benefits:
  - improved efficiency
  - increased profit
  - increased productivity
  - reduction in wasted time
  - reduction in cost.
- Risks and issues:
  - change management, e.g. training, transition from existing to new technology, risk of loss of service/data
  - ethical considerations, e.g. consultation with stakeholders, data ownership, impacts on employees
  - data management and access, e.g. privacy, security of data
  - legal considerations, e.g. data protection legislation, Computer Misuse Act 1990.

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Transferable skills

Communication

- Interviewing employers to gather information about how organisations use technology to achieve their goals.

Managing information

- Gathering information from a variety of sources and presenting it as a case study.

Assessment criteria

Pass	Merit	Distinction
Learning aim A: Explore current and emerging technologies and their purposes		
A.P1 Describe types of current and emerging technologies and their purposes.	**A.M1** Explain how current and emerging technologies are being used in organisations, giving detailed examples and identifying any future technological trends.	**A.D1** Analyse how current and emerging technologies are being used in organisations, using detailed examples and evaluating the impact of any future technological trends.
A.P2 Outline how current and emerging technologies are being used in organisations, giving outline examples.		
Learning aim B: Investigate how an organisation uses technology to meet its needs		
B.P3 Describe how an organisation has selected and used technology to meet its needs.	**B.M2** Explain how an organisation has selected and used technology to meet its needs, assessing the benefits and risks to the organisation.	**B.D2** Evaluate how an organisation has selected and used technology to meet its needs, analysing the benefits and risks, and making suggestions for how it might be impacted by emerging technology.
B.P4 Outline how technology has benefited an organisation.		

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Essential information for assessment decisions

Learning aim A

For distinction standard, learners will:

- produce a comprehensive analysis of both current and emerging technologies and their impact on a range of different types of business, using detailed and relevant examples and drawing some valid and insightful conclusions on future technological trends and the impact of new and emerging technologies on organisations. The analysis should contain examples from a range of both emerging and current technologies, using the correct technical terminology.

For merit standard, learners will:

- produce a detailed explanation of current and emerging technologies, using some relevant examples from different types of organisation, e.g. private sector and public sector, product and service organisations. Learners will explain how these organisations are using technology and the benefits it brings to them. Their examples will be balanced between current, and new and emerging technologies, and they will mostly use the correct technical terminology.

For pass standard, learners will:

- produce outline information about how technologies are being used, with most of the examples referring to current technology, with some broad references to emerging technology. They will give some detail on how and why they are being used by a small number of organisations and the range of technologies will be limited. Technical terminology will be used although there might be errors in its application.

Learning aim B

For distinction standard, learners will:

- provide a well-balanced and detailed evaluation of how an organisation chooses its adopted technologies and what the key factors were in that process. They will analyse how well an organisation uses technology to meet its business needs, using justified examples. They will explain how technology has directly contributed to the success of the organisation but will also consider the risks and/or negative effects it may bring. They will make some insightful suggestions on how the organisation may be impacted by emerging technology.

For merit standard, learners will:

- provide a detailed and well-organised explanation on how an organisation uses technology to meet its business needs. They will give specific examples of why the organisation has chosen particular types of technology, what the technology is used for and the process the organisation goes through to select its technology. They will give some explanation, with examples on how it has been beneficial to the organisation, as well as what the risks and issues would be. There will be some detail on how new or emerging technology may be of further benefit to the organisation.

For pass standard, learners will:

- provide broad information on the types of technology that an organisation has currently adopted and what it is being used for, providing some outline examples. There will be some reference to how the organisation has selected the technology, why the organisation has invested in that particular technology and how it meets the needs of the organisation. The examples given will be limited and some outline risks may be listed but they will not be explained in detail.

Assessment activity

The summative assessment activity takes place after learners have completed their formative development. The activity should be practical, be set in a realistic scenario and draw on learning from the unit, including the transferable skills. You will need to give learners a set period of time and number of hours in which to complete the activity. *Section 6* gives information on setting assignments and there is further information on our website.

A suggested structure for summative assessment is shown in the *Unit summary* section, along with suitable forms of evidence. This is for illustrative purposes only and can therefore be adapted to meet local needs or to assess across units where suitable opportunities exist. The information in the *Links to other units* section will be helpful in identifying opportunities for assessment across units.

The following scenario could be used to produce the required evidence for this unit. Centres are free to use comparable scenarios or other forms of evidence, provided that they meet the assessment requirements of the unit.

Suggested scenario

You have been asked by your manager to produce a report on how organisations are using current and emerging technologies to meet their business needs. Your investigation should cover different types of business across different sectors.

You will produce a case study on one of the organisations where you will look at their use of technology in greater depth. You will look in detail at the technology that is being used, the advantages and limitations of this technology in achieving the organisation's needs, and how emerging technology is being considered or could be used.

If a retake is necessary, an alternative example must be used. The following is an example of a retake assessment activity.

You will produce a report on a different range of organisations and their use of technology, as well as a case study on a different organisation.

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Further information for tutors and assessors

Delivery guidance

The following are examples of practical activities and workshops that tutors could use when developing sector and transferable skills in the delivery of this unit. Wherever possible, practical activities should be used to help learners develop both personal and sector skills in preparation for the final assessment. These suggestions are not intended as a definitive guide to cover the full GLH of the unit.

Introduction to unit A tutor-led discussion introducing technologies and their practical uses, case studies and real-life examples of where these have been implemented. There should be a wide range of these technologies in a variety of employment sectors so that learners are able to see their full implementation and practical uses. Learners should develop their understanding of the different types of technology, identifying a few current and emerging technologies, evaluating how these work and their purposes. Learners should be introduced to the tools and techniques used by organisations to select and use technology to meet their business objectives. Learners complete activities identifying the difference between current and emerging technologies, along with their uses and how these allow organisations to achieve their objectives, as well as their general impact on society and individuals and their advantages and disadvantage. **Suggested time:** about 6 hours.
Activity: New and emerging technologies and their uses Learners should be given case studies in either written or video format of real organisations and how they use new and emerging technologies to meet their organisational objectives, as well as the impact of them compared to legacy/traditional methods, e.g. letters being replaced with emails. Learners should discuss different organisational objectives and how organisations use technologies to achieve their objectives. Once learners are able to identify confidently how organisations use technologies to fulfil their objectives, they should work with a local employer to gain a real-life understanding of how it implements technologies to maintain sustainability, conduct business on a day-to-day basis and ultimately meet their business objectives. Learners should have access to a variety of individuals in a company, including key stakeholders, along with customers and technological systems, so that they can conduct their own investigation that can be used to further identify how to make the technology more effective in meeting the business objectives. Learners should identify the actual technologies used in the business and how these contribute to its effectiveness. **Suggested time:** about 6 hours.
Activity: Emerging technologies' impact on individuals Learners should identify specific technologies that are emerging and then carry out some research to find out how they are being used by individuals and organisations and then present back on the findings. Learners should be given access to a means to create and distribute the survey, and be guided as to how to create a survey. They should consider carefully the types of question to ask, as well as the findings, and their report should identify any trends that they find in the research. **Suggested time:** about 4 hours.

Activity: Feasibility study Learners should be given a scenario and two alternate emerging technologies that could improve that scenario. They should analyse the needs of the user and organisation, and provide a recommendation of which technology would be most appropriate from the options, or suggesting an alternative if that is the most appropriate solution. The recommendation could be given by either a formal document, presentation or role-play meeting. If a meeting is the chosen method, this must be documented accordingly. **Suggested time:** about 4 hours.
Activity: Ethical considerations Learners should be given the opportunity to discuss and review the ethical considerations of various emerging technologies. They could be presented with a scenario or given some pointers to consider when adopting new technologies. This can be done as a group discussion or for learners to take individual technologies and consider their adoption and ethical impacts on individuals and organisations. **Suggested time:** about 2 hours.

Links to other units

This unit has strong links to *Unit 1: Set Up and Configure Technology Systems*.

Employer involvement

This unit would benefit from employer involvement in the form of:

- work experience with local employers to allow learners to carry out their case study on the technology used
- masterclasses from local employers who will demonstrate how they are using technology in their organisation to achieve business objectives
- a masterclass from a technology vendor explaining their products and how they are used.

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Unit 3: Security Protection and Risk Management

Level: **2**

Unit type: **Mandatory**

Assessment type: **External**

Guided learning hours: **60**

Unit in brief

Learners study threats to IT system security and the methods used to protect against them.

Unit introduction

Information technology (IT) systems play a major role in the world around us and in almost everything we do. Our increasing reliance on IT systems for data storage and transmission makes us vulnerable to accidental and malicious actions that can pose serious risks to both organisations and individuals.

In this unit, you will study system vulnerabilities, the different types of security threat that exist, both accidental and malicious, and the tools and techniques that can be used to minimise risks such as potential damage, including loss of data, loss of data integrity or unauthorised access to data.

The skills you develop in this unit will prepare you for progression to employment in an IT support, or similar, role.

Summary of assessment

This unit is assessed using an onscreen test, set and marked by Pearson. The test contains different types of question and is worth 60 marks. The test duration is 75 minutes. The assessment is available on demand. The first assessment is available in January 2018.

Sample assessment materials will be available to help centres prepare learners for assessment.

Assessment outcomes

AO1 Demonstrate knowledge of security protection and risk management issues

Command words: describe, give, identify, name, state

Marks: ranges from 1 to 4 marks

AO2 Demonstrate understanding of security protection and risk management issues, and the methods that can be used to manage and protect computer systems and data against security threats

Command words: describe, explain, identify

Marks: ranges from 1 to 4 marks

AO3 Be able to assess or analyse information, make connections on the effectiveness of methods used to manage and protect computer systems and data against security threats

Command words: analyse, assess, explain

Marks: ranges from 2 to 6 marks

AO4 Be able to assess or evaluate information on the threats to computer systems, their impact and how they can be managed

Command words: analyse, assess, discuss, explain, to what extent

Marks: ranges from 4 to 6 marks

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Essential content

The essential content is set out under content areas. Learners must cover all specified content before the assessment.

A Security threats and system vulnerabilities

Learners should understand the types of internal and external threat to computer systems and data, their features and characteristics, and that threats are constantly evolving. Learners need to understand the effects and risks linked to each threat. Learners need to know the methods of mitigation, including prevention and recovery, and their advantages and disadvantages.

A1 Internal threats

Threats to systems and data may arise internally as a result of the actions of employees of an organisation or by an authorised user of a system.

- Accidental threats:
  - accidental damage to physical equipment caused by employee/user
  - accidental loss of data/power, unintentional disclosure of data, authorised user action
  - physical damage, destruction by fire, flood or other disaster
  - risk of bring your own device (BYOD)
  - unsafe practices
  - the use of external storage devices/media
  - visiting untrusted websites
  - downloading/uploading files to/from the internet
  - file-sharing applications.
- Malicious threats:
  - malicious damage caused by employee/unauthorised user action
  - intentional deletion/editing of data and intentional disclosure of data
  - dumpster diving and shoulder surfing
  - theft of equipment or data
  - malicious damage to equipment or data
  - unauthorised access by employees to secure areas in a building
  - unauthorised access to administration functions, security levels and protocols, users overriding security controls
  - risk of BYOD.

A2 External threats

External threats that arise when the internet is used to access computer systems and data.

Threats to systems and data may arise externally as a result of the actions of unauthorised people, malicious software, theft or physical damage.

- External threats to computer systems and data:
  - malicious software (malware) used to obtain secure information, viruses, worms, Trojans, ransomware, spyware, adware, rootkits, backdoors, botnets, zero-day attacks
  - unauthorised access by individuals, commercial organisations or governments
  - social engineering used to obtain secure information by deception, to include collection of passwords, data theft, scams, phishing, pharming
  - dumpster diving and shoulder surfing
  - damage or destruction by fire
  - malicious damage to equipment or data.

