

Pearson BTEC International Level 2 in Information Technology

Specification

First teaching from September 2020

L2

Issue 1

Pearson BTEC International Level 2 Qualifications in Information Technology

Specification

First teaching September 2022

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About Pearson

We are the world's leading learning company operating in countries all around the world. We provide content, assessment and digital services to learners, educational institutions, employers, governments and other partners globally. We are committed to helping equip learners with the skills they need to enhance their employability prospects and to succeed in the changing world of work. We believe that wherever learning flourishes so do people.

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Welcome

With a track record built over 40 years of learner success, our BTEC International Level 2 qualifications are recognised internationally by governments and employers. These qualifications are designed to enhance the curriculum and prepare learners for the ever-changing world of work. BTEC International Level 2 qualifications allow learners to progress to study at Level 3 and above or to the workplace.

Career-ready education

BTECs enable a learner-centred approach to education, with a flexible, unit-based structure and knowledge applied to project-based assessments. BTECs focus on the holistic development of the practical, interpersonal and thinking skills required to be successful in employment and higher education.

When creating the BTEC International Level 2 qualifications in this suite, we worked with many employers, colleges and schools to ensure that we met their needs.

BTEC addresses these needs by offering:

- a range of BTEC qualification sizes, each with a clear purpose, so that there is something to suit each learner's choice of study programme and progression plans
- internationally relevant content, which is closely aligned with employer and further education needs
- assessments and projects chosen to help learners progress; this means that some assessments and projects are set by you to meet local needs, while others are set by Pearson, ensuring a core of skills and understanding common to all learners.

We provide a full range of support, both resources and people, to ensure that learners and teachers have the best possible experience during their course. See *Section 10 Resources and support*, for details of the support we offer.

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Introduction to the BTEC International Level 2 qualifications for the information technology sector

This specification contains all the information you need to deliver the Pearson BTEC International Level 2 Qualifications in Information Technology. We also refer you to other handbooks and policies. This specification includes all the units for these qualifications.

These qualifications are part of the suite of Information Technology qualifications offered by Pearson. In this suite, there are qualifications that focus on different progression routes, allowing learners to choose the one best suited to their aspirations. These qualifications are not regulated in England.

All qualifications in the suite share some common units and assessments, which gives learners some flexibility in moving between sizes.

In the Information Technology sector these qualifications are:

Pearson BTEC International Level 2 Award in Information Technology

Pearson BTEC International Level 2 Certificate in Information Technology

Pearson BTEC International Level 2 Extended Certificate in Information Technology

Pearson BTEC International Level 2 Diploma in Information Technology.

This specification signposts the other essential documents and support that you need as a centre in order to deliver, assess and administer the qualifications, including the staff development required. A summary of all essential documents is given in *Section 7 Administrative arrangements*. Information on how we can support you with these qualifications is given in *Section 10 Resources and support*.

The information in this specification is correct at the time of publication.

Qualifications, sizes and purposes at a glance

Title	Size and structure	Summary purpose
Pearson BTEC International Level 2 Award in Information Technology	120 GLH Equivalent in size to 1 International GCSE. Two units, of which one is mandatory and assessed by a Pearson Set Assignment. Mandatory content (50%).	This qualification is designed to support learners who want an introduction to the sector through applied learning. The qualification supports progression to further study at Level 3/pre-tertiary education as part of a programme of study that includes BTEC International Level 3 qualifications and/or International GCSEs.
Pearson BTEC International Level 2 Certificate in Information Technology	240 GLH Equivalent in size to two International GCSEs. Four units, of which one is mandatory and assessed by a Pearson Set Assignment. Mandatory content (25%).	This qualification is designed to support learners who are interested in learning about the information technology industry alongside other fields of study, with a view to progressing to a wide range of courses at Level 3/pre-tertiary level, not necessarily in information technology-related subjects. The qualification is designed to be taken as part of a programme of study that includes other appropriate BTEC International Level 2 qualifications or International GCSEs.
Pearson BTEC International Level 2 Extended Certificate in Information Technology	360 GLH Equivalent in size to three International GCSEs. Six units, of which two are mandatory and assessed by a Pearson Set Assignment. Mandatory content (33%).	This qualification is designed to support learners who want to study information technology as a substantial element of a one-year, full-time course alongside smaller courses in other subjects, or for those wanting to take it alongside another area of complementary or contrasting study as part of a two-year, full-time study programme. The qualification would support progression to further education at Level 3/pre-tertiary level if taken as part of a programme of study that included other BTEC International Level 2 qualifications or International GCSEs.

Title	Size and structure	Summary purpose
Pearson BTEC International Level 2 Diploma in Information Technology	480 GLH Equivalent in size to four International GCSEs. At least eight units, of which two are mandatory and assessed by Pearson Set Assignment. Mandatory content (25%).	This qualification is designed to support learners who want to study information technology as a one-year, full-time course, or for those wanting to take it alongside another area of complementary or contrasting study as part of a two-year, full-time study programme. The qualification would support progression to Level 3/ pre-tertiary level courses if taken as part of a programme of study that included other BTEC International Level 2 qualifications or International GCSEs.

Structures of the qualifications at a glance

This table shows all the units and the qualifications to which they contribute. The full structure for this Pearson BTEC International Level 2 in Information Technology is shown in *Section 2 Structure*. **You must refer to the full structure to select units and plan your programme.**

Key

Pearson Set Assignment units are shown in bold

M

Mandatory units

O

Optional units

Unit (number and title)	Unit size (GLH)	Award (120 GLH)	Certificate (240 GLH)	Extended Certificate (360 GLH)	Diploma (480 GLH)
1 Using IT to Support Information and Communication in Organisations	60	M	M	M	M
2 Data and Spreadsheet Modelling	60	O	O	M	M
3 Setting up a Technology System	60	O	O	O	O
4 Introduction to Computer Networking	60	O	O	O	O
5 Introduction to Programming	60	O	O	O	O
6 Introduction to Digital Graphics and Animation	60	O	O	O	O
7 Introduction to Website Development	60	O	O	O	O
8 Introduction to App Development	60	O	O	O	O
9 Introduction to Games Design	60	O	O	O	O
10 Introduction to Database Systems	60	O	O	O	O

Qualification and unit content

Pearson has developed the content of the new BTEC International Level 2 qualifications in collaboration with employers and subject experts so that content is up to date and includes knowledge, understanding, skills and personal attributes required in the sector.

The mandatory content ensures that all learners are following a coherent programme of study and that they acquire knowledge, understanding and skills that will be worthwhile and fulfilling, and will also provide a basis for further study at Level 3. Learners are expected to show achievement across mandatory units as detailed in *Section 2 Structure*.

BTEC qualifications encompass applied learning that brings together knowledge and understanding with practical and technical skills. This applied learning is achieved through learners performing vocational tasks that encourage the development of appropriate vocational behaviours and transferable skills. Transferable skills include communication, teamwork and research and analysis, which are valued by employers. Opportunities to develop these skills are signposted in the units.

Our approach provides rigour and balance, and promotes the ability to apply learning immediately in new contexts. The units include guidance on approaches to breadth and depth of coverage, which can be modified to ensure that content is current and reflects international variations.

Assessment

Assessment is designed to fit the purpose and objective of the qualification. It includes a range of assessment types and styles suited to vocational qualifications in the sector. All assessment is internal but some mandatory units are assessed using Pearson Set Assignments.

Pearson Set Assignment (PSA) units

Some units in the qualifications are assessed using a Pearson Set Assignment. Each assessment is set by Pearson and is marked by teachers.

Set assignment units are subject to external standards verification processes common to all BTEC units. By setting an assignment for some units, we can ensure that all learners take the same assessment for a specific unit. Learners are permitted to resit set assignment units during their programme. Please see *Section 6 Internal assessment* for further information.

Set assignments are available from June each year and are valid until the end of August in the following year. For detailed information on the Pearson Set Assignment, please see the table in *Section 2 Structure*. For further information on preparing for assessment, see *Section 5 Assessment structure*.

Internal assessment

All units in the sector are internally assessed and subject to external standards verification. Before you assess you will need to become an approved centre, if you are not one already. You will need to prepare to assess using the guidance in *Section 6 Internal assessment*.