A3 Changing and evolving threats

Learners will need to have an awareness that:

- new threats are constantly being developed
- existing threats evolve over time
- regular updates should be available and the importance of organisations/ users applying these updates either automatically or manually
- information is available for organisations/user on known hardware and software vulnerabilities from manufacturers' help facilities, user forums, FAQs.

A4 Vulnerabilities

Factors that affect the vulnerability of computer systems and data and how each factor impacts on the vulnerability.

- Types of system:
  - individual devices, including PCs, laptops, mobile devices
  - portable storage devices
  - networks, including local area network (LAN), wireless local area network (WLAN)
  - file servers
  - cloud computing systems, online storage, remote server, online software.
- Connection between systems:
  - connection to the internet
  - connection to internal networks.
- Connection methods:
  - wired
  - wireless – Wi-Fi, Bluetooth®, cellular.
- Interactions between devices:
  - use of storage devices.
- Operating systems:
  - unsupported versions
  - updates not installed
  - mobile devices' reliance on original equipment manufacturers (OEM) to update system software
  - legacy systems.
- Software:
  - zero-day vulnerability
  - downloads
  - untrusted sources
  - illegal copies.
- Users:
  - limitations of understanding
  - training
  - keeping up to date.

B Methods used to secure computer systems and data

Tools and techniques used to deal with current and evolving threats and their effectiveness.

B1 Software- and hardware-based protection

Types and characteristics of software- and hardware-based protection used to protect computer systems and data, why they are used, the threats they protect against and an overview of how they carry out their function.

- Antivirus software and detection techniques, virus signatures, heuristic techniques, techniques for dealing with identified threats.
- Software and hardware firewalls and the filtering techniques they use, inbound and outbound rules and network addressing.
- User authentication methods and processes and their advantages and disadvantages:
  - types of biometric authentication – fingerprint, retina, facial recognition
  - two-step verification
  - security tokens, including USB-based keys
  - knowledge-based authentication, including question and response pairs
  - certificate-based authentication
  - digital signature
  - Completely Automated Public Turing Test To Tell Computers and Humans Apart (CAPTCHA™).
- Login procedures:
  - user name and password
  - rules for password security
  - best practice for password complexity/strength
  - graphical password
  - password history and time between password changes
  - account lockout and password reset procedures.
- Access controls to restrict users' access to:
  - applications
  - folders/shared areas
  - files – files' access rights (read only, full access (read/write/execute), read/write, no access)
  - physical resources – access to peripheral devices.
- Protection of data during transmission:
  - virtual private network (VPN)
  - encryption
  - digital signatures.
- Encryption of files, folders, disks
- Precautions that can be taken to secure a wireless local area network (WLAN), including:
  - wireless encryption – wired equivalent privacy (WEP), Wi-Fi protected access (WPA2) and Wi-Fi protected setup (WPS)
  - wireless MAC address filtering and hiding the service set identifier (SSID).

- Secure transfer of personal information and payment details:
  - digital certificate
  - secure websites
  - HTTPS protocol
  - encryption – symmetric and public key/asymmetric
  - secure access to personal information
  - treating email attachments, download, web pages and links with caution
  - avoid using unsecured wireless networks
  - applying best practice when using passwords.

B2 Physical security

Comparing the types, characteristics, benefits and risks, their advantages and disadvantages, and the effectiveness of different physical security measures used to protect computer systems and data:

- building and computer/network room security:
  - site security locks
  - card entry
  - passcode
  - biometrics – fingerprint, retina, facial recognition
  - closed circuit television (CCTV)
  - security staff
  - alarms
- data storage:
  - data protection methods
  - central storage
- backup procedures:
  - selection of data
  - timing
  - frequency
  - media
  - planned, automated and manual
  - type (full, differential and incremental)
  - on-site, off-site and cloud data storage
- individual actions:
  - logging out of applications
  - logging off machines
  - screen locking
  - shoulder surfing prevention
  - shredding documents.

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C Legal requirements and IT security policies and procedures

C1 Legal requirements

Current United Kingdom legislation that applies to different computer systems and data.

Centres must ensure that subsequent amendments of listed legislative acts are delivered to ensure currency of content taught.

- The principles and requirements of the data protection legislation and its impact on organisations, computer systems and data.
- Computer Misuse Act 1990, its definitions of illegal practices and the impact it has on organisations, computer systems and data.

C2 IT security policies and procedures

General security-related IT policies and procedures that exist to protect the computer systems and data.

Learners need to be aware that the title and content of policies will vary from organisation to organisation.

- Organisation policies (Acceptable Use Policy):
  - internet and email use
  - security and password procedures – system making you change password often
  - staff responsibilities for the use of IT systems
  - staff IT security training.
- Backup procedure and policies:
  - frequency
  - media
  - planned, automated and manual – advantages and disadvantages and purposes
  - type (full, differential and incremental) – advantages and disadvantages and purposes
  - on-site/off-site/cloud – advantages and disadvantages and purposes.
- Data protection policy – to ensure organisational compliance with the relevant legislation.
- Disaster recovery policy.

Grade descriptors

To achieve a grade learners are expected to demonstrate these attributes across the essential content of the unit. The principle of best fit will apply in awarding grades.

Level 2 Pass

Learners are able to identify the current threats to computer systems and data used by organisations and individuals and be aware that new threats are evolving. They show understanding that threats can impact on organisations and individuals. Learners show some understanding of the main methods that can be used to manage the risks and protect computer systems and data against threats.

Level 2 Distinction

Learners are able to demonstrate an understanding that the computer systems and data used by organisations and individuals are vulnerable to attack from both internal and external sources. They can make valid, justified judgements on the impact of the threats on individuals and organisations. Learners show understanding of a wide variety of methods that can be used to manage the risks and protect computer systems and data against threats and assess their effectiveness. They can synthesise their knowledge and understanding of threats to analyse realistic scenarios, make an assessment of the potential weaknesses and recommend solutions. They can evaluate the effectiveness of their recommended solutions.

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Key words typically used in assessment

The following table shows the key words that will be used consistently by Pearson in our assessments to ensure learners are rewarded for demonstrating the necessary skills.

Please note: the list below will not necessarily be used in every paper/session and is provided for guidance only.

Command or term	Definition
Analyse	Learners examine in detail the meaning or essential features of a topic or situation, or break something down methodically into its components to say how they are related and explain how each one contributes to the topic or situation.
Assess	Learners present a careful consideration of varied factors or events that apply to a specific situation or identify those which are the most important or relevant to arrive at a conclusion.
Describe	Learners give a clear, objective account in their own words showing recall, and in some cases application, of the relevant features and information about a subject.
Discuss	Learners consider different aspects of a topic, how they interrelate and the extent to which they are important.
Evaluate	Learners draw on varied information to consider aspects such as strengths or weaknesses, advantages or disadvantages, alternative actions, and relevance or significance, and come to a conclusion.
Explain	Learners show they understand the origins, functions and objectives of a subject and its suitability for purpose. They give reasons to support an opinion, view or argument, with clear details.
Give	Learners provide examples, justifications and/or reasons to a context.
Identify	Learners indicate the main features or purpose of something, and/or are able to discern and understand facts or qualities.
State/Name	Learners give a definition or example.
To what extent	Learners show clear details and give reasons and/or evidence to support an opinion, view or argument. It could show how conclusions are drawn (arrived at). For example, 'To what extent might recent…'.

Links to other units

This is a mandatory unit and underpins knowledge in:

- Unit 1: Set Up and Configure Technology Systems
- Unit 2: Exploring Current and Emerging Technologies.

Employer involvement

Centres may involve employers in the delivery of this unit if there are local opportunities to do so. There is no specific guidance related to this unit.

Unit 5: IT Service Solutions

Level: **2**

Unit type: **Mandatory**

Assessment type: **External**

Guided learning hours: **60**

Unit in brief

Learners study how to interpret the needs of an organisation and how to design an appropriate information technology (IT) solution.

Unit introduction

IT is a vital part of any organisation. It enables workers to perform tasks that are important to the daily running of the organisation and supports the delivery of services and/or products to customers. Effective IT solutions are vital to improve an organisation's competitiveness and to ensure customer needs are met. The needs of an organisation can rarely be met with a single piece of hardware or software; therefore an effective IT solution will identify how different IT services and systems can be combined to meet identified requirements. These IT services and systems form a portfolio of IT solutions that are often identified as an IT service catalogue.

In this unit, you will apply your understanding of current and emerging technology systems to explore the needs of organisations and the IT systems that support them. You will examine IT service catalogues and create one to meet an organisation's needs. You will explore a range of scenarios and learn how to analyse the IT needs and IT service requirements. You will explore the implications for organisations and their stakeholders of using and implementing IT solutions.

You will apply an understanding of how IT systems are used and combined to complete assessment tasks. You will analyse an IT service catalogue to identify the benefits and drawbacks of a given service solution. You will also create and review your own service catalogue in response to a given set of requirements. The analytical skills and subject knowledge you will develop through this unit will prepare you for a range of employment roles, including infrastructure technician, cyber intrusion analyst or digital and technology solutions professional.

Summary of assessment

This unit is assessed using a task set and marked by Pearson. The task is out of 45 marks. The task must be completed in a 3.5-hour supervised assessment. All final outcomes will be submitted in a format specified by Pearson. The assessment is available twice a year, March and June. The first assessment is available in March 2018.

Sample assessment materials will be available to help centres prepare learners for assessment.

Assessment outcomes

AO1 Demonstrate knowledge and understanding of IT solutions through recall and selection of facts, terminology and processes

AO2 Apply understanding of terminology, information technologies and procedures to make IT recommendations

AO3 Review IT needs and recommendations to make reasoned judgements, justify decisions and present conclusions

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Essential content

The essential content is set out under content areas. Learners must cover all specified content before the assessment.

A Analysing the IT needs of organisations

Learners should explore the purpose of organisations, and how the needs of an organisation and its customers drive the organisation's IT requirements.

A1 IT service life cycle

Learners will apply principles of the IT service life cycle when designing IT service delivery solutions.

- Service identification:
  - identifying the needs of organisations, users and customers
  - using and interpreting an outline IT service catalogue.
- Service delivery design:
  - identifying the technical requirements for an appropriate IT service delivery solution to meet an organisation's needs
  - creating a service catalogue.
- Service management:
  - analysis of benefits and drawbacks of a solution in terms of meeting an organisation's needs in relation to alternatives
  - comparison of solutions to possible alternatives
  - implications of a solution for the organisation and its customers
  - updating a service catalogue.

A2 Purpose of organisations

Learners should explore the IT service needs of organisations and their stakeholders in different contexts.

- Understand how the purpose of organisations relates to the IT service requirements.
- Understand the IT services required to support key tasks carried out by organisations or individuals:
  - manufacturing products
  - delivering services
  - contracting supplies
  - marketing and sales
  - customer relations
  - IT support
  - financial.
- Be able to use information in the form of text, diagrams and tables to analyse the requirements of an organisation, including:
  - business outlines
  - functional specifications
  - data flow diagrams
  - building/floor plans
  - IT system diagrams.

B IT systems used by organisations

Understand the features and characteristics of IT systems used by organisations to meet identified IT service needs.

B1 Software and hardware

Learners should understand how the features and characteristics of IT services (hardware, software and networking) are used to meet organisations' needs. Learners should understand how hardware and software are used as part of a larger solution.

- How and why software and hardware are used:
  - communication
  - collaboration
  - product production and/or service provision
  - financial transactions
  - file storage and/or transfer
  - web platforms/hosting
  - productivity
  - remote access
  - creativity and/or innovation
  - customer access to product and/or service.
- Types of software used in organisations:
  - operating systems
  - utility software
  - application software
  - hosted/cloud computing software
  - mobile applications
  - open-source and proprietary software.
- The role of different computer hardware used in organisations as part of larger solutions:
  - technology systems (servers, clients and independent digital devices)
  - storage devices
  - peripheral devices
  - accessibility devices
  - multifunctional devices
  - mobile devices.