For units where there is no Pearson Set Assignment, you select the most appropriate assessment styles according to the learning set out in the unit. This ensures that learners are assessed using a variety of styles to help them develop a broad range of transferable skills. Learners could be given opportunities to:

- write up the findings of their own research
- use case studies to explore complex or unfamiliar situations
- carry out projects for which they have choice over the direction and outcomes
- demonstrate practical and technical skills using appropriate tools/ processes etc.

For these units, Pearson will provide an Authorised Assignment Brief that you can use. You will make grading decisions based on the requirements and supporting guidance given in the units. Learners may not make repeated submissions of assignment evidence. For further information, please see *Section 6 Internal assessment*.

Language of assessment

Assessment of the units for these qualifications are available in English but can be translated as necessary.

Learners taking the qualifications may be assessed in sign language where it is permitted for the purpose of reasonable adjustment. For information on reasonable adjustments, see *Section 7 Administrative arrangements*.

Grading for units and qualifications

Achievement of the qualification requires demonstration of depth of study in each unit, assured acquisition of a range of practical skills required for employment or for progression to higher education, and successful development of transferable skills. Learners who achieve a qualification will have achieved across mandatory units where applicable.

Units are assessed using a grading scale of Distinction (D), Merit (M), Pass (P) and Unclassified (U). All mandatory and optional units contribute proportionately to the overall qualification grade, for example a unit of 60 GLH will contribute double that of a 30 GLH unit.

Qualifications in the suite are graded using a scale of P to D*, **or** PP to D*D*. Please see *Section 9 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 qualifications.

1 Qualification purpose and progression

Pearson BTEC International Level 2 qualifications in Information Technology

Who are these qualifications for?

The Pearson BTEC International Level 2 qualifications in Information Technology (IT) are designed either for learners in the 14–19 age group, who wish to pursue a career in IT via Level 3 and then to higher education or through junior IT employment.

Which size qualification to choose?

Choosing the most suitable size of qualification will depend on the learner's broader programme of study. For example, a learner who wishes to focus mainly on IT support and website, application and games development may take the Diploma, while a learner who selects a smaller qualification, such as the Award or Certificate, will likely combine it with International GCSEs, in order to support their desired progression.

Qualification structures have been designed to enable a learner who starts with the smallest qualification to progress easily to the larger qualifications.

What do these qualifications cover?

The content of these qualifications has been designed to support progression to roles in IT, most likely via further study at Level 3 and then through higher-education routes in the particular areas.

All learners will be required to take mandatory content that is directly relevant to progression routes in all of the identified areas.

In addition, learners take optional units that support the progression route identified in the qualification title.

What could these qualifications lead to?

These qualifications support progression to further study in IT, for example:

- Pearson BTEC International Level 3 qualifications in Information Technology.

How do these qualifications provide transferable skills?

In the BTEC International Level 2 units, there are opportunities during the teaching and learning phase to give learners practice in developing transferable skills. Where we refer to transferable skills in this specification, we are generally referring to skills in the following three main categories:

- **cognitive and problem-solving skills** – using critical thinking, approaching non-routine problems, applying expert and creative solutions, using systems and technology
- **interpersonal skills** – communicating, working collaboratively, negotiating and influencing, self-presentation
- **intrapersonal skills** – self-management, adaptability and resilience, self-monitoring and development.

There are also specific requirements in some units for assessment of these skills where relevant, for example, where learners are required to undertake real or simulated activities. These skills are indicated in the units and in *Appendix 1: Transferable employability skills*.

How do the qualifications provide transferable knowledge and skills for further and higher education?

All BTEC International Level 2 qualifications provide transferable knowledge and skills that prepare learners for progression to university. The transferable skills that universities value include:

- the ability to learn independently
- the ability to research actively and methodically
- the ability to give presentations and be active group members.

BTEC learners can also benefit from opportunities for deep learning, where they are able to make connections across units and select areas of interest for detailed study.

2 Structure

Qualification structures

The structures for the qualifications in this specification are:

- Pearson BTEC International Level 2 Award in Information Technology
- Pearson BTEC International Level 2 Certificate in Information Technology
- Pearson BTEC International Level 2 Extended Certificate in Information Technology
- Pearson BTEC International Level 2 Diploma in Information Technology.

Pearson BTEC International Level 2 Award in Information Technology

Mandatory units

There is one mandatory unit, which includes one set assignment unit. Learners must complete and achieve a Pass or above in the mandatory unit.

Optional units

Learners must complete at least one optional unit.

Pearson BTEC International Level 2 Award in Information Technology				
Unit number	Unit title	GLH	Type	How assessed
Mandatory units – learners complete and achieve all units				
1	Using IT to Support Information and Communication in Organisations	60	Mandatory	Set assignment
Optional units – learners must complete one optional unit				
2	Data and Spreadsheet Modelling	60	Option	Set assignment
3	Setting up a Technology System	60	Option	Internal
4	Introduction to Computer Networking	60	Option	Internal
5	Introduction to Programming	60	Option	Internal
6	Introduction to Digital Graphics and Animation	60	Option	Internal
7	Introduction to Website Development	60	Option	Internal
8	Introduction to App Development	60	Option	Internal
9	Introduction to Games Design	60	Option	Internal
10	Introduction to Database Systems	60	Option	Internal

Pearson BTEC International Level 2 Certificate in Information Technology

Mandatory units

There is 1 mandatory unit, which includes 1 set assignment unit. Learners must complete and achieve a Pass or above in the mandatory unit.

Optional units

Learners must complete at least three optional units.

Pearson BTEC International Level 2 Certificate in Information Technology				
Unit number	Unit title	GLH	Type	How assessed
Mandatory units – learners complete and achieve all units				
1	Using IT to Support Information and Communication in Organisations	60	Mandatory	Set assignment
Optional units – learners must complete three optional units				
2	Data and Spreadsheet Modelling	60	Option	Set assignment
3	Setting up a Technology System	60	Option	Internal
4	Introduction to Computer Networking	60	Option	Internal
5	Introduction to Programming	60	Option	Internal
6	Introduction to Digital Graphics and Animation	60	Option	Internal
7	Introduction to Website Development	60	Option	Internal
8	Introduction to App Development	60	Option	Internal
9	Introduction to Games Design	60	Option	Internal
10	Introduction to Database Systems	60	Option	Internal

Pearson BTEC International Level 2 Extended Certificate in Information Technology

Mandatory units

There are 2 mandatory units, which include 2 set assignment units. Learners must complete and achieve a Pass or above in all mandatory units.

Optional units

Learners must complete at least four optional units.

Pearson BTEC International Level 2 Extended Certificate in Information Technology				
Unit number	Unit title	GLH	Type	How assessed
Mandatory units – learners complete and achieve all units				
1	Using IT to Support Information and Communication in Organisations	60	Mandatory	Set assignment
2	Data and Spreadsheet Modelling	60	Mandatory	Set assignment
Optional units – learners must complete four optional units				
3	Setting up a Technology System	60	Option	Internal
4	Introduction to Computer Networking	60	Option	Internal
5	Introduction to Programming	60	Option	Internal
6	Introduction to Digital Graphics and Animation	60	Option	Internal
7	Introduction to Website Development	60	Option	Internal
8	Introduction to App Development	60	Option	Internal
9	Introduction to Games design	60	Option	Internal
10	Introduction to Database Systems	60	Option	Internal

Pearson BTEC International Level 2 Diploma in Information Technology

Mandatory units

There are 2 mandatory units, which include 2 set assignment units. Learners must complete and achieve a Pass or above in all mandatory units.

Optional units

Learners must complete at least six optional units.

Pearson BTEC International Level 2 Diploma in Information Technology				
Unit number	Unit title	GLH	Type	How assessed
Mandatory units – learners complete and achieve all units				
1	Using IT to Support Information and Communication in Organisations	60	Mandatory	Set assignment
2	Data and Spreadsheet Modelling	60	Mandatory	Set assignment
Optional units – learners must complete six optional units				
3	Setting up a Technology System	60	Option	Internal
4	Introduction to Computer Networking	60	Option	Internal
5	Introduction to Programming	60	Option	Internal
6	Introduction to Digital Graphics and Animation	60	Option	Internal
7	Introduction to Website Development	60	Option	Internal
8	Introduction to App Development	60	Option	Internal
9	Introduction to Games Design	60	Option	Internal
10	Introduction to Database Systems	60	Option	Internal

Set assignment units

This is a summary of the type and availability of set assignment units. For more information, see *Section 5 Assessment structure*, and the units and sample assessment materials.

Unit	Type	Availability
Unit 1: Using IT to Support Information and Communication in Organisations	<ul style="list-style-type: none">• An assignment set by Pearson and marked by the centre.• The advised assessment period is 20 hours.• Completed using a computer.	Two available for each series.
Unit 2: Data and Spreadsheet Modelling	<ul style="list-style-type: none">• An assignment set by Pearson and marked by the centre.• The advised assessment period is 20 hours.• Completed using a computer.	Two available for each series.

Employer involvement in assessment and delivery

You are encouraged to give learners opportunities to be involved with employers. For more information, please see *Section 4 Planning your programme*.

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. This section explains how the units work. It is important that all teachers, assessors, internal verifiers and other staff responsible for the programme review this section.

Section	Explanation
Unit number	The number is in a sequence in the sector. Numbers may not be sequential for an individual qualification.
Unit title	This is the formal title that we always use, it appears on certificates.
Level	All units are at Level 2.
Unit type	This shows if the unit is internal or assessed using a Pearson Set Assignment. See structure information in <i>Section 2 Structure</i> for details.
Guided Learning Hours (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	This is 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 written with learners in mind. It indicates why the unit is important, how learning is structured and how it might be applied when they progress to employment or higher education.
Assessment	For internal set assignment units, this section states whether set assignments are required to be completed.
Learning aims	These help to define the scope, style and depth of learning of the unit. You can see where learners should be learning standard requirements ('understand') or where they should be actively researching ('investigate'). You can find out more about the verbs we use in learning aims in <i>Appendix 2: Glossary of terms used</i> .
Summary of unit	This section helps teachers to see at a glance the main content areas given against the learning aims and the structure of the assessment. The content areas and structure of assessment must be covered. The forms of evidence given are suitable to fulfil the requirement.

Section	Explanation
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.
Assessment criteria	Each learning aim has Pass and Merit criteria. Each assignment has at least one Distinction criterion. A full glossary of terms used is given in <i>Appendix 2: Glossary of terms used</i> . All assessors need to understand our expectations of the terms used. Distinction criteria represent outstanding performance in the unit. Some criteria require learners to draw together learning from across the learning aims.
Essential information for assignments	This shows the maximum number of assignments that may be used for the unit to allow for effective summative assessment and how the assessment criteria should be used to assess performance. For set assignment units, this section will include any conditions for taking the assignment.
Further information for teachers and assessors	This section gives you information to support the implementation of assessment. It is important that this is read carefully alongside the assessment criteria, as the information will help with interpretation of the requirements.
Resource requirements	Any specific resources that you need to be able to teach and assess are listed in this section. For information on support resources, see <i>Section 10 Resources and support</i> .
Essential information for assessment decisions	This section gives guidance on and examples for each learning aim or assignment of the expectations for Pass, Merit and Distinction standard.
Assessment controls	This section gives details of the rules that learners need to abide by when taking the assessment.
Links to other units and other curriculum subjects	This section shows you the main relationships between different units and any clear links to other curriculum subjects. This helps you to structure your programme and make best use of available materials and resources.
Employer involvement	This section gives you information on the units, which can be used to involve learners with employers. This will help you to identify the kind of involvement that is likely to be most successful.
Opportunities to develop transferable employability skills	This section gives you guidance on how transferable employability skills might be developed in teaching and assessment of the unit.

Index of units

This section contains all the units developed for these qualifications. Please refer to *pagse 4–5* to check which units are available in all qualifications in the information technology sector.

Unit 1:	Using IT to Support Information and Communication in Organisations	19
Unit 2:	Data and Spreadsheet Modelling	31
Unit 3:	Setting up a Technology System	39
Unit 4:	Introduction to Computer Networking	49
Unit 5:	Introduction to Programming	61
Unit 6:	Introduction to Digital Graphics and Animation	71
Unit 7:	Introduction to Website Development	83
Unit 8:	Introduction to App Development	93
Unit 9:	Introduction to Games Design	103
Unit 10:	Introduction to Database Systems	115

Unit 1: Using IT to Support Information and Communication in Organisations

Level: 2

Unit type: **Pearson Set Assignment**

Guided learning hours: **60**

Unit in brief

The aim of this unit is to enable learners to develop an understanding of the ways in which information technology can provide value to organisations, and engage with stakeholders.

Unit introduction

Developments in information technology (IT) have had a significant impact on the way in which organisations operate. Where once IT may have been considered separate from other parts of an organisation, successful organisations now integrate IT systems into all aspects of their business and operations. This unit helps learners to understand the different uses of IT in organisations, and how its effective use can contribute to the organisation's success and improvement.

In this unit, you will explore different types of organisation and examine how IT helps them to meet their organisational needs and complete common business functions effectively. You will explore the value IT provides for an organisation and its internal and external stakeholders, examining ways in which information is used by different stakeholders, and considering how that information is best presented to them to improve engagement and add value to the organisation.

You will respond to a scenario and plan and develop an information campaign aimed at internal and external stakeholders.

Assessment

This unit has a Pearson Set Assignment. Learners must complete a Pearson Set Assignment Brief.

Learning aims

In this unit you will:

- A** Explore how IT meets the needs of organisations
- B** Plan an information campaign for an identified organisation
- C** Produce an information campaign for an identified organisation.

Summary of unit

Learning aim	Key content areas	Assessment approach
A Explore how IT meets the needs of organisations	A1 Business functions and organisational needs A2 Data and IT used in organisations A3 Computer systems used in organisations	This unit is assessed through a Pearson Set Assignment.
B Plan an information campaign for an identified organisation	B1 Stakeholders B2 Methods of communicating with stakeholders B3 Preparing for an information campaign	
C Produce an information campaign for an identified organisation	C1 Producing an information campaign	

Content

Learning aim A: Explore how IT meets the needs of organisations

A1 Business functions and organisational needs

How common business functions support the needs of organisations.

- The purpose of different organisations (commercial businesses and not-for-profit) in terms of providing:
 - a service
 - a product
 - both products and services.
- Common business functions and how they relate to the needs of organisations:
 - production/operations to include – manufacturing, delivery of services, order fulfilment, supply chain management, resource management
 - marketing and sales to include – market research, advertising, new product development, customer relations, promotional campaigns
 - human resources to include – staff recruitment, staff management, compliance with employment law, payroll management
 - accounts and finance to include – budget allocation, financial reporting, monitoring cash flow, invoicing, account management.

A2 Data and IT used in organisations

How data and IT are used in organisations and the impact on the success of an organisation.

- The measurable value of data and IT:
 - improvement and efficiency of decision making
 - optimising manufacturing and supply logistics
 - delivery and improvement of products and services
 - increasing profits, e.g. reducing costs, reducing waste
 - optimising productivity
 - increased customer engagement and satisfaction, e.g. improved brand recognition, identifying customer needs
 - diversification.
- How data and IT are used in organisations to support business functions:
 - analysis of trends
 - prediction of and planning for fluctuations in prices, availability of resources and demand
 - setting and monitoring key performance indicators (KPIs) and quality control metrics
 - customer interaction and engagement
 - customer behaviour analysis and targeted marketing.

A3 Computer systems used in organisations

How IT systems are used in organisations and the impact on the success of an organisation.

- The use of computer hardware to support business functions:
 - personal computers to include – desktops and laptops
 - mobile devices to include – smartphones, wearable devices, laptops
 - peripheral devices for system input and output to include – keyboards, sensors, scanners, printers, projectors, RFID systems

- accessibility devices to include – alternative keyboards, sip-and-puff systems, wands and sticks, braille embossers
- storage devices to include – USB flash drives, internal and external hard drives, optical drives/discs.
- The use of networks and communication systems to support business functions:
 - the components of a network to include – servers (physical and cloud), clients, access points, infrastructure/cabling, routers
 - benefits of using networked systems, e.g. remote working, shared resources, central storage, access to and maintenance of data
 - drawbacks of using networked systems, e.g. cost implications, security and privacy concerns, maintenance.
- The use of software to support business functions:
 - applications software, e.g. word processing, spreadsheets, databases, graphic editing
 - system and utility software to include – operating systems, anti-virus, firewalls, back-up and restoration, task schedulers
 - specialist software, e.g. payroll, enterprise resource management, content management, project management tools.

Learning aim B: Plan an information campaign for an identified organisation

B1 Stakeholders

The roles and needs of different stakeholders.