B2 Connecting IT systems and transferring data

Learners should explore the use of connection methods for different purposes. They should understand how wired and wireless connections are used as part of a larger solution to meet identified needs.

- Understand the benefits and drawbacks of different wired and wireless connection methods:
  - audio/video data
  - communication
  - device control
  - data collection and monitoring
  - file transfer and backup.

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- Understand common networks used by organisations:
  - mobile/cellular
  - local area network (LAN)
  - wide area network (WAN)
  - personal area network (PAN).
- Understand when and how networks and connections are used individually and/or in combination with others.
- Understand factors affecting the performance of communication methods and networks:
  - volume of data
  - bandwidth
  - latency
  - hardware
  - software.

C IT service delivery

Learners should understand the needs of an organisation to recommend IT services that will support the organisation and its stakeholders. They should be able to provide IT recommendations by using a range of documents.

C1 Service identification

Learners should be able to recommend an integrated solution that meets identified needs.

- Identify IT services that could form part of an IT service delivery solution by drawing on knowledge of:
  - the purpose and type of an organisation
  - the aims and needs of an organisation
  - tasks to be performed by an organisation or individuals
  - the services or products an organisation provides
  - customer experience, including:
    - needs, expectations, how product/service is delivered and will be consumed
  - staff – needs, working styles and patterns
  - location – staff, customers, premises, market/service delivery point.
- Describe how the features and or characteristics of an IT service would complete an identified task or contribute to meeting an identified need.
- Understand the difference between information and data and identify when each is used to inform and support tasks performed by an organisation or individual.

C2 Recommend an IT service solution

Learners should be able to interpret and use a range of information related to IT service issues in order to recommend an IT service solution. Learners need to be able to:

- identify known IT service issues from information provided:
  - stakeholder reviews
  - current IT service catalogue
  - organisations' needs
- identify affected stakeholders
- provide appropriate IT system diagrams that represent the hardware and software used in the recommended solution and how they work together (including connections to be used). Diagrams may include:
  - data flow diagrams
  - network/system diagrams.

D Impact and implications of an IT service delivery solution

Learners should understand that organisations continually change. They should be able to review an IT solution to meet these changes.

D1 Reviewing a solution

Review the effectiveness and appropriateness of an IT service delivery solution to the identified needs of an organisation.

- Understand the contextual factors that affect the needs of an organisation and how these influence choices made during the 'service identification' and 'service delivery solution' stages of the life cycle.
- Be able to explain how specific features of the solution and its parts address the needs and contextual factors of a given scenario.
- Comparison to possible alternative solutions and justification of choices made during the proposal process.

D2 Benefits and limitations of a proposed IT solution

Consider the benefits and limitations of an IT service delivery solution as part of a larger review.

- Be able to discuss the benefits of a proposed IT solution, including:
  - impact on productivity
  - availability of services and/or products
  - customer satisfaction
  - reduction of operational costs
  - impact on security
  - accuracy of data and information
  - disaster prevention and recovery.
- Be able to discuss the drawbacks of the proposed IT solution and their implications, including:
  - limitation of features of chosen hardware and software
  - security considerations
  - availability of IT services and impact on the organisation's ability to provide products and services.
- Be able to analyse the potential impact of a proposed solution with consideration of:
  - number of users
  - location – users, systems, customers
  - user experience – ease of use, performance, availability, accessibility
  - use of in-house or outsourced/third-party systems and services – expertise of staff, training, service-level agreements (SLAs)
  - implementation/deployment of solution
  - scalability/customisation of system
  - legislation
  - maintenance.

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Grade descriptors

To achieve a grade learners are expected to demonstrate these attributes across the essential content of the unit. The principle of best fit will apply in awarding grades.

Level 2 Pass

Learners are able to recall information to identify the needs of given organisations. They apply their knowledge of IT use in organisations to make suggestions of IT services that are appropriate for a given situation and can plan a solution that is capable of meeting most of the organisation's needs. They are able to review their work and make some sound evaluative comments as to the quality and appropriateness of the solutions they design. They communicate using appropriate technical language.

Level 2 Distinction

Learners are able to recall detailed information and more complex processes to identify the needs of given organisations and the wider implications that these needs have on the organisation and stakeholders. They effectively apply their knowledge of IT use in organisations to provide suggestions of IT services that show thorough knowledge of a given situation, making clear and relevant links between parts of the service. They can plan a solution that effectively and efficiently meets the organisation's needs. They are able to provide a balanced review of their work and make logical, developed evaluative comments as to the quality and appropriateness of the solutions they design. They communicate using technical language in a fluent and accurate manner.

Keywords typically used in assessment

The following table shows the keywords that will be used consistently by Pearson in our assessments to ensure learners are rewarded for demonstrating the necessary skills.

Please note: the list below will not necessarily be used in every paper/session and is provided for guidance only.

Command or term	Definition
Analyse	Consider a given scenario or context and break down the problem into smaller parts to apply understanding and produce solutions or justify actions.
Customers	Any external recipient/user of an organisation's product or service. Both clients and consumers are considered as customers to an organisation.
Describe	Learners give a clear, objective account in their own words showing recall, and in some cases application, of the relevant features and information about a subject.
Discuss	Consider different aspects of a topic, how they interrelate and the extent to which they are important.
Explain	Learners show they understand the origins, functions and objectives of a subject and its suitability for purpose. They give reasons to support an opinion, view or argument, with clear details.
Identify	Establish or indicate the origin, nature or definitive character of something.
Infrastructure	Hardware and software (local and remote) that is used to support IT service delivery.
IT service	Any activity or process (large or small) performed by an organisation that requires IT system(s) to achieve its aims, e.g. email, e-commerce, printing, collaboration software, design tools and automated manufacturing and other processes.
IT service catalogue	A document where all IT services for an organisation are identified by a unique and appropriate name and their requirements described.
IT service life cycle	A methodology for identifying, defining, planning and evaluating a solution to meet the IT service needs of an organisation.

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Command or term	Definition
IT system/technology system	An integrated set of software and hardware components for collecting, storing, and processing data and information, ranging from a single digital device to large networks of computers.
Justification	Give reasons or evidence in order to support an opinion and or decision, or to prove something right or reasonable.
Produce	Provide a solution, using a range of appropriate documents, which applies understanding of IT systems and processes to a given computing problem.
Rationale	Provide justified reasoning for a set of actions or decisions, supported by evidence.
Recommendation	A suggestion or proposal of an IT solution.
Relevance	Important to the matter at hand.
Review	Providing a balanced consideration of the appropriateness, and possible implications of a scenario or outcome.
Stakeholders	A person or group that have an interest and/or are affected by issues related to the business (senior management, staff, customers, clients, etc.).

Links to other units

This unit assesses the underpinning knowledge in:

- Unit 1: Set Up and Configure Technology Systems
- Unit 2: Exploring Current and Emerging Technologies
- Unit 3: Security Protection and Risk Management.

Employer involvement

This unit would benefit from employer involvement in the form of:

- learning activities/exercises (case studies, business problems etc.) set with input from industry practitioners
- units delivered or co-delivered by an industry practitioner(s). This could take the form of guest lectures.

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Unit 8: Networking Technologies and Applications

Level: **2**

Unit type: **Mandatory**

Assessment type: **Internal**

Guided learning hours: **60**

Unit in brief

Learners configure a network for a range of given situations, looking at key components, protocols and services that software applications offer to support networking.

Unit introduction

Computer networks play a large part in the workplace and in our everyday lives. We connect to networks using a multitude of devices, from tablets and computers to mobile phones – even our watches and wearable technologies connect to a network.

In this unit, you will explore different network types and the standards that relate to them. You will also explore how wired and wireless networks operate, and how applications function within a network. The unit will focus on how networks can and should be made secure and look at how the security of networks is a risk to both organisations and individuals.

You will develop skills that apply to networking and that will prepare you for progression to employment or further study. Some example job roles relevant to this unit include junior network engineer and network support assistant.

Learning aims

In this unit you will:

A Understand protocols and applications used in networking

B Develop a secure network

C Review and troubleshoot a network solution.

Unit summary

Learning aim	Key teaching areas	Summary of suggested assessment evidence
A Understand protocols and applications used in networking	**A1** Understand components and applications used in networking **A2** Explore network topologies, standards and protocols **A3** Understand network applications and software	Develop a short report/presentation on the technologies used in networking, and how they relate to topologies, to include areas on securing networks and how applications support efficient networking. Photographs/observations on developing a secure network, supported with evidence of testing. Review to user groups on the network solution provided, to include observations on troubleshooting.
B Develop a secure network	**B1** Configure a network following a given plan **B2** Modify the network to specific requirements **B3** Apply network security	
C Review and troubleshoot a network solution	**C1** Review a network solution **C2** Troubleshoot a given network	

Key teaching areas in this unit include:

Sector skills	Knowledge	Transferable skills/behaviours
• Configuring networks • Securing networks	• Work that is carried out during practicals • Understanding technologies and systems • Following professional procedures	• Thinking skills/adaptability • Problem solving • Self-management and development

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Unit content

Knowledge and sector skills

Learning aim A: Understand protocols and applications used in networking

A1 Understand components and applications used in networking

Learners should develop an understanding of the features of network components and services.

- Considerations of the types of networks, how they are used and configured, to include:
  - client server
  - peer to peer
  - internet
  - mobile.
- Interconnection devices:
  - routers (wired and wireless)
  - switches
  - hubs (wired and wireless)
  - firewalls
  - cable types and connectors, e.g. Cat 5-6, coaxial, fibre
  - wireless access points
  - network interface cards (wired and wireless).
- Types of network services:
  - directory services, e.g. active directory
  - telecoms services, e.g. email, remote access, remote desktop
  - network services, e.g DCHP, DNS.
- Use of appropriate tools to make networking cables and test.

A2 Explore network topologies, standards and protocols

- Topologies, both logical and physical, e.g. star, bus, ring, mesh.
- Protocols and standards, e.g. TCP/IP, SMTP, 802.x, Bluetooth®, 3G and 4G.
- Factors that affect range and interference, e.g. noise, distance, cabling issues.

A3 Understand network applications and software

Learners should have an appreciation of network services and their requirements.

- Application services:
  - web services
  - databases
  - antivirus.
- Network operating systems (NOS), such as:
  - Windows®
  - Linux®
  - Mac OS Server®.

Learning aim B: Develop a secure network

Learners should be able to configure and plan a network that includes hybrid devices and be able to make that network secure.

B1 Configure a network following a given plan

- Selecting and configuring components, to include:
  - server(s)
  - nodes, e.g. mobiles devices, workstations
  - interconnection devices, e.g. switches, hubs, routers.
- Selecting and configuring differing media types, e.g. wireless or wired.
- Installing network operating systems.
- Configuring services, e.g. DNS, Active Directory (AD).

B2 Modify the network to specific requirements

- Modifying a network to make it more secure, as well as configuring it for specific organisational requirements. Example modifications include:
  - configuring Internet Protocol (IP) addresses
  - managing domains
  - adding user types and groups
  - installing and configuring antivirus and firewalls.

B3 Apply network security

- Securing a network by undertaking the following tasks:
  - passwords, e.g. setting up, changing, managing password policies
  - authorisation, e.g. administering authorisation
  - permissions, e.g. setting up user accounts with different permissions, restricting new services according to permissions
  - access controls.
- Encryption.
- Physical security:
  - biometrics
  - locks
  - firewalls
  - antivirus.

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Learning aim C: Review and troubleshoot a network solution

Learners will develop the skills to look at networks critically and plan improvements.

C1 Review a network solution

- Testing a given network using available networking tools, e.g. ping, benchmarking, IPCONFIG.
- Documenting network testing against benchmarks in a professional manner for a range of user groups, including end users and management.
- Identifying potential improvements by evaluationg the following aspects of a network:
  - performance
  - capacity
  - accessibility
  - portability
  - reliability
  - scalability
  - manageability.

C2 Troubleshoot a given network

Identifying if network meets user requirements:

- troubleshoot and repair routine issues, e.g. faulty cable, IP address conflict, faulty interface card.

Transferable skills

Thinking skills/adaptability

- Undertaking network installation, configuration and testing.
- Liaising with user groups.

Problem solving

- Troubleshooting networks.
- Create a network to meet client requirements.

Self-management and development

- Developing the professional reports and documents used to review network solutions.

Assessment criteria

Pass	Merit	Distinction
Learning aim A: Understand protocols and applications used in networking		
A.P1 Produce an outline of key components, services, topologies and protocols.	**A.M1** Explain how directory services support networking.	**A.D1** Evaluate differing component types used in networks and recommended components for a solution to a given scenario.
Learning aim B: Develop a secure network		
B.P2 Configure and test a network solution to a given situation.	**B.M2** Modify a network solution according to organisational requirements.	**B.D2** Produce a robust and effective network solution that has security features appropriate to the organisational requirements.
B.P3 Secure a network to meet requirements.		
Learning aim C: Review and troubleshoot a network solution		
C.P4 Review a network against given requirements.	**C.M3** Explain how the network should be managed.	**C.D3** Justify the produced network against all user requirements, with reference to performance and future improvements.
C.P5 Troubleshoot a given network solution.		

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Essential information for assessment decisions

Learning aim A

For distinction standard, learners will:

- evaluate a range of network components, to include interconnection devices, media types and a range of end user devices (including mobile devices), workstations and servers. Learners will include an evaluation of security devices such as firewalls.

For merit standard, learners will:

- explain in detail how directory services are used to support organisations in areas such as account management and additional services. Learners will explain them across a range of possible platforms and operating systems.

For pass standard, learners will:

- explain all of the key components used to construct a simple network, to include media, interconnection devices and end user devices (including mobile devices). Learners will outline all of the topologies given in the unit content.

Learning aim B

For distinction standard, learners will:

- show that their given network is secure by testing extensively and providing examples of the security measures and the network tools they employed.

For merit standard, learners will:

- perform specific modifications, including IP addresses, managing domains and adding/removing specific user groups.

For pass standard, learners will:

- configure a network to a given plan. The network must have multiple end user devices (including mobile devices) and the network can use any media type. It must be fully tested and the tests documented. Lastly, the network must be made secure (including all mobile devices).

Learning aim C

For distinction standard, learners will:

- perform a detailed justification of a network solution (created or given, but accompanied by specific requirements). They will use the performance metrics outlined in the unit content to justify the solution, with improvements and future developments for the network identified, relevant and detailed. Learners will employ all terminology correctly throughout.

For merit standard, learners will:

- produce detailed management plans for either a given network solution or one built in previous tasks, recording how storage, user groups and security will be managed.

For pass standard, learners will:

- review a given network against the main points of the user's requirements, including user groups, security and storage. They will demonstrate how to troubleshoot a network, to include signal loss, login issues and a lack of storage.

Assessment activity

The summative assessment activity takes place after learners have completed their formative development. The activity should be practical, be set in a realistic scenario and draw on learning from the unit, including the transferable skills. You will need to give learners a set period of time and number of hours in which to complete the activity. *Section 6* gives information on setting assignments and there is further information on our website.

A suggested structure for summative assessment is shown in the *Unit summary* section, along with suitable forms of evidence. This is for illustrative purposes only and can therefore be adapted to meet local needs or to assess across units where suitable opportunities exist. The information in the *Links to other units* section will be helpful in identifying opportunities for assessment across units.

The following scenario could be used to produce the required evidence for this unit. Centres are free to use comparable scenarios or other forms of evidence, provided that they meet the assessment requirements of the unit.

Suggested scenario

You have been approached to help a small company that has online sales and a sales team that sometimes works remotely. They require a new solution to replace their ageing network. The sales office requires eight dedicated workstations connected to a server that controls their website, with the server protected from outside threats. Further to this, there must be the capacity for any sales staff to use their own devices so a Bring Your Own Device (BYOD) ability must be available.
You have been asked to provide a design and build a network to meet these needs.

If a retake is necessary, an alternative example must be used. The following is an example of a retake assessment activity.

A practical task using the school or college's IT department in a similar manner, having dedicated devices on a network, accessing a Virtual Learning Environment (VLE) with the addition of mobile devices or BYOD.

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Further information for tutors and assessors

Delivery guidance

The following are examples of practical activities and workshops that tutors could use when developing sector and transferable skills in the delivery of this unit. Wherever possible, practical activities should be used to help learners develop both personal and sector skills in preparation for the final assessment. These suggestions are not intended as a definitive guide to cover the full GLH of the unit.

Introduction to unit A tutor-led discussion on the uses of networks, identifying their advantages and disadvantages. Learners brainstorm examples of end user devices, interconnection devices and transmission media from their experiences and share with the group. The tutor provides an overview of each and learners will then evaluate a network they use, identifying the devices used and giving a very basic summary of the network's performance. **Suggested time:** about 2 hours.
Activity: Build network cable A demonstration followed by 'build your own' Cat5 network cable. The tutor leads learners through different cable types by demonstrating each one and discussing the benefits and limitations of each and their suitability for different purposes. The tutor demonstrates how to build a cable, to include the cutting, crimping and testing of a network cable. Learners then build cables individually and test them by using them to connect up devices. Learners should create and test at least one cable type but could be challenged to create more. **Suggested time:** about 3 hours.
Activity: Construct a simple network using a hub or switch using three end user devices The tutor demonstrates how to connect a network and related devices together. In small groups, learners practise the configuration steps, with the tutor facilitating. Learners create their own network in a lab (set up in advance) with a switch and three different user devices to connect. Devices should be different and should fit the content of the unit. **Suggested time:** about 2 hours.
Activity: Add devices, including BYOD, to the existing network, add and remove users In a sandboxed network (already set up by either the learners or the tutor), learners connect their own devices as well as those provided. They are given administrative rights to add or remove users in a controlled manner as well as to provide different access levels. **Suggested time:** about 2 hours.
Activity: Add a server to the network Using a pre-prepared network, learners are shown how to add a new server to the network, how to allow other devices access to that server and how to configure the server to provide services to the users, as well as access levels. Learners then create their own server in small groups and add it to the network to provide services. They test other learners' servers and provide feedback on accessibility and performance. **Suggested time:** about 4 hours.

Links to other units

This unit has strong links to:

- Unit 1: Set Up and Configure Technology Systems
- Unit 3: Security Protection and Risk Management.

Employer involvement

This unit would benefit from employer involvement in the form of:

- guest speakers, including a network manager from a local organisation
- live case studies
- work experience in a local organisation in first line support
- employer business materials as exemplars.

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Unit 11:Installing and Maintaining Networks

Level: **2**

Unit type: **Mandatory**

Assessment type: **Internal Synoptic**

Guided learning hours: **60**

Unit in brief

Learners develop their understanding of network management functions and cloud computing as well as how to manage differing network types using a range of tools and services.

Unit introduction

Networks are important for us in the world that we live in, both in business and at home. We are still reliant on electronic communication so, in order to achieve this, we must have networks and the experts to maintain them.

In this unit, you will study traditional network management on cabled networks and also how wireless and mobile networks are added and supported.

You will build on the knowledge and skills already developed and apply the knowledge learned in developing network solutions. In undertaking this unit, you will benefit from a greater understanding of network management and this will give you more opportunities for employment or further study.

Learning aims

In this unit you will:

A Understand network management tools and systems

B Implement network management procedures

C Use enabling network technologies.

Unit summary

Learning aim	Key teaching areas	Summary of suggested assessment evidence
A Understand network management tools and systems	**A1** Network management **A2** Network documentation	A short report or presentation, focusing on the key points of network management tools and systems. Observations or video evidence of the network management activities being carried out. Observations on how ethical hacking is used to support network administration and security. A report or presentation on the business value of cloud technologies, to include the differing types.
B Implement network management procedures	**B1** Configuration options **B2** Maintenance activities	
C Use enabling network technologies	**C1** Ethical hacking in support of network management, penetration testing, firewalls **C2** Internet of Things (IoT) **C3** Bring your own device (BYOD) management **C4** Business value of cloud technologies **C5** Consider differing cloud types	

Key teaching areas in this unit include:

Sector skills	Knowledge	Transferable skills/behaviours
• Deeper understanding of managing complex systems • How to produce formal documentation	• Practical work on networking • Ability to maintain and secure networks	• Communication • Thinking skills/adaptability • Problem solving

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Unit content

Knowledge and sector skills

Learning aim A: Understand network management tools and systems

A1 Network management

- Network management functions:
  - configuration options (user groups)
  - account management
  - performance
  - response times
  - traffic reporting.
- Using differing operating systems software, e.g. Windows®, Linux®, mobile.
- Considering differing protocols and layouts, including those utilising mobile devices, e.g. TCP/IP, POP, DNS.
- Networking tools, e.g. Wireshark®, systems-specific software.

A2 Network documentation

- Documentation, testing reports, service logs.

Learning aim B: Implement network management procedures

Learners should develop the skills to effectively manage a network and provide maintenance on an existing network.

B1 Configuration options

- Configuration options:
  - user accounts
  - roaming profiles
  - server settings
  - local configurations
  - drive mappings
  - virus scanning options.
- User interface configuration, e.g. drive access, software access.

B2 Maintenance activities

- Regular maintenance activities:
  - backup and restore options
  - account creation and deletion
  - account modifications
  - password and account rights changes
  - system testing
  - virus scan.
- Documentation updates; work logs.

Learning aim C: Use enabling network technologies

C1 Ethical hacking in support of network management, penetration testing, firewalls

- Examining security features as tools to support, e.g. firewall management, access controls, user rights, virtual private network access.
- Applying penetration testing as a tool to support network management, e.g port scanning, vulnerability scanning, password cracking.

C2 Internet of Things (IoT)

- Technologies and services used in the IoT.
- Security considerations, e.g. hacking and ethical hacking, virus control.
- Ethical considerations of the IoT, e.g. freedom of information.

C3 Bring your own device (BYOD) management

- Policies concerned with using own devices on a network, e.g. viewing past histories, sharing data.
- BYOD maintenance support in organisations, e.g. physical support, upgrading hardware and software.
- BYOD device configuration support, e.g. user accounts, access rights, access to peripheral devices such as printers.

C4 Business value of cloud technologies

- Understanding cloud services from a business perspective, giving consideration to the following:
  - scalability
  - security
  - hardware independence
  - costs.
- Examining how cloud computing enhances organisations, e.g. value, competitiveness.

C5 Consider differing cloud types

- Cloud types, i.e. private, public and hybrid.
- Cloud deployment, i.e. how cloud services are deployed and accessed.
- Cloud storage.
- Security, i.e. security considerations when using cloud technology.

Transferable skills

Communication skills

- Preparing business style reports.

Thinking skills/adaptability

- Understanding cloud systems.

Problem solving

- Installing and modifying network solutions.

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Assessment criteria

Pass	Merit	Distinction
Learning aim A: Understand network management tools and systems		
A.P1 Use network management tools and activities to document a network.	**A.M1** Justify the effectiveness of documenting network management activities.	**A.D1** Evaluate network management tools.
Learning aim B: Implement network management procedures		
B.P2 Demonstrate how to manage a specific network, using tools.	**B.M2** Demonstrate that specific network management capabilities can be used to improve network speed and or capacity.	**B.D2** Manage a network, maximising its performance against user requirements.
Learning aim C: Use enabling network technologies		
C.P3 Use ethical hacking tools to demonstrate a network is secure.	**C.M3** Justify how ethical hacking could be used to support networking professionals.	**C.D3** Demonstrate with confidence that you understand how ethical hacking can be used to improve the security of IT systems.
C.P4 Develop a network that uses the IoT.		
C.P5 Discuss how cloud systems operate and their differing types.	**C.M4** Justify key points for introducing a cloud solution.	**C.D4** Evaluate cloud solutions for a given network.