- Internal stakeholders:
 - shareholders/owners
 - management
 - employees.
- External stakeholders:
 - suppliers
 - customers/clients
 - government
 - pressure groups
 - communities.
- Reasons for communicating with internal stakeholders:
 - formal reporting to include – business proposals, business plans, financial summaries, impact analysis, sales reports
 - planning for and managing changes within the organisation to include – new or improved products/services, diversification, changes to manufacturing processes, changes to legislation, change of premises, responses to cybersecurity incidents, new developments in technologies
 - staff training
 - informing staff about company policy.
- Reasons for communicating with external stakeholders:
 - advertisement (direct and indirect marketing)
 - responding to queries, e.g. price queries, issues with a product, returns
 - technical support
 - providing instructions.

B2 Methods of communicating with stakeholders

The selection and use of appropriate methods for communicating with different stakeholders.

- Internal communications:
 - email
 - business reports
 - policy documents
 - notice board announcements (physical and virtual).
- External communications:
 - email, e.g. formal direct letters, mailshots, personalised recommendations
 - social media, e.g. public posts, direct messages, viral campaigns
 - targeted advertisements
 - podcasts
 - videos.
- Utilisation of multi-channel campaigns, i.e. the use of more than one communications channel to communicate to stakeholders.

B3 Preparing for an information campaign

Approaches to planning an information campaign.

- Gather data, interpret, and prepare data for inclusion in the campaign, e.g. AdWords, social media trends, publicly available large data sets.
- Preparing a communications plan:
 - identifying stakeholders and target audience, e.g. age, gender, interests, income
 - medium/platform of communication to be used for identified stakeholders
 - creating keyword strategies
 - planning content appropriate to:
 - chosen medium/platform
 - target audience
 - key messages
 - brand/company image.
 - planning a series of related communications to reveal information/build interest over time, e.g. multiple related posts/tweets, teaser adverts
 - research related to publishing schedule to include:
 - best time to publish social media posts
 - types of content that generate best engagement at different times
 - creating a publishing schedule to include – type of content, frequency, day and time.

Learning aim C: Produce an information campaign for an identified organisation

C1 Producing an information campaign

- Considerations when communicating with internal and external stakeholders:
 - maintaining privacy and security
 - tone of voice
 - presenting to different technical and non-technical stakeholders, e.g. when to use technical language or jargon, emphasis on different information
 - maintaining company image/brand identity
 - clarity of information
 - inclusion and diversity.
- Presenting information in different ways for different audiences:
 - written information
 - graphs
 - infographics
 - images
 - video and animation.
- Utilising features of different platforms and mediums for communication to improve reach and impact:
 - cookies
 - links
 - hashtags/keywords
 - polls
 - audience targeting
 - comments
 - descriptions.

Assessment criteria

Pass		Merit	Distinction
Learning aim A: Explore how IT meets the needs of organisations			A.D1 Evaluate the value of data and computer systems and their potential impact on an identified organisation in relation to their business needs.
A.P1 Outline the business needs of an identified organisation.	A.P2 Outline how data and computer systems support the business functions of an identified organisation.	A.M1 Describe how data and computer systems provide measurable value for an identified organisation.	
Learning aim B: Plan an information campaign for an identified organisation			B.D2 Produce a comprehensive communications plan for an information campaign that will use a range of information, platforms and mediums.
B.P3 Produce a basic communications plan for an information campaign.	B.P4 Prepare information for internal and external stakeholders ready for inclusion in a campaign.	B.M2 Produce a detailed and effective communications plan for an information campaign that will use a range of information, platforms and mediums.	
Learning aim C: Produce an information campaign for an identified organisation			C.D3 Implement a comprehensive and effective information campaign to communicate with internal and external stakeholders using of a range of information, platforms and mediums.
C.P5 Communicate information to internal stakeholders using an appropriate method as part of an information campaign.	C.P6 Communicate information to external stakeholders using an appropriate method as part of an information campaign.	C.M3 Implement a detailed information campaign to communicate with internal and external stakeholders making use of a range of information, platforms and mediums.	

Essential information for assignments

This unit is assessed using a Pearson Set Assignment Brief. A set assignment must be used to assess learners.

Further information for teachers and assessors

Resource requirements

For this unit, learners must have access to networked computer systems with access to the internet. Learners will need access to:

- content creation tools, e.g. graphic editing software, audio editing, video editing
- office productivity software, e.g. word processing, spreadsheets
- email software
- internet access including access to metrics/analytics from social media.

Essential information for assessment decisions

Learning aim A

For Distinction standard, in their evaluation learners must consider the value of data and computer systems to an identified organisation. They should consider the extent to which use of data and computer systems impacts on the organisation and enables them to meet their business needs. Learners should explore the 'value' to a company both in terms of monetary value, e.g. how it helps save money or contributes to improved profit and in terms of more abstract value, e.g. improved customer experience, brand recognition. As part of the evaluation learners should draw conclusions as to the potential impact these have on the identified organisation and its stakeholders. The learners' conclusions must be supported with relevant examples.

For Merit standard, learners must provide detailed descriptions of how data and computer systems are used in an identified organisation and industry. Their descriptions should include information as to how the identified data and systems provide measurable value for an identified organisation. For example, learners may describe how specific sales data is used by a supermarket to optimise stock levels and supply chains and advertise stock, or how the business makes use of user feedback data to improve the quality of goods and services.

For Pass standard, learners should outline the needs of an identified organisation. They should consider the core purpose(s) of the business, i.e. if it is a service or product-based business and the common business functions that inform the business needs.

Learners should also outline how data and computer systems support the business functions of an identified organisation. Their outline should make reference to specific computer systems and data that might be used in the organisation. While these should be relevant to the identified business or sector, at this level it is likely that there will be a number of generic examples.

Learning aim B

For Distinction standard, learners must produce comprehensive communications plans for an information campaign. Their plans should provide detailed coverage of a range of information, platforms, and mediums they intend to use to communicate the information for the campaign to identified stakeholders.

The plan should include a rationale for their planning decisions, which is well-reasoned with supporting evidence. The plan must:

- provide details of the internal and external stakeholders that will be targeted in the campaign, demonstrating a good understanding of the needs of the identified target audience

- provide a supported justification for the medium/platform of communication to be used to communicate with the identified stakeholders, effectively explaining the key tools and features they will make use of
- provide details of an effective and appropriate keyword strategy they will use in the campaign providing effective justification for the strategy chosen
- contain content for a series of related and effective communications to reveal information/build interest over time, e.g. multiple related posts/tweets, teaser adverts
- contain a detailed publishing schedule for the communications they intend to create.

The range of information, platforms, and mediums required to be effective will vary depending on the type of campaign. For example, depending on the campaign and target audience, an effective campaign might require only the use of two platforms, e.g. email and social media or it might require the use of more. If an identified campaign only requires a small number of platforms to be used, the campaign can still effectively use a number of different ways to present information and engage with stakeholders using those mediums.

At this level the plan should be appropriate for use in a range of settings, i.e. for use by a content production team to implement the campaign and also for senior management in the business to make decisions about the campaign planned. Their rationale should make clear reference to the needs of the targeted stakeholders and the needs of the business as appropriate.

For Merit standard, learners must produce a detailed and effective communications plan for an information campaign. Their plans should provide details of the range of information, platforms, and mediums they intend to use to communicate the information for the campaign to identified stakeholders.

The plan should include a rationale for their planning decisions, which is generally well-reasoned but may not always be fully convincing or supported.

Their plans must:

- provide details of the internal and external stakeholders that will be targeted in the campaign, demonstrating a sound understanding of the needs of the identified target audience
- explain the medium/platform of communication to be used to communicate with the identified stakeholders, identifying the key tools and features they will make use of, and their reasons for choosing them
- provide an explanation of the keyword strategy they will use in the campaign
- contain content for a series of related communications to reveal information/build interest over time, e.g. multiple related posts/tweets, teaser adverts
- contain a publishing schedule for the communications they intend to create.

The range of information, platforms, and mediums required to be effective will vary depending on the type of campaign. For example, an effective campaign may only make use of two platforms (email and social media) but might effectively use several different ways to present information and engage with stakeholders using those mediums.

At this level the plan will be mostly appropriate for use in a range of settings but there may be some choices that will be less effective for their intended purpose. Their rationale will make reference to the needs of the targeted stakeholders and the needs of the business but these may not always be explored in detail.