Essential information for assessment decisions

Learning aim A

For distinction standard, learners will:

- evaluate a range of networking tools covering a variety of system types identified in the unit content, including mobile computing as well as the more traditional networking solutions such as peer-to-peer and client–server networks. Learners will demonstrate that they can use documentation to support the use of the tools they have evaluated.

For merit standard, learners will:

- document a network solution effectively using a range of documentation, including testing and service logs, in support of any network management already carried out.

For pass standard, learners will:

- use a range of network management tools from across a range of systems effectively, including mobile devices networked to a solution. The range of tools used should match those detailed in the unit content. Learners will perform network management activities across a range of operating systems. (The specific activities will depend on the operating systems chosen.)

Learning aim B

For distinction standard, learners will:

- maximise the effectiveness of a networked solution according to the requirements of particular user groups or a business owner, with the solution covering a range of devices, including BYOD and mobile devices. The maximisation must include activities concerning network speed and storage capacity. All activities must be documented.

For merit standard, learners will:

- improve either the speed of a network or the storage capacity of a given network in relation to specific user requirements. All work must be documented.

For pass standard, learners will:

- use a selection of network management tools on a range of devices, including mobile devices.

Learning aim C

For distinction standard, learners will:

- demonstrate, using examples, how ethical hacking and its associated tools can be used to improve IT security across a range of operating systems and devices. Learners will produce evidence demonstrating their confidence in this subject. Learners will explain how cloud computing can be implemented for a given solution, evaluating the impact it will have on the organisation's functions and the scalability and security that will be required for a cloud solution.

For merit standard, learners will:

- justify, using examples, under which circumstances ethical hacking can be used as a network management procedure, identifying specific tools and procedures. Learners will identify the key points that must be considered when deploying a cloud solution, including security, deployment and storage.

For pass standard, learners will:

- use ethical hacking tools to perform a range of activities on a secure network environment, including accessing a network when passwords have been forgotten and describing how the IoT can be used, giving examples where it has been adopted. Learners will discuss how cloud computing operates, including how cloud systems are made secure and how they are scalable, and describing differing cloud solutions and relating them to differing scenarios as examples.

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Assessment activity

The summative assessment activity takes place after learners have completed their formative development. The activity should be practical, be set in a realistic scenario and draw on learning from the unit, including the transferable skills. You will need to give learners a set period of time and number of hours in which to complete the activity. *Section 6* gives information on setting assignments and there is further information on our website.

A suggested structure for summative assessment is shown in the *Unit summary* section, along with suitable forms of evidence. This is for illustrative purposes only and can therefore be adapted to meet local needs or to assess across units where suitable opportunities exist. The information in the *Links to other units* section will be helpful in identifying opportunities for assessment across units.

The following scenario could be used to produce the required evidence for this unit. Centres are free to use comparable scenarios or other forms of evidence, provided that they meet the assessment requirements of the unit.

Suggested scenario

Your school or college needs to bring in a new network that can support both cloud and BYOD. It is particularly important to consider how ethical hacking can be used for positive gains on the network. You have been asked to provide a report on their existing network and guidance on how to make the network secure and manageable. You should demonstrate the use of network management tools to the employees such that they will be able to effectively manage the network.

If a retake is necessary, an alternative example must be used. The following is an example of a retake assessment activity.

You are asked to work with a small local business that urgently requires a new network. However, the budget will not stretch to the purchase of new servers and up-to-date workstations, and so you are asked to consider other options for them, such as a cloud solution and allowing staff to bring in their own devices. You should provide a report to the manager of the new network you recommend as well as the management and security considerations for the network.

Further information for tutors and assessors

Delivery guidance

The following are examples of practical activities and workshops that tutors could use when developing sector and transferable skills in the delivery of this unit. Wherever possible, practical activities should be used to help learners develop both personal and sector skills in preparation for the final assessment. These suggestions are not intended as a definitive guide to cover the full GLH of the unit.

Introduction to unit The tutor arranges a talk from a guest speaker who uses a cloud-based system in their organisation and who can help learners to understand the benefits. Learners identify these benefits and the rationale for using cloud-based solutions by producing materials advertising or supporting a cloud-based product/solution. **Suggested time:** about 2 hours.
Activity: Network management The tutor will perform a demonstration of how to install and configure a range of operating systems and deploy them over a network. Learners take notes throughout the demonstration to support themselves in their own activity where they will install and configure a range of operating systems using a range of interconnection devices, and monitor them for response times and traffic. Learners create and use logs to document the network professionally. **Suggested time:** about 6 hours.
Activity: Configuration Learners are shown how to configure a network for a range of user types and groups, including the configuration of roaming profiles, as well as modifying a range of server settings to include drives and virus scanning options. They are given a scenario and asked to build a network to meet that scenario by configuring and modifying the components and services on the network they are given. **Suggested time:** about 4 hours.
Activity: Maintain a network Learners are given an existing, sandboxed network to perform a range of network activities, including backup, account changes (including access rights), systems testing and modifying login scripts. They are guided through each of the activities by the tutor before being given a refreshed network on which to perform those activities. Each activity is documented by learners with a clear audit trail of changes made. **Suggested time:** about 3 hours.
Activity: Ethical hacking Learners are given a demonstration of how to use ethical hacking tools, with the safe use of tools underpinned at all stages. They are given a sandboxed network to try to use ethical hacking as a tool to gain access when passwords have been lost. They create and develop a log of their activities so they can accurately document the issues with the network they have been given. **Suggested time:** about 3 hours.
Activity: Bring your own device Learners use their own devices, or ones that been provided, to configure and test BYOD functionality on a network. They configure a network to allow BYOD and the devices to access peripherals and drives. They test functionality and access and document any issues arising. **Suggested time:** about 2 hours.

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Links to other units

This unit draws on the knowledge and skills taught in:

- Unit 1: Set Up and Configure Technology Systems
- Unit 2: Exploring Current and Emerging Technologies
- Unit 3: Security Protection and Risk Management
- Unit 8: Network Technologies and Applications.

Employer involvement

This unit would benefit from employer involvement in the form of:

- guest speakers with experience of cloud computing and/or BYOD to explain the benefits and drawbacks in adopting those solutions
- case studies on ethical hacking to show where proactive security measures helped to make a network more secure
- work experience, especially in network support.

4 Planning your programme

Is there a learner entry requirement?

As a centre, it is your responsibility to ensure that recruited learners have a reasonable expectation of success on the programme. There are no formal entry requirements but we expect learners to have qualifications at or equivalent to Level 1.

Learners are most likely to succeed if they have:

- three or four GCSEs at intermediate grades and/or
- BTEC qualification(s) achieved at least at Level 1
- at least Level 1 equivalent achievement in English and mathematics through GCSE or Functional Skills.

Learners may demonstrate ability to succeed in various ways. For example, learners may have relevant work experience or specific aptitude shown through diagnostic tests or non-education experience.

What is involved in becoming an approved centre?

All centres must be approved before they can offer this qualification – so that you are ready to assess learners and so that we can provide the support needed. Further information is given in *Section 8 Administrative arrangements*.

What level of sector knowledge is needed to deliver this qualification?

We do not set any requirements for tutors but expect centres to assess the overall skills and knowledge of the teaching team to ensure that they are relevant and up to date with current industry practice. This will give learners a rich programme to prepare them for progression.

What resources are required to deliver this qualification?

As part of your centre approval, you will need to show that the necessary material resources and workspaces are available to deliver the qualification. For some units, specific resources are required.

What makes good vocational teaching?

The approach to vocational teaching must be led by what is right for the particular sector. Therefore, each unit includes delivery guidance and suggested assessment tasks. Using the delivery guidance and suggested assessment tasks and our additional free delivery guidance and assignment briefs, you can build a course that contextualises learning in real-life and/or employment scenarios. This will draw in naturally the kind of broader attributes valued in the sector, for example problem solving when troubleshooting issues with a network, as well as the more general skills needed in work that fit well with project-based learning, for example teamwork, independent learning.

What are the requirements for meaningful employer involvement?

This qualification has been designed as a Technical Certificate qualification and as an approved centre you are required to ensure that during their study, every learner has access to meaningful activity involving employers. See *Section 2 Structure* and *Section 9 Quality Assurance* for the requirements for employer involvement.

Support for employer involvement

It is important that you give learners opportunities that are of high quality and that are directly relevant to their study. We will support you in this through guidance materials and by giving you examples of best practice. See *Section 11 Resources and support* for details of the support available, including the Work Experience Toolkit.

What support is available for delivery and assessment?

We provide a wealth of support materials, including schemes of learning, delivery plans, assignment briefs, additional papers for external assessments and examples of marked learner work.

To support you with planning your assessments, you will be allocated a Standards Verifier early in the planning stage. There will be extensive training programmes and support from our Subject Advisor team.

For further details see *Section 11 Resources and support*.

How will my learners become more employable through this qualification?

This qualification is aligned/mapped to the National Occupational Standard for IT/Technology Infrastructure Design and Planning.

Learners will be acquiring the key technical and sector knowledge, and practical and technical skills that employers need. Employability skills, such as teamwork and communication, and completing realistic tasks have been built into the design of the learning aims and content. This gives tutors the opportunity to use relevant contexts, scenarios and materials to enable learners to develop a portfolio of evidence that demonstrates the breadth of their skills and knowledge in a way that equips them for employment.

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5 Assessment structure

The Pearson BTEC Level 2 Technical Diploma in Digital Technology (Networking and Cybersecurity) is assessed using a combination of *internal assessments*, which are set and marked by tutors, and an *external assessments*, which are set and marked by Pearson.

We have taken great care to ensure that the assessment method chosen is appropriate to the content of the unit and is in line with requirements from employers.

In developing an overall plan for delivery and assessment for the programme, you will need to consider the order in which you deliver units, whether delivery is over short or long periods and when assessment can take place.

One internally-assessed unit in the qualification is defined as synoptic (see *Section 2 Structure*). A synoptic assessment is one that a learner should take later in a programme and in which they will be expected to apply learning from a range of units. As such, you must plan the assignments so that learners can demonstrate learning from across their programme.

We have addressed the need to ensure that the time allocated to final assessment of internally- and externally-assessed units is reasonable so that there is sufficient time for teaching and learning, formative assessment and development of transferable skills.

In administering internal and external assessment, the centre needs to be aware of the specific procedures and policies that apply, for example to registration, entries and results. An overview with signposting to relevant documents is given in *Section 8 Administration arrangements*.

6 Internal assessment

This section gives an overview of the key features of internal assessment and how you, as an approved centre, can offer it effectively. The full requirements and operational information are given in the Pearson *Quality Assurance Handbook* available on our website. All members of the assessment team need to refer to this document.

For this qualification, it is important that you can meet the expectations of stakeholders and the needs of learners by providing a programme that is practical and applied. You can tailor programmes to meet local needs and use links with local employers and the wider vocational sector.

When internal assessment is operated effectively, it is challenging, engaging, practical and up to date. It must also be fair to all learners and meet national standards.

Principles of internal assessment

Our approach to internal assessment for this qualification offers flexibility in how and when you assess learners, provided that you meet assessment and quality assurance requirements. You will need to take account of the requirements of the unit format, which we explain in *Section 3 Units*, and the requirements for delivering assessment given in *Section 8 Administrative arrangements*.

Operating internal assessment

The assessment team

It is important that there is an effective team for internal assessment so that all assessment is planned and verified. For this qualification, it is likely that the team will be small but it is still necessary to ensure that the assessment process is followed. Full information is given in the Pearson *Quality Assurance Handbook*.

The key roles are:

- the Lead Internal Verifier (Lead IV) for the qualification has responsibility for the planning, record keeping and standard setting for the qualification. The Lead IV registers with Pearson annually and organises training using our support materials
- Internal Verifiers (IVs) check that assignments and assessment decisions are valid and that they meet our requirements. In a small team, all people will normally be assessors and IVs. No one can verify their own actions as an assessor
- assessors set or use assignments to assess learners to national standards.

Planning and record keeping

The Lead IV should make sure that there is a plan for assessment of the internally-assessed units and maintain records of assessment undertaken. The key records are:

- verification of assignment briefs
- learner authentication declarations
- assessor decisions on assignments, with feedback given to learners
- verification of assessment decisions.

Examples of records and further information are given in the Pearson *Quality Assurance Handbook*.

Effective organisation

Internal assessment needs to be well organised so that learners' progress can be tracked and so that we can monitor that assessment is being carried out in line with national standards. We support you through, for example, providing training materials and sample documentation. Our online myBTEC service can help support you in planning and record keeping. Further information on using myBTEC can be found in *Section 11 Resources and support* and on our website.

It is particularly important that you manage the overall assignment programme and deadlines to make sure that learners are able to complete assignments on time.

Learner preparation

To ensure that you provide effective assessment for your learners, you need to make sure that they understand their responsibilities for assessment and the centre's arrangements.

From induction onwards, you will want to ensure that learners are motivated to work consistently and independently to achieve the requirements of the qualification. Learners need to understand how assignments are used, the importance of meeting assignment deadlines and that all the work submitted for assessment must be their own.

You will need to give learners a guide that explains how assignments are used for assessment, how assignments relate to the teaching programme and how they should use and reference source materials, including what would constitute plagiarism. The guide should also set out your approach to operating assessment, such as how learners must submit work and request extensions.

You are encouraged to employ a range of formative assessment approaches before putting learners through to the assignments to formally assess the units. Formative assessment supports teaching and learning, and should be ongoing throughout the learning process. It enables tutors to enhance learning by giving learners constructive feedback so that they can identify their strengths and weaknesses, and to put measures in place to target areas that need work. Formative assessment approaches that incorporate reflective learning and regular skills assessment are important in encouraging self-development and reflective practice, to ensure that learners progress.

Setting assignments

An assignment is issued to learners as an assignment brief with a defined start date, a completion date and clear requirements for the evidence that they need to provide. This assignment will be separate from the practice and exploration activities that have been used during the learning period, and learners must understand that the assignment is being used to judge the learning aims. There may be specific, observed practical components during the assignment period. Assignments can be divided into tasks and may require several forms of evidence. A valid assignment will enable a clear and formal assessment outcome, based on the assessment criteria.

When setting your assignments, you need to work with the information given in the *Essential information for assessment decisions* and the *Assessment activity* sections of the units. You can choose to use the suggested scenarios or to adapt them to take account of local circumstances, provided that assignments are verified.

In designing your own assignment briefs you should bear in mind the following points.

- A learning aim must always be assessed as a whole and must not be spilt into two or more tasks.
- Assignments must be structured to allow learners to demonstrate the full range of achievement at all grade levels. Learners need to be treated fairly by being given the opportunity to achieve a higher grade if they have the ability.
- Learners should be given clear tasks, activities and structures for evidence; the criteria should not be given as tasks.
- You must ensure that assignments for synoptic assessment are designed to enable learners to draw on the specific units identified and demonstrate that they can identify and use effectively an appropriate selection of skills, techniques, concepts, theories and knowledge in an integrated way. Assignments for the synoptic unit will be monitored at programme level as part of the standards verification process to ensure that they encourage learners to select and apply their learning from across the qualification in an integrated way.
- Where there is a requirement for assessment to be conducted in the real work environment (mandatory work placement), assignments must be designed to facilitate this. Where there is no mandatory requirement for workplace assessment but learners will be in work placement or work experience settings as a part of the programme, then it would be worthwhile if these assignments were also designed for completion in the real work environment. You must ensure that the work placement or work experience setting gives learners the opportunity to achieve at all grade levels.

As assignments provide a final assessment, they will draw on the specified range of teaching content for the learning objective. The specified teaching content is compulsory. The evidence for assessment need not cover every aspect of the teaching content as learners will normally be given particular examples, case studies or contexts in their assignments. For example, if a learner is carrying out a practical performance, then they must address all the relevant range of content that applies in that instance.

An assignment brief should have:

- a vocational scenario or context that motivates the learner to apply their learning through the assignment
- an audience or purpose for which the evidence is being provided
- clear instructions to the learner about what they are required to do, normally set out through a series of tasks.

Forms of evidence

The units allow for a variety of forms of evidence to be used, provided that they are suited to the type of learning aim and the learner being assessed. For most units, the practical demonstration of skills is necessary. The units give you information on suitable forms of evidence that would give learners the opportunity to apply a range of transferable and sector skills. Centres may choose to use different suitable forms for evidence to those proposed. Overall, learners should be assessed using varied forms of evidence.

The main forms of evidence include:

- observation and recordings of practical tasks or performance in the workplace with supporting evidence
- projects
- recordings of role play, interviews and other types of simulated activity
- oral or written presentations with assessor questioning
- work logbooks and reflective journals.

It is important to note that an observation record is a source of evidence and does not confer an assessment decision. It must be sufficiently detailed to enable others to make a judgement about the quality and sufficiency of the performance and must document clearly the rationale for the assessment decision. Observation records should be accompanied by supporting evidence, which may take the form of videos, audio recordings, photographs, preparation notes, learner logs and other similar types of record.

The form(s) of evidence selected must allow:

- the learner to provide all the evidence required for the learning aim(s) and the associated assessment criteria at all grade levels
- the learner to produce evidence that is their own independent work
- a verifier to independently reassess the learner to check the assessor's decisions.

Centres need to take particular care in ensuring that learners produce independent work.

Making valid assessment decisions

Assessment decisions through applying unit-based criteria

Assessment decisions for this qualification are based on the specific criteria given in each unit and set at each grade level. The way in which individual units are written provides a balance of assessment of sector-specific knowledge, technical and practical skills, and transferable skills appropriate to the purpose of the qualification.

Pass, Merit and Distinction criteria all relate to individual learning aims. The assessment criteria for a unit are hierarchical and holistic where, in satisfying the M criteria, a learner would also have satisfied the P criteria. The unit assessment grid shows the relationships of the criteria so that assessors can apply all the criteria to the learner's evidence at the same time.

Assessors must show how they have reached their decisions using the criteria in the assessment records. When a learner has completed all the assessment for a unit then the assessment team will give a grade for the unit. This is given according to the highest level for which the learner is judged to have met all the criteria. Therefore:

- to achieve a Distinction, a learner must have satisfied all the Distinction criteria (and all the Pass and Merit criteria); these define outstanding performance across the unit as a whole
- to achieve a Merit, a learner must have satisfied all the Merit criteria (and all the Pass criteria) through high performance in each learning aim
- to achieve a Pass, a learner must have satisfied all the Pass criteria for the learning aims, showing coverage of the unit content and therefore attainment at Level 2 of the national framework.

The award of a Pass is a defined level of performance and cannot be given solely on the basis of a learner completing assignments. Learners who do not satisfy the Pass criteria should be reported as Unclassified.

Making assessment decisions using criteria

As an assessor, you review authenticated learner work and make judgements on standards using the assessment criteria and the supporting information provided in units and training materials. The evidence from a learner can be judged using all the relevant criteria at the same time. The assessor needs to make a judgement against each criterion that evidence is present and sufficiently comprehensive.

Assessors should use the following information and support in reaching assessment decisions:

- the *Essential information for assessment decisions* section in each unit
- your Lead IV and assessment team's collective experience, supported by the standardisation materials we provide.

Once the team has agreed the outcome, a formal assessment decision is recorded and reported to learners. The information given:

- must show the formal decision and indicate where criteria have been met
- may show where attainment against criteria has not been demonstrated
- avoid giving direct, specific instructions on how the learner can improve the evidence to achieve a higher grade.

Authenticity of learner work

Assessors must ensure that evidence is authentic to a learner through setting valid assignments and supervising them during the assessment period. Assessors must take care not to provide direct input, instructions or specific feedback that may compromise authenticity.

Once an assessment has begun, learners must not be given feedback that relates specifically to their evidence and how it can be improved, learners must work independently.

An assessor must assess only learner work that is authentic, i.e. learners' own independent work. Learners must authenticate the evidence that they provide for assessment through signing a declaration stating that it is their own work.

Assessors must complete a declaration that:

- the evidence submitted for this assignment is the learner's own
- the learner has clearly referenced any sources used in the work
- they understand that false declaration is a form of malpractice.

Centres can use Pearson templates or their own templates to document authentication.

During assessment, an assessor may suspect that some or all of the evidence from a learner is not authentic. The assessor must then take appropriate action using the centre's policies for malpractice. Further information is given in *Section 8 Administrative arrangements*.

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Resubmission of improved evidence

An assignment provides the final assessment for the relevant learning aims and is normally a final assessment decision, except where the Lead IV approves one opportunity to resubmit improved evidence based on the completed assignment brief.

The Lead IV has the responsibility to make sure that resubmission is operated fairly. This means:

- checking that a learner can be reasonably expected to perform better through a second submission, for example that the learner has not performed as expected
- making sure that giving a further opportunity does not give an unfair advantage over other learners, for example through the opportunity to take account of feedback given to other learners
- checking that the learner will be able to provide improved evidence without further guidance and that the original evidence submitted remains valid.

Once an assessment decision has been given to the learner, the resubmission opportunity must have a deadline within 15 working days in the same academic year.

For assessment to be fair, it is important that learners are all assessed in the same way and that some learners are not advantaged by having additional time or the opportunity to learn from others. Therefore, learners who did not complete assignments by your planned deadline or an authorised extension deadline, if one was given for specific circumstances, may not have the opportunity to subsequently resubmit. Similarly, learners who submit work that is not their own should not be given an opportunity to resubmit.

The outcome of any resubmission of the assignment by the learner is then recorded as the final decision.

A learner who has not achieved their expected level of performance in the relevant learning aims **after resubmission** of an assignment may be offered a single retake opportunity using a new assignment. The highest grade that may be awarded is a Pass.

The Lead IV must authorise a retake with a new assignment only in exceptional circumstances and where it is necessary, appropriate and fair to do so. For further information on offering a retake opportunity you should refer to the *BTEC Centre Guide to Assessment* available on our website. We provide information on writing assignments for retakes on our website (please go to www.btec.co.uk/keydocuments).

7 External assessment

A summary of the type and availability of external assessment for this qualification is given below. These external assessments assess units that are 33% of the total qualification GLH and are weighted to contribute the same proportion of the overall qualification grade.

See the units and sample assessment materials for more information.

Unit	Type	Availability
Unit 3: Security Protection and Risk Management	• Onscreen test set and marked by Pearson. • 75 minutes. • 60 marks.	On demand. First assessment January 2018.
Unit 5: IT Service Solutions	• A task set and marked by Pearson and completed under supervised conditions. • This task must be taken during the four-day period timetabled by Pearson. • The set task can be in more than one supervised session, however, it must be completed within four days once started. • The task must be completed in a 3.5-hour supervised assessment. • All final outcomes will be submitted in a format specified by Pearson.	Two timetabled periods each year. First assessment March 2018.

For *Unit 3*, onscreen tests are available on demand starting from January 2018. These tests use a range of question types, including examiner marked. As tests have a full marking process, results for individual learners will be released once the process is complete and the time to issue results will vary.

For *Unit 5*, we will issue two different tasks each year. Learners can complete the task at any time during the timetabled period. Learners' evidence will be submitted to Pearson for marking at the end of the scheduled timetabled period. We will issue results for each task after the marking period for that task.

We will provide annually, in our *Information Manual*, a detailed timetable for entries, assessment and results. Resits cannot be scheduled until a learner's result has been issued.