For Pass standard, learners should produce a communications plan for an information campaign. Their plan must contain details of:

- the medium/platform of communication to be used to communicate with the identified stakeholders
- the key tools and features they will make use of
- details of the keywords to be used in the campaign
- plans for a series of related communications, e.g. multiple related posts/tweets, teaser adverts
- a basic publishing schedule.

The learner must have identified multiple platforms and audience members, but these may not always be the most appropriate or may lack the detail needed to fully inform the creation/implementation of an effective campaign.

Learners should prepare information for internal and external stakeholders ready for inclusion in a campaign. While the data chosen may not be fully appropriate at this level to be considered 'effective' or 'convincing' there should be clear evidence that they have taken into consideration some of the key characteristics of the target audience. For example, learners may have chosen to provide data that informs management about profits over time, but the information extracted may also contain too much data about individual sales, rather than high-level strategic information.

They should include a rationale that attempts to explain reasons for the planning decisions they have made, but this will not always be fully convincing or supported.

Learning aim C

Learners are not expected to use live social media platforms for this task. Evidence using offline/simulated environments or mock-ups is acceptable.

For Distinction standard, learners must implement a comprehensive and effective information campaign as identified in their plans. They should make effective use of tools and features provided through their chosen medium and platform. It would be expected that while different communications in the campaign may be targeting different stakeholders, they will clearly form a cohesive part of a larger campaign. It would be expected that they all have clear brand identity, in addition to effective communicating to the targeted stakeholder.

For Merit standard, learners must implement their plan, by creating the communication materials they have planned. Learners' evidence should demonstrate a good understanding of the tools being used. The selection of content, medium and platform should be appropriate for the intended task. However, it may be the case that while most are appropriate there may still be some features chosen that are less effective or less appropriate for the intended purpose.

For Pass standard, learners must implement their plan by creating the materials to communicate information to internal and external stakeholders. In both cases the way in which they communicate, in terms of tools, platforms chosen and quality, should be generally appropriate, however there may be some issues. For example, as part of their campaign, they may have selected to communicate sales information to investors, and while the information they provide may be accurate, they may have used tables of information, where graphs or info-graphics would have been more appropriate.

Assessment controls

Time: this assignment has a recommended time period. This is for advice only and can be adjusted depending on the needs of learners.

Supervision: you should be confident of the authenticity of learners' work. This may mean that learners should be supervised.

Resources: all learners should have access to the same types of resource to complete the assignment.

Research: learners should be given the opportunity to carry out research outside of the learning context if required for the assignment.

Links to other units and curriculum subjects

This unit links to:

- Unit 2: Data and Spreadsheet Modelling
- Unit 6: Introduction to Digital Graphics and Animation
- Unit 7: Introduction to Website Development
- International GCSE/core curriculum in Information Technology.

Employer involvement

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

- guest speakers and interview opportunities
- work experience
- business material as exemplars
- visits to appropriate business organisations.

Opportunities to develop transferable employability skills

In completing this unit, learners will have the opportunity to develop skills in research and planning, problem-solving, responsibility, and communication.

Unit 2: Data and Spreadsheet Modelling

Level: 2

Unit type: **Pearson Set Assignment**

Guided learning hours: **60**

Unit in brief

Learners will investigate the characteristics of data and information and how information can help organisations in decision making. They will use data manipulation methods to create a dashboard to present and draw conclusions from information.

Unit introduction

To make decisions, organisations collect vast amounts of data from a range of different sources. Organisations need to use appropriate data-collection methods to ensure that the data is of sufficient quality to enable decision making. Data must then be converted into information to become useful.

Learners will explore the different data manipulation methods that can be used to change the way that data is presented. Learners will provide summaries of given data and present them in a dashboard that will allow organisations to make effective decisions. It is up to the data user to look at the information and draw conclusions, so how the information is presented is key to ensuring that effective and accurate decisions are made.

In this unit, learners will study the different presentation features that can be used to ensure that information is understood clearly in an objective way so that it is not misinterpreted.

Assessment

This unit has a Pearson Set Assignment. Learners must complete a Pearson Set Assignment Brief.

Learning aims

In this unit you will:

- A** Understand the role of data and information in organisations
- B** Create a dashboard using data manipulation methods
- C** Review the effectiveness of the dashboard to provide information.

Summary of unit

Learning aim	Key content areas	Assessment approach
A Understand the role of data and information in organisations	A1 Processing information A2 Data sources and characteristics A3 Quality of data and its impact on decision making	This unit is assessed through a Pearson Set Assignment.
B Create a dashboard using data manipulation methods	B1 Data processing methods B2 Producing a dashboard	
C Review the effectiveness of the dashboard to provide information	C1 Drawing conclusions C2 Review dashboard and presentation methods	

Content

Learning aim A: Understand the role of data and information in organisations

A1 Processing information

Identification and the characteristics of data, and how its processed into information.

- Characteristics of raw data: no meaning, structure or context, unprocessed.
- Data preparation processes, e.g. data cleansing, data redundancy, normalisation.
- Characteristics of information including meaning, structure, context.

A2 Data sources and characteristics

Characteristics of data from different sources, and their usefulness for providing information.

- Sources of data and how they can be used to provide information:
 - social media, e.g. user preferences, demographics
 - shop loyalty schemes, e.g. customer shopping habits
 - ATM/cash machines, e.g. customer services
 - census, sensors, e.g. economic and social
 - search engine data, e.g. customer shopping habits
 - mobile phone networks, e.g. usage.
- Data characteristics and reliability considerations:
 - data collection including primary, secondary data
 - size and completeness of data sets
 - data consistency such as ways in which data is recorded, e.g. date format, number format, currency.

A3 Quality of data and its impact on decision making

Factors that affect the quality of data and the data modelling and the impact on decision making.

- Quality of data:
 - source and data collection method
 - completeness of the data
 - data accuracy
 - age of the data.
- Data modelling and its impact on decision making:
 - advertising/marketing, e.g. improved marketing targeting and sales
 - customer engagement/services, e.g. improved customer services
 - performance and operations, e.g. improved productivity and sales
 - financial management, e.g. strategic management
 - predictive analytics, e.g. selling stocks and shares
 - demographic analysis, e.g. marketing campaign.

Learning aim B: Create a dashboard using data manipulation methods

B1 Data processing methods

Applying data processing methods for different purposes.

- Reasons for processing data, e.g. decision making in relation to business processes, customer services, sales-forecasting.
- Presenting data:
 - data types, e.g. text, currency
 - formatting cells, e.g. colours, alignment, borders
 - other formatting, e.g. text wrap, merge
 - charts, e.g. column, line, pie, area, scatter, sunburst, pivot tables.
- Data manipulation methods:
 - importing data
 - formulae, e.g. =A2+B2
 - functions, e.g. =SUM(A2:A33), =AVERAGE(A2:A33), =MAX(A2:A33)
 - decision-making functions, e.g. if, whatif, sumif
 - lookup functions, e.g. vlookup, hlookup, match, index
 - count functions, e.g. countblank, countif
 - logical operators, e.g. not, and, or
 - sort, e.g. multiple columns and values
 - filter, e.g. greater than, equals.
- Other data processing methods:
 - absolute and relative cell referencing
 - macros
 - data validation
 - worksheets, e.g. linking worksheets
 - alternative views, e.g. hiding and unhiding cells, freezing and split planes
 - conditional formatting, e.g. colour-based formatting.

B2 Producing a dashboard

Methods for presenting information in a dashboard.

- Show data summaries from the data set:
 - totals
 - count
 - percentage
 - breakdown, e.g. finance, sales, budget
 - performance, e.g. social media, customer retention rate
 - allocations, e.g. time, budget.
- Presentation methods:
 - tables
 - graphs or charts, e.g. dynamic charts or graphs
 - pivot tables or charts
 - sparklines
 - radio buttons
 - checkboxes.

- Presentation features:
 - font size, style and colour
 - cell borders and shading
 - graphics/animation
 - titles, overall and section titles
 - labelling and data formatting.

Learning aim C: Review the effectiveness of the dashboard to provide information

Effectiveness of the dashboard to enable users to draw conclusions.

C1 Drawing conclusions

- Characteristics of different types of information:
 - trends
 - patterns
 - anomalies.

C2 Review dashboard and presentation methods

Effectiveness of data manipulation methods to enable decision making.