Learners must be prepared for external assessment by the time they undertake it. In preparing learners for assessment, you will want to take account of required learning time, the relationship with any other external assessments and opportunities for resits. Learners who take an external assessment and who do not perform as expected may have one further opportunity using a later external assessment. For *Unit 5*, learners may take the set task only once within the timetabled period.

Learners who attempt an external assessment twice will have the better of the grades achieved used in the final grade calculation for the qualification.

Units

The externally-assessed units have a specific format, which we explain in *Section 3 Units*. The content of the units will be sampled across external assessments over time through appropriate papers and tasks. The ways in which learners are assessed are shown through the assessment outcomes and grading descriptors.

Sample assessment materials

Each externally-assessed unit has a set of sample assessment materials (SAMs) that accompanies the specification. The SAMs are there to give you an example of what the external assessment will look like in terms of the feel and level of demand of the assessment.

The SAMs show the range of possible activity types that may appear in the actual assessments and give you a good indication of how the assessments will be structured. While SAMs can be used for practice with learners, as with any assessment, the content covered and specific details of the activities will vary in each assessment.

These sample assessments can be downloaded from our website.

Conducting external assessments

Centres must make arrangements for the secure delivery of external assessments. You need to ensure that learners are aware that they need to work independently and that they are aware of the requirements for any external assessment.

Each external assessment has a defined degree of control under which it must take place. We define degrees of control as follows.

High control

This is the completion of assessment in formal invigilated examination conditions. It applies to onscreen tests.

Medium control

This is completion of assessment, usually over a longer period of time, which may include a period of controlled conditions. The controlled conditions may allow learners to access resources, prepared notes or the internet to help them complete the task. This applies to task-based assessments.

Further information on responsibilities for conducting external assessment is given in the document *Instructions for Conducting External Assessments*, available on our website.

8 Administrative arrangements

Introduction

This section focuses on the administrative requirements for delivering a BTEC qualification. It will be of value to Quality Nominees, Lead IVs, Programme Leaders and Examinations Officers.

Learner registration and entry

Shortly after learners start the programme of learning, you need to make sure that they are registered for the qualification and that appropriate arrangements are made for internal and external assessment. You need to refer to our *Information Manual* for information on making registrations for the qualification and entries for external assessments.

Learners can be formally assessed only for a qualification on which they are registered. If learners' intended qualifications change, for example if a learner decides to choose a different pathway specialism, then the centre must transfer the learner appropriately.

Access to assessment

Both internal and external assessments need to be administered carefully to ensure that all learners are treated fairly and that results and certificates are issued on time to allow learners to progress to chosen progression opportunities.

Our equality policy requires that all learners have equal opportunity to access our qualifications and assessments, and that our qualifications are awarded in a way that is fair to every learner. We are committed to making sure that:

- learners with a protected characteristic (as defined by the Equality Act 2010) are not, when they are undertaking one of our qualifications, disadvantaged in comparison to learners who do not share that characteristic
- all learners achieve the recognition they deserve for undertaking a qualification and this achievement can be compared fairly to the achievement of their peers.

Further information on access arrangements can be found in the Joint Council for Qualifications (JCQ) document *Access Arrangements, Reasonable Adjustments and Special Consideration for General and Vocational Qualifications*.

Administrative arrangements for internal assessment

Records

You are required to retain records of assessment for each learner. Records should include assessments taken, decisions reached and any adjustments or appeals. Further information can be found in our *Information Manual.* Records must be maintained as specified as we may ask to audit them.

Reasonable adjustments to assessment

To ensure that learners have fair access to demonstrate the requirements of the assessments, a reasonable adjustment is one that is made before a learner takes an assessment. You are able to make adjustments to internal assessments to take account of the needs of individual learners. In most cases, this can be achieved through a defined time extension or by adjusting the format of evidence. We can advise you if you are uncertain as to whether an adjustment is fair and reasonable. You need to plan for time to make adjustments if necessary.

Further details on how to make adjustments for learners with protected characteristics are given on our website in the document *Supplementary guidance for reasonable adjustment and special consideration in vocational internally assessed units*.

Special consideration

Special consideration is given after an assessment has taken place for learners who have been affected by adverse circumstances, such as illness. You must operate special consideration in line with our policy (see previous paragraph). You can provide special consideration related to the period of time given for evidence to be provided or for the format of the assessment if it is equally valid. You may not substitute alternative forms of evidence to that required in a unit or omit the application of any assessment criteria to judge attainment. Pearson can consider applications for special consideration only in line with the policy.

Appeals against assessment

Your centre must have a policy for dealing with appeals from learners. These appeals may relate to assessment decisions being incorrect or assessment being conducted unfairly. The first step in such a policy could be a consideration of the evidence by a Lead IV or other member of the programme team. The assessment plan should allow time for potential appeals after assessment decisions have been given to learners. If there is an appeal by a learner you must document the appeal and its resolution. Learners have a final right of appeal to Pearson but only if the procedures that you have put in place have not been followed. Further details are given in our policy *Enquiries and appeals about Pearson Vocational Qualifications*.

Administrative arrangements for external assessment

Entries and resits

For information on the timing of assessment and entries, please refer to the annual examinations timetable on our website. Learners are permitted to have one resit of an external assessment.

Access arrangements requests

Access arrangements are agreed with Pearson before an assessment. They allow learners with special educational needs, disabilities or temporary injuries to:

- access the assessment
- show what they know and can do without changing the demands of the assessment.

Access arrangements should always be processed at the time of registration. Learners will then know what type of arrangements are available in place for them.

Granting reasonable adjustments

For external assessment, a reasonable adjustment is one that we agree to make for an individual learner. A reasonable adjustment is defined for the individual learner and informed by the list of available access arrangements.

Whether an adjustment will be considered reasonable will depend on a number of factors to include the:

- needs of the learner with the disability
- effectiveness of the adjustment
- cost of the adjustment; and
- likely impact of the adjustment on the learner with the disability and other learners.

Adjustment may be judged unreasonable and not approved if it involves unreasonable costs, timeframes or affects the integrity of the assessment.

Special consideration requests

Special consideration is an adjustment made to a learner's mark or grade after an external assessment to reflect temporary injury, illness or other indisposition at the time of the assessment. An adjustment is made only if the impact on the learner is such that it is reasonably likely to have had a material effect on that learner being able to demonstrate attainment in the assessment.

Centres are required to notify us promptly of any learners who they believe have been adversely affected and request that we give special consideration. Further information can be found in the special requirements section on our website.

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Dealing with malpractice in assessment

Malpractice means acts that undermine the integrity and validity of assessment, the certification of qualifications, and/or that may damage the authority of those responsible for delivering the assessment and certification.

Pearson does not tolerate actions (or attempted actions) of malpractice by learners, centre staff or centres in connection with Pearson qualifications. Pearson may impose penalties and/or sanctions on learners, centre staff or centres where incidents (or attempted incidents) of malpractice have been proven.

Malpractice may arise or be suspected in relation to any unit or type of assessment within the qualification. For further details regarding malpractice and advice on preventing malpractice by learners, please see Pearson's *Centre Guidance: Dealing with Malpractice*, available on our website.

The procedures we ask you to adopt vary between units that are internally assessed and those that are externally assessed.

Internally-assessed units

Centres are required to take steps to prevent malpractice and to investigate instances of suspected malpractice. Learners must be given information that explains what malpractice is for internal assessment and how suspected incidents will be dealt with by the centre. The *Centre Guidance: Dealing with Malpractice* document gives full information on the actions we expect you to take.

Pearson may conduct investigations if we believe that a centre is failing to conduct internal assessment according to our policies. The above document gives further information, examples and details the penalties and sanctions that may be imposed.

In the interests of learners and centre staff, centres need to respond effectively and openly to all requests relating to an investigation into an incident of suspected malpractice.

Externally-assessed units

External assessment means all aspects of units that are designated as external in this specification, including preparation for tasks and performance. For these assessments, centres must follow the JCQ procedures set out in the latest version of *JCQ Suspected Malpractice in Examinations and Assessments Policies and Procedures* (www.jcq.org.uk).

In the interests of learners and centre staff, centres need to respond effectively and openly to all requests relating to an investigation into an incident of suspected malpractice.

Learner malpractice

Heads of Centres are required to report incidents of any suspected learner malpractice that occur during Pearson external assessments. We ask that centres do so by completing a *JCQ Form M1* (available at www.jcq.org.uk/exams-office/malpractice) and emailing it and any accompanying documents (signed statements from the learner, invigilator, copies of evidence, etc.) to the Investigations Team at candidatemalpractice@pearson.com. The responsibility for determining appropriate sanctions or penalties to be imposed on learners lies with Pearson.

Learners must be informed at the earliest opportunity of the specific allegation and the centre's malpractice policy, including the right of appeal. Learners found guilty of malpractice may be disqualified from the qualification for which they have been entered with Pearson.

Teacher/centre malpractice

Heads of Centres are required to inform Pearson's Investigations Team of any incident of suspected malpractice by centre staff, before any investigation is undertaken. Heads of centres are requested to inform the Investigations Team by submitting a *JCQ Form M2(a)* (available at www.jcq.org.uk/exams-office/malpractice) with supporting documentation to pqsmalpractice@pearson.com. Where Pearson receives allegations of malpractice from other sources (for example Pearson staff or anonymous informants), the Investigations Team will conduct the investigation directly or may ask the head of centre to assist.

Incidents of maladministration (accidental errors in the delivery of Pearson qualifications that may affect the assessment of learners) should also be reported to the Investigations Team using the same method.

Heads of Centres/Principals/Chief Executive Officers or their nominees are required to inform learners and centre staff suspected of malpractice of their responsibilities and rights; see Section 6.15 of the *JCQ Suspected Malpractice in Examinations and Assessments Policies and Procedures* document.

Pearson reserves the right in cases of suspected malpractice to withhold the issuing of results and/or certificates while an investigation is in progress. Depending on the outcome of the investigation results and/or certificates may be released or withheld.

You should be aware that Pearson may need to suspend certification when undertaking investigations, audits and quality assurances processes. You will be notified within a reasonable period of time if this occurs.

Sanctions and appeals

Where malpractice is proven, we may impose sanctions or penalties.

Where learner malpractice is evidenced, penalties may be imposed such as:

- mark reduction for external assessments
- disqualification from the qualification
- being barred from registration for Pearson qualifications for a period of time.

If we are concerned about your centre's quality procedures, we may impose sanctions such as:

- working with you to create an improvement action plan
- requiring staff members to receive further training
- placing temporary blocks on your certificates
- placing temporary blocks on registration of learners
- debarring staff members or the centre from delivering Pearson qualifications
- suspending or withdrawing centre approval status.

The centre will be notified if any of these apply.

Pearson has established procedures for centres that are considering appeals against penalties and sanctions arising from malpractice. Appeals against a decision made by Pearson will normally be accepted only from heads of centres (on behalf of learners and/or members or staff) and from individual members (in respect of a decision taken against them personally). Further information on appeals can be found in our *Enquiries and Appeals* policy, which is on our website. In the initial stage of any aspect of malpractice, please notify the Investigations Team by email via pqsmalpractice@pearson.com who will inform you of the next steps.

Certification and results

Once a learner has completed all the required units for a qualification, even if final results for external assessments have not been issued, then the centre can claim certification for the learner, provided that quality assurance has been successfully completed. For the relevant procedures please refer to our *Information Manual*. You can use the information provided on qualification grading to check overall qualification grades.

Results issue

Results for external assessment will be issued once marking is complete.

Qualification results will be issued once a learner has completed all components of the qualification and you have claimed certification. The result will be in the form of a grade. You should be prepared to discuss performance with learners, making use of the information we provide and post-results services.

Post-assessment services

Once results for external assessments are issued, you may find that the learner has failed to achieve the qualification or to attain an anticipated grade. It is possible to transfer or reopen registration in some circumstances. Our *Information Manual* gives further information.