- Dashboard information:
 - information is not misinterpreted
 - information is not biased
 - inaccurate conclusions are not made.
- Presentation methods:
 - form controls, e.g. dropdown menus, spinners
 - tables
 - graphs or charts, e.g. dynamic charts or graphs
 - pivot tables or charts
 - sparklines
 - radio buttons
 - checkboxes
 - conditional formatting
 - allocations, e.g. time, budget.

Assessment criteria

Pass		Merit	Distinction
Learning aim A: Understand the role of data and information in organisations			A.D1 Analyse different ways data is collected and used by organisations and its impact on decision-making.
A.P1 Identify different ways data is collected and used by organisations and its impact on decision-making.	A.M1 Describe different ways data is collected and used by organisations and its impact on decision-making.		
Learning aim B: Create a dashboard using data manipulation methods			B.D2 Demonstrate the use of complex data manipulation methods and data presentation methods to provide a clear and accurate summary of data on the dashboard.
B.P2 Demonstrate the use of some basic data manipulation methods to present data.	B.M2 Demonstrate the use of detailed data manipulation methods to present data.		
B.P3 Demonstrate the use of basic data presentation methods to develop a summary of data on the dashboard.	B.M3 Demonstrate the use of a range of data presentation methods to provide a clear summary of data on the dashboard.		
Learning aim C: Review the effectiveness of the dashboard to provide information			C.D3 Evaluate the effectiveness of the dashboard to present information.
C.P4 Explain how the dashboard presents information.	C.M4 Assess the effectiveness of the dashboard to present information.		

Essential information for assignments

This unit is assessed using a Pearson Set Assignment Brief. A set assignment must be used to assess learners.

Further information for teachers and assessors

Resource requirements

For this unit, learners must have access to:

- a wide range of research resources, largely text and internet based. There are many free-to-use data sets available
- industry standard software, such as spreadsheets, and access to sufficient secure storage space to complete the analysis.

Essential information for assessment decisions

Learning aim A:

For Level 2 Distinction, learners must examine data collection methods used and draw balanced, reasoned conclusions as to the impact on decision-making, using a wide range of relevant examples and demonstrating a sound understanding of the link between the data collection methods and the quality of data.

For Level 2 Merit, learners must examine data collection methods used by organisations and their effect on decision-making, providing some relevant examples and demonstrating an understanding of the link between the data collection methods and quality of data.

For Level 2 Pass, learners must examine data collection methods used by organisations and the ways they are used to aid decision-making, using examples to illustrate their views. They will show some links between the data collection methods and their usefulness to aid decision-making.

Learning aim B

For Level 2 Distinction, learners must select and use effective and relevant methods to accurately manipulate a range of data to provide a clear and accurate summary of data on the dashboard. Methods used should include complex formulas, functions and automated features, e.g. decision-making functions, lookup functions, count functions. The dashboard should contain a wide range of clear and accurate summaries of their manipulated data. These could include charts or graphics, tables, pivot tables and/or sparklines.

For Level 2 Merit, learners must select and use a range of relevant methods to manipulate the data. This includes the use of some advanced formulas and functions and automated features, e.g. buttons/macros, dropdown menus to show a different aspect of the data. Learners must provide clear summaries of data on the dashboard using a range of presentation methods, e.g. different charts/graphs, tables, pivot tables. These must be used appropriately in most places to communicate effective information.

For Level 2 Pass, learners must select and use a range of basic data manipulation methods, such as Sum and Average, and include some advanced functions, such as lookup functions. The dashboard must have summaries of their manipulated data that incorporates mostly appropriate presentation methods, including different charts/graphs and tables. Some presentation methods used must be appropriate for the data being shown and make use of suitable presentation features on their dashboard in most places.

Learning aim C

Learners review the dashboard and its capacity to show appropriate information to enable decision-making.

For Level 2 Distinction, learners must judge the capacity of the dashboard to present information that enables a range of specific, relevant, and clear conclusions to be drawn, such as trends, patterns and possible anomalies.

Learners must make reasoned judgements as to the effectiveness of the dashboard to enable accurate conclusions to be drawn. Their evaluation should consider how information was presented, and the methods and features used to ensure the information was not biased, or likely to be misunderstood.

For Level 2 Merit, learners must examine the capacity of the dashboard to draw specific and relevant conclusions. This must include some trends or patterns. Learners must show an understanding of the effectiveness of the presentation features they have used to ensure the information on the dashboard was not biased or misunderstood.

For Level 2 Pass, learners must examine the capacity of the dashboard to enable simple, mostly accurate conclusions to be drawn. These must include trends and patterns.

Learners must indicate the presentation methods used, and show how they lead to these conclusions being made.

Assessment controls

Time: this assignment has a recommended time-period. This is for advice only and can be adjusted depending on the needs of learners.

Supervision: you should be confident of the authenticity of learners' work. This may mean that learners should be supervised.

Resources: all learners should have access to the same types of resource to complete the assignment.

Research: learners should be given the opportunity to carry out research outside of the learning context if required for the assignment.

Links to other units and curriculum subjects

This unit links to:

- Unit 1: Using IT to Support Information and Communication in Organisations
- Unit 10: Introduction to Database Systems
- International GCSE/core curriculum in Information Technology.

Employer involvement

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

- guest speakers and interview opportunities
- work experience
- dashboard exemplars
- visits to appropriate business organisations.

Opportunities to develop transferable employability skills

In completing this unit, learners will have the opportunity to develop skills in research and planning, problem-solving, innovation, and self-direction.

Unit 3: Setting up a Technology System

Level: 2

Unit type: **Internal**

Guided learning hours: **60**

Unit in brief

Learners will carry out installation activities and investigate why the installation and upgrading of computer hardware and software plays an important part in ensuring that technology systems are able to support the business requirements.

Unit introduction

Technology systems are crucial for organisations to operate effectively, and organisations rely on technology support teams to install, maintain, and regularly update these systems. Hardware components must be replaced when they malfunction and upgraded to support the computer's processing requirements. New versions or updates of application software are required to enable the users to carry out day to day tasks effectively and efficiently.

In this unit, you will examine reasons that technology systems must work efficiently, and why they require the most up-to-date application software/apps to support the business processing requirements.

You will install the internal components of a computer, testing these to ensure that the components have been installed correctly. You will also install and upgrade software applications.

Learning aims

In this unit you will:

- A** Understand hardware and software types and their purposes in business environments
- B** Carry out the installation and configuration of a technology system
- C** Review the effectiveness of the installation process and configuration of a technology system.

Summary of unit

Learning aim	Key content areas	Assessment approach
A Understand hardware and software types and their purposes in business environments	A1 Technology systems A2 Hardware components and their purpose A3 Software and services A4 Upgrading computer hardware and software/apps	<p>A written report on the most suitable hardware components and software/apps for a given scenario.</p> <p>An evaluation of the benefits and implications of installing and upgrading hardware and software in a technology system.</p>
B Carry out the installation and configuration of a technology system	B1 Hardware and software installation process B2 Configuring a technology system	<p>An installation plan to meet user requirements.</p> <p>Evidence of the installation activities for the hardware components and software/apps installation and configuration. The test plan should record the testing process and action taken to rectify faults.</p>
C Review the effectiveness of the installation process and configuration of a technology system	C1 Review checks	<p>A written report that reviews the success of the hardware and software/apps installation and configuration of a technology system against requirements.</p>

Content

Learning aim A: Understand hardware and software types and their purposes in business environments

A1 Technology systems

Purpose, features and functions of technology systems.

- Desktop computer.
- Laptop.
- Mobile device.

A2 Hardware components and their purpose

Purpose, benefits, and implications of installing internal components in a technology system.

- Internal computer hardware components to include: central processing unit (CPU), processor, e.g. AMD, Intel, storage, e.g. SSD, HDD, drives, hard drive, e.g. (HDD), solid state drive (SSD), ATA drive, motherboard, network card, sound and video cards, fan, e.g. heat sink.
- Power Supply Unit (PSU).
- Data cables to include: Integrated Drive Electronics (IDE), Enhanced Integrated Drive Electronics (EIDE), Advanced Technology Attachment (ATA), Serial Advanced Technology Attachment (SATA), Small Computer System Interface (SCSI).
- Wired and wireless peripherals and their purposes to include: keyboard, pointing device, monitor, printer/scanner, headphones/speakers.
- Cables, ports and their uses to include: VGA, DV, USB, HDMI, PS/2, Ethernet, audio, power, Thunderbolt/USB-C.
- Internal mobile device hardware components to include: display screen, System-on-a-chip (SoC), memory/storage/SD card slots, modems, battery, Global Positioning Systems (GPS), camera, sensors – fingerprint, accelerometer, gyroscope, proximity, ambient light, Bluetooth[®], heart rate monitor.

A3 Software and services

Purpose, features and functions of the software and services of a technology system.

- System software to include: operating systems (OS), e.g. Windows[®], macOS, Linux, device drivers, e.g. printer/scanner, firmware, utilities, security, e.g. antivirus, malware.
- Application software to include: word processing, database, spreadsheet, presentation, graphic.
- Web browsers.
- Cloud based storage.
- Email applications.
- Online meeting/video conferencing.
- Specialised software, e.g. project management.
- Android, Apple iPhone[®] apps, Native apps.

A4 Upgrading computer hardware and software/apps

Reasons, benefits, and implications for installing and upgrading hardware and software in a technology system.

- Reasons for upgrading hardware to include: hardware fault and failure, routine maintenance, system requirements, system performance.
- Reasons for upgrading software/apps to include: software updates, hardware drivers, business processes, security management including antivirus, malware, firewall.
- Benefits to include: improved system performance, functionality, productivity/customer service, performance, features, efficiency and reliability, storage capacity, security, reduced cost.
- Implications to include: compatibility, training, cost, health and safety, decommissioning.

Learning aim B: Carry out the installation and configuration of a technology system

Processes and procedures followed when installing and testing a technology system.

B1 Hardware and software installation process

- Preparation:
 - job sheet and procedures
 - backup data
 - resources including tools/hardware components
 - system software, e.g. utility, device drivers, firmware
 - safe working practices/health and safety regulations.
- Installation of the hardware components:
 - safe working practices
 - correct tools/resources to carry out the installation
 - fit new components and reconnect components
 - disposing of packaging.
- Installing/upgrading software
 - locate/download
 - install/upgrade.
- Testing:
 - software tools, e.g. performance monitor, runtime analysers, diagnostic software, utility software:
 - testing strategy for functionality to include testing process and recording documentation
 - troubleshooting
 - system help tools.

B2 Configuring a technology system

- System time and date.
- Desktop image.
- Folder structures/access to folders.
- Software/apps, e.g. style dialogue, shortcut, colours, icons, home screen/desktop.
- Connection set-up, e.g. synchronisation, email configuration, Bluetooth® pairing, locking/unlocking and security.

Learning aim C: Review the effectiveness of the installation process and configuration of a technology system

C1 Review checks

Considerations when reviewing the success of the hardware and software/apps installation and configuration of a technology system against requirements.

- Client/user/system requirements.
- Purpose of the installation.
- Choice of hardware components.
- Choice of software/apps.
- Technology system connectivity.

Assessment criteria

Pass	Merit	Distinction
Learning aim A: Understand hardware and software types and their purposes in business environments		A.D1 Evaluate the benefits and implications of installing and upgrading hardware and software in a technology system.
A.P1 Identify the benefits and implications of installing and upgrading hardware and software in a technology system.	A.M1 Explain the benefits and implications of installing and upgrading hardware and software in a technology system.	
Learning aim B: Carry out the installation and configuration of a technology system		B.D2 Produce a comprehensive plan and install and configure a technology system demonstrating awareness of the user requirements.
B.P2 Produce a basic plan for installing and configuring a technology system. B.P3 Install and configure computer hardware and software in line with own basic planning.	B.M2 Produce a detailed plan for installing and configuring a technology system. B.M3 Install and configure computer hardware and software in line with own detailed planning.	
Learning aim C: Review the effectiveness of the installation process and configuration of a technology system		C.D3 Evaluate how the installation and configuration of a technology system is suitable for the intended purpose demonstrating a sound awareness of the user requirements.
C.P4 Identify how the installation and configuration of a technology system is suitable for the intended purpose.	C.M4 Explain how the installation and configuration of a technology system is suitable for the intended purpose demonstrating awareness of the user requirements.	

Essential information for assignments

The recommended structure of assessment is shown in the unit summary, along with suitable forms of evidence. *Section 6 Internal assessment* gives information on setting assignments and there is also further information on our website.

There is a suggested maximum number of three summative assignments for this unit. The relationship of the learning aims and criteria is:

Learning aim: A (A.P1, A.M1, A.D1)

Learning aim: B (B.P2, B.P3, B.M2, B.M3, B.D2)

Learning aim: C (C.P4, C.M4, C.D3)

Further information for teachers and assessors

Resource requirements

For this unit, learners must have access to a technology system that can be dismantled, repaired and upgraded to meet a brief.

Learners will need access to:

- technology system including desktop computer, laptop and mobile device
- resources, e.g. hardware components and tools
- software and apps
- connection to the internet (download software/apps).

The practical activities should take place in a workshop/computer lab with appropriate tools and take account of health and safety requirements.

Simulators can be used to gain prior experience before handling 'live resources' and software testing tools can be used to support the testing process.

Essential information for assessment decisions

Learning aim A

For Distinction standard, learners must examine the most appropriate hardware components and software/apps for a given scenario, demonstrating a considered and reasoned appreciation of the purpose, benefits, and implications of installing the internal components and software/apps into a technology system. The link between the reasons for the installation and upgrade, and the benefits and implications should be clearly evaluated.

For Merit standard, learners must consider suitable hardware components and software/apps for a given scenario, demonstrating a sound understanding of the purpose, benefits, and implications of installing the internal components and software/apps into a technology system. The link between the reasons for the installation and upgrade, and the benefits and implication, should be clearly explained.

For Pass standard, learners must consider hardware generic components and software/ apps for a given scenario, demonstrating an understanding of the purpose, benefits, and implications of installing the internal components and software/apps into a technology system although evidence may sometimes be generic. Some of the reasons for the installation and upgrade, or some of the benefits and implications, may not be clear.

Learning aim B

For Distinction standard, learners must create a comprehensive installation plan that clearly meets the user and system requirements, that identifies the installation activities, and includes a description of hardware components and software/apps to be installed and configured to meets user requirements.

The learner should provide comprehensive evidence of the installation and configuration of at least two components and at least two software/apps. The test plan should be comprehensive and record the installation and configuration of hardware and software, and how system faults were rectified.

For Merit standard, learners must create a detailed installation plan that meets most of the user and system requirements, that identifies the installation activities, and includes a description of hardware components and software/apps to be installed and configured.

The learner should provide detailed evidence of the installation and configuration of at least two components and at least two software/apps. The test plan should clearly record the installation and configuration of hardware and software, and how most system faults were rectified.

For Pass standard, learners must create a basic installation plan that meets most user and system requirements and identifies the installation activities, a list of components and software/apps to be installed with some basic configuration.

The learner should provide some evidence of the installation and configuration of at least one component and at least one software/app. The test plan should record the installation and configuration of hardware and software, and how some of the system faults were rectified.

Learning aim C

For Distinction standard, learners must judge the success of the component installation and configuration of the technology system against the intended purpose demonstrating a sound awareness of the user requirements. Learners must make well-reasoned judgements as to the effectiveness of the updated technology system against the purpose and the choice of hardware components, software/apps and configuration carried out using a range of relevant examples to support the conclusions.

For Merit standard, learners must examine the success of the component installation and configuration of the technology system against the intended purpose demonstrating a clear awareness of the user requirements. Learners must make sound judgements as to the effectiveness of the updated technology system against the purpose and the choice of hardware components, software/apps and configuration carried out although there may be occasional omissions in the detail. Learners will use good examples to support the explanation.

For Pass standard, learners must consider the success of the component installation and configuration of the technology system against the intended purpose demonstrating some awareness of the user requirements. Learners must make some useful judgements as to the effectiveness of the updated technology system against the purpose and the choice of some hardware components, software/apps and configuration carried out although there may be some gaps in their reasoning and the examples given will be appropriate but limited.

Links to other units and curriculum subjects

This unit links to:

- Unit 1: Using IT to Support Information and Communication in Organisations
- Unit 4: Introduction to Computer Networking
- International GCSE/core curriculum in Information Technology.

Employer involvement

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

- guest speakers and interview opportunities
- work experience
- business material as exemplars
- visits to appropriate business organisations.

Opportunities to develop transferable employability skills

In completing this unit, learners will have the opportunity to develop skills in research and planning, problem-solving, responsibility, and communication.