Changes to qualification requests

Where a learner who has taken a qualification wants to resit an externally-assessed unit to improve their qualification grade, you firstly need to decline their overall qualification grade. You must decline the grade before the certificate is issued. For a learner receiving their results in August, you should decline the grade by the end of September if the learner intends to resit an external assessment.

Additional documents to support centre administration

As an approved centre, you must ensure that all staff delivering, assessing and administering the qualifications have access to this documentation. These documents are reviewed annually and are reissued if updates are required.

- Pearson *Quality Assurance Handbook*: this sets out how we will carry out quality assurance of standards and how you need to work with us to achieve successful outcomes.
- *Information Manual*: this gives procedures for registering learners for qualifications, transferring registrations, entering for external assessments and claiming certificates.
- *Lead Examiners' Reports*: these are produced after each series for each external assessment and give feedback on the overall performance of learners in response to tasks or questions set.
- *Instructions for the Conduct of External Assessments*: explains our requirements for the effective administration of external assessments, such as invigilation and submission of materials.
- Regulatory policies: our regulatory policies are integral to our approach and explain how we meet internal and regulatory requirements. We review the regulated policies annually to ensure that they remain fit for purpose. Policies related to this qualification include:
  - adjustments for candidates with disabilities and learning difficulties, access arrangements and reasonable adjustments for general and vocational qualifications
  - age of learners
  - centre guidance for dealing with malpractice
  - recognition of prior learning and process.

This list is not exhaustive and a full list of our regulatory policies can be found on our website.

9 Quality assurance

Centre and qualification approval

As part of the approval process, your centre must make sure that the resource requirements listed below are in place before offering the qualification.

- Centres must have appropriate physical resources (for example, equipment, IT, learning materials, teaching rooms) to support the delivery and assessment of the qualification.
- Staff involved in the assessment process must have relevant expertise and/or occupational experience.
- There must be systems in place to ensure continuing professional development for staff delivering the qualification.
- Centres must have in place appropriate health and safety policies relating to the use of equipment by learners.
- Centres must deliver the qualification in accordance with current equality legislation.
- Centres should refer to the teacher guidance section in individual units to check for any specific resources required.

Continuing quality assurance and standards verification

On an annual basis, we produce the Pearson *Quality Assurance Handbook*. It contains detailed guidance on the quality processes required to underpin robust assessment, internal verification and planning of appropriate employer involvement.

The key principles of quality assurance are that:

- a centre delivering BTEC programmes must be an approved centre, and must have approval for the programmes or groups of programmes that it is delivering
- the centre agrees, as part of gaining approval, to abide by specific terms and conditions around the effective delivery and quality assurance of assessment; it must abide by these conditions throughout the period of delivery
- Pearson makes available to approved centres a range of materials and opportunities, through online standardisation, intended to exemplify the processes required for effective assessment, and examples of effective standards. Approved centres must use the materials and services to ensure that all staff delivering BTEC qualifications keep up to date with the guidance on assessment
- an approved centre must follow agreed protocols for standardisation of assessors and verifiers, for the planning, monitoring and recording of assessment processes, and for dealing with special circumstances, appeals and malpractice.

The approach of quality-assured assessment is through a partnership between an approved centre and Pearson. We will make sure that each centre follows best practice and employs appropriate technology to support quality-assurance processes, where practicable. We work to support centres and seek to make sure that our quality-assurance processes do not place undue bureaucratic processes on centres. We monitor and support centres in the effective operation of assessment and quality assurance.

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The methods we use to do this for BTEC Technical Certificate and Diploma qualifications include:

- making sure that all centres complete appropriate declarations at the time of approval
- undertaking approval visits to centres
- making sure that centres have effective teams of assessors and verifiers who are trained to undertake assessment
- undertaking an overarching review and assessment of a centre's strategy for ensuring sufficient and appropriate engagement with employers at the beginning of delivery of any BTEC programme(s)
- undertaking a review of the employer involvement planned at programme level to ensure its appropriateness at a time when additional activities can be scheduled where necessary
- assessment sampling and verification, through requested samples of assessments, completed assessed learner work and associated documentation
- an overarching review and assessment of a centre's strategy for delivering and quality assuring its BTEC programmes.

Centres that do not fully address and maintain rigorous approaches to delivering, assessing and quality assurance cannot seek certification for individual programmes or for the BTEC Technical Certificate and Diploma qualifications. An approved centre must make certification claims only when authorised by us and strictly in accordance with requirements for reporting.

Centres that do not comply with remedial action plans may have their approval to deliver qualifications removed.

10 Understanding the qualification grade

Awarding and reporting for the qualification

This section explains the rules that we apply in providing an overall qualification grade for each learner. The final grade awarded for a qualification represents a holistic performance across all of the qualification. As the qualification grade is an aggregate of the total performance, there is some element of compensation in that a higher performance in some units will be balanced by a lower outcome in others.

Eligibility for an award

In order to be awarded the qualification, a learner must complete all units and achieve a Pass or above in all units. See *Section 2 Structure* for full details.

To achieve the qualification grade, learners must:

- achieve and **report a grade** (D, M or P) for all units within a valid combination
- achieve the **minimum number of points** at a grade threshold.

Where there are optional units in a qualification, it is the responsibility of the centre to ensure that a correct unit combination is adhered to. Learners who do not pass all the required units shown in the structure will not achieve the qualification. For example, learners who have not passed the required external units or who have not taken enough mandatory units will not achieve that qualification even if they have enough points.

Calculation of the qualification grade

The final grade awarded for a qualification represents an aggregation of a learner's performance across the qualification. As the qualification grade is an aggregate of the total performance, there is some element of compensation in that a higher performance in some units may be balanced by a lower outcome in others.

In the event that a learner achieves more than the required number of optional units (where available), the mandatory units along with the optional units with the highest grades will be used to calculate the overall result, subject to the eligibility requirements for that particular qualification title.

The qualification is awarded at the grade ranges shown in the table below.

Qualification	Available grade range
Diploma	PP to DD

The *Calculation of qualification grade* table, shown further on in this section, shows the minimum thresholds for calculating these grades. The table will be kept under review over the lifetime of the qualification. The most up to date table will be issued on our website.

Pearson will monitor the qualification standard and reserves the right to make appropriate adjustments.

Learners who do not meet the minimum requirements for a qualification grade to be awarded will be recorded as Unclassified (U) and will not be certificated. They may receive a Notification of Performance for individual units. Our *Information Manual* gives full details.

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Points available for internal units

The table below shows the number of **points** available for internal units. For each internal unit, points are allocated depending on the grade awarded.

	Unit size
	60 GLH
U	0
Pass	16
Merit	24
Distinction	32

Points available for the external units

Raw marks from the external units will be awarded **points** based on performance in the assessment. The points scores available for each external unit at grade boundaries are as follows.

	Unit size
	60 GLH
U	0
Pass	16
Merit	24
Distinction	32

We will automatically calculate the points for each external unit once the external assessment has been marked and grade boundaries have been set. For more details about how we set grade boundaries in the external assessment please go to our website.

Claiming the qualification grade

Subject to eligibility, we will automatically calculate the qualification grade for your learners when the internal unit grades are submitted and the qualification claim is made. Learners will be awarded qualification grades for achieving the sufficient number of points within the ranges shown in the relevant calculation of qualification grade table for the cohort.

Calculation of qualification grade table

Diploma	
Grade	**Points threshold**
PP	96
MP	112
MM	128
DM	152
DD	176

The table is subject to review over the lifetime of the qualification.
The most up-to-date version will be issued on our website.

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Examples of grade calculations based on table applicable to registrations from September 2017

Example 1: Achievement of a Diploma with a PP grade

Unit	GLH	Type	Grade	Points
1	60	Internal	Pass	16
2	60	Internal	Pass	16
3	60	External	Pass	16
5	60	External	Pass	16
8	60	Internal	Merit	24
11	60	Internal	Pass	16
	360		**PP**	**104**

The learner has achieved a Pass or above in all units.

The learner has sufficient points for a PP grade.

Example 2: Achievement of a Diploma with a DD grade

Unit	GLH	Type	Grade	Points
1	60	Internal	Merit	24
2	60	Internal	Merit	24
3	60	External	Distinction	32
5	60	External	Distinction	32
8	60	Internal	Distinction	32
11	60	Internal	Distinction	32
	360		**DD**	**176**

The learner has sufficient points for a DD grade.

Example 3: Achievement of a Diploma with an Unclassified result

Unit	GLH	Type	Grade	Points
1	60	Internal	Merit	24
2	60	Internal	Merit	24
3	60	External	Unclassified	0
5	60	External	Pass	16
8	60	Internal	Pass	16
11	60	Internal	Distinction	32
	360		**U**	**112**

The learner has a U in Unit 3.

The learner has sufficient points for an MP but has not met the requirement for a Pass, or above, in all units.

11 Resources and support

Our aim is to give you support to enable you to deliver Pearson BTEC Level 2 Technicals with confidence. You will find resources to support teaching and learning, assessing, and professional development on our website.

Support for setting up your course and preparing to teach

Schemes of Learning

Our free Schemes of Learning give you suggestions and ideas for how to deliver the units in the qualifications, including opportunities to develop employability skills, tips on embedding mathematics and English, and how to link units through holistic assessments.

Delivery planner

High-level models showing how the course can be delivered over different timescales, for example six months, one year, two years.

myBTEC

myBTEC is a free, online toolkit that lets you plan and manage your BTEC provision from one place. It supports the delivery, assessment and quality assurance of BTEC qualifications in centres and supports teachers with the following activities:

- checking that a programme is using a valid combination of units
- creating and verifying assignment briefs (including access to a bank of assignment briefs that can be customised)
- creating assessment plans and recording assessment decisions
- tracking the progress of every learner throughout their programme.

To find out more about myBTEC, visit the myBTEC page on the support services section of our website.

Support for teaching and learning

Work Experience Toolkit

Our free Work Experience Toolkit gives guidance for tutors, assessors, work-based supervisors and learners on how to make the most of work placements and work experience.

Pearson Learning Services provides a range of engaging resources to support BTEC qualifications.

Teaching and learning resources may also be available from a number of other publishers. Details of Pearson's own resources and of all endorsed resources are on our website.

Support for assessment

Sample assessment materials for externally-assessed units

Sample assessment materials (SAMs) are available for externally-assessed units and can be downloaded from the Pearson Qualifications website. An additional set of sample assessment materials for externally-assessed units will also be available, giving your learners further opportunities for practice.

Sample assessment materials for internally-assessed units

We do not prescribe the assessments for the internally-assessed units. Rather, we allow you to set your own, according to your learners' preferences.

We provide assignment briefs approved by Pearson Standards Verifiers.

Sample marked learner work

To support you in understanding the expectation of the standard at each grade, examples of sample marked learner work will be made available on our website.

Training and support from Pearson

People to talk to

There are lots of people who can support you and give you advice and guidance on delivering your Pearson BTEC Level 2 Technicals. They include the following.

- Standards Verifiers – they can support you with preparing your assignments, ensuring that your assessment plan is set up correctly, in preparing learner work and providing quality assurance through sampling.
- Subject Advisors – available for all sectors. They understand all Pearson qualifications in their sector and so can answer sector-specific queries on planning, teaching, learning and assessment.
- Curriculum Development Managers (CDMs) – they are regionally based and have a full overview of BTEC qualifications and of the support and resources that Pearson provides. CDMs often run network events.
- Customer Services – the 'Support for You' section of our website gives the different ways in which you can contact us for general queries. For specific queries, our service operators can direct you to the relevant person or department.

Training and professional development

We provide a range of training and professional development events to support the introduction, delivery, assessment and administration of the Pearson BTEC Level 2 Technicals.

These sector-specific events, developed and delivered by specialists, are available both face to face and online.

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