Unit 4: Introduction to Computer Networking

Level: 2

Unit type: **Internal**

Guided learning hours: **60**

Unit in brief

This unit examines the purpose and features of computer networks, and explores how they are designed, implemented, and tested.

Unit introduction

Computer networking is an important part of our daily business and personal lives that most people take for granted. Without networks, many of the tools and systems used by businesses and individuals would not function: we couldn't surf the web, have video calls, or use a variety of devices such as a smartphone or laptop to communicate with friends and family online, or use games consoles. Security plays an important role in computer networking as organisations need to keep data as secure as possible while protecting their systems against daily threats.

In this unit, you will investigate the network environment and the different security threats it can face, and you will examine the techniques that can be used to defend the network environment and consequently an organisation's business processes.

You will connect computer systems and mobile devices to develop a network environment and will thoroughly test the network to ensure it functions correctly.

Learning aims

In this unit you will:

- A** Understand a computer network environment and security threats
- B** Design a computer network
- C** Implement and test a computer network.

Summary of unit

Learning aim	Key content areas	Assessment approach
A Understand a computer network environment and security threats	A1 Network environments A2 Networks in organisations A3 Security threat types A4 Computer network security measures	A written report that: <ul style="list-style-type: none"> examines network environments in organisations considers the impact of security threats on organisations examines measures used to mitigate network security risks.
B Design a computer network	B1 Factors affecting network design B2 Hardware components in a network B3 Software components in a network B4 Design documentation for a network	A portfolio evidencing: <ul style="list-style-type: none"> the design and implementation of a network for a given brief the testing and optimisation of the network a rationale for the security measures used.
C Implement and test a computer network	C1 Implementing a computer network C2 Testing a computer network	

Content

Learning aim A: Understand a computer network environment and security threats

A1 Network environments

Purpose, types and features of network environments.

- Types of different networks to include Wide Area Network (WAN), Local Area Network (LAN), Personal Area Network (PAN), Virtual Private Network (VPN), Storage Area Network (SAN).
- Physical topologies including star, mesh, tree, ad hoc.
- Methods of connecting a device to a network including: Ethernet, Wi-Fi, Bluetooth®, 3G/4G/5G.
- Features of network environments, e.g. virtualisation, cloud computing, BYOD.
- Protocols and standards including OSI model, TCP/IP, Ethernet standards.
- Hardware components of the network (wired/wireless) including server, routers, switches, hub, cables, nodes, network interface cards (NIC).
- Network software including operating system (client/server), network monitoring, management and troubleshooting tools, application software.

A2 Networks in organisations

Purpose, role and benefits of networks in organisations.

- Communication and accessing information (internal and external to the organisation)
- Supporting business processes.
- Resource sharing and storage/data, e.g. shared printer, cloud computing.
- Collaboration, e.g. online software.
- Entertainment.

A3 Security threat types

Security threats and their impact on organisations.

- Common security threats:
 - internal threat, e.g. unsafe practices, sabotage
 - external threats, e.g. hackers, phishing
 - physical threats, e.g. theft, fire, terrorist action
 - social engineering e.g. phishing (spear phishing/whaling), vishing, smishing, tailgating
 - software driven threats (malware) e.g. Trojan horses, spyware, ransomware, rootkits, worms, keyloggers
 - network-based attacks, e.g. distributed denial-of-service (DDoS), denial-of-service (DoS), man in the middle (MitM), DNS Tunneling
 - weak cyber security measures, including weak passwords/poor password policy, out of date/no anti-malware software, poorly configured firewall, latest security patches not applied
 - impact of the attacks on organisations including loss of data and information, operational or trading, financial loss, reputation damage.

A4 Computer network security measures

The purpose, function and effectiveness of security tools and techniques that organisations use to mitigate attacks.

- User ID and passwords.
- Encryption/Decryption.
- Software including anti-virus/anti-malware, malware removal tools, firewalls, anti-track.
- Software configuration.
- Access control including files and applications.
- Web/wireless security.
- Patch management.
- Training/risk management.
- IT security policy and procedures.

Learning aim B: Design a computer network

Considerations, methods, and procedures involved when designing a peer-to-peer or client-server network.

B1 Factors affecting network design

- Interpreting user requirements, to include:
 - purpose of the network
 - objectives and activities performed to meet objectives
 - details of the users and their roles/function, including the number of users
 - size and geographical spread/location
 - budget
 - constraints, e.g. costs, hardware and software availability, physical environment (e.g. inside or outside, building layout, materials used in the building).

B2 Hardware components in a network

- Features of hardware components:
 - their role and purpose
 - connection methods
 - communication with other components in the intended computer network.
- Choosing hardware components, to include:
 - computer systems, workstations, servers
 - network adapters (wired/wireless)
 - router
 - hub
 - switch
 - network cabling, e.g. fibre optics, UTP, STP, coaxial, connectors
 - wireless, e.g. Wi-Fi, Bluetooth, NFC, RFID.

B3 Software components in a network

- Features of software components:
 - their role and purpose
 - their relationship with other components in the intended computer network.
- Choosing software components, to include:
 - applications, e.g. internet browsers, email, network utilities (remote management), office applications
 - security, e.g. firewall, anti-virus
 - operating system with appropriate utilities capable of operating in a network environment.

B4 Design documentation for a network

Network requirement considerations and the design and testing documentation process.

- Consideration of different network requirements and preparation of design documentation:
 - computer network set-up and configuration, e.g. IP addressing/subnet masks (if appropriate), network utilities, sharing files and folders, access permissions for users, managing user accounts (add, remove and amend), and sharing hardware/software resources, e.g. internet, printers, storage devices
 - network security (potential threats, how the threats can be mitigated)
 - network user rights, e.g. administration rights, access control rights, shared resource rights
 - network design and testing documentation
 - network diagram, e.g. structure of the network, components, positioning of the components, connection medium and IP addresses (if applicable)
 - test plan with test data to test functionality, e.g. testing the connectivity between all devices on the network.

Learning aim C: Implement and test a computer network**C1 Implementing a computer network**

Considerations, methods, and procedures involved when developing a peer-to-peer or client-server network.

- Hardware and software required for implementation:
 - hardware, including:
 - two computer systems/workstations/clients
 - a server
 - simulated software, such as Packet Tracer
 - network adapters
 - network cabling
 - a hub/router/switch
 - software, including:
 - a server operating system
 - operating system, e.g. adding/removing/amending users, sharing files and folders, setting access permissions to files and folders, installing applications, sharing hardware resources, i.e. printer or any other network device
 - security software, e.g. firewall, anti-virus.

C2 Testing the network

Processes for testing computer networks.

- Test computer networks for functionality/connectivity using command tools, e.g. ipconfig and ping.
- Use utilities/services provided by the operating system to test other aspects of the network, e.g. shared resources, user accounts, access control, security file/folder permissions.
- Obtaining and using client and user feedback, e.g. functionality, usability, requirements, performance.
- Improving the computer network, e.g. performance, capacity, accessibility, scalability, reliability, security.

Assessment criteria

Pass	Merit	Distinction
Learning aim A: Understand a computer network environment and security threats		A.D1 Evaluate the effectiveness of computer networks to meet organisation requirements, and security measures used to mitigate potential security risks.
A.P1 Identify the role, type and features of different computer networks used in organisations. A.P2 Identify potential security threats, and security measures used to mitigate risks.	A.M1 Assess the effectiveness of computer networks to meet organisation requirements, and security measures used to mitigate potential security risks.	
Learning aim B: Design a computer network		B.D2 Produce a comprehensive design for a computer network from a given brief, to meet user requirements. C.D3 Justify approaches taken to connect, configure and apply effective security measures to a network environment in line with own comprehensive plan.
B.P3 Identify the user requirements, hardware and software components for a given brief. B.P4 Produce a basic design for a computer network from a given brief, to meet user requirements.	B.M2 Produce a detailed design for a computer network from a given brief, to meet user requirements.	
Learning aim C: Implement and test a computer network		
C.P5 Connect, configure and test a basic network environment applying planned basic security measures. C.P6 Outline approaches and decisions taken in implementing a network environment.	C.M3 Implement a computer network using own detailed design, testing for functionality and connectivity using feedback from others, including rationale for possible improvements. C.M4 Explain approaches and decisions taken in implementing a network environment.	

Essential information for assignments

The recommended structure of assessment is shown in the unit summary, along with suitable forms of evidence. *Section 6 Internal assessment* gives information on setting assignments and there is also further information on our website.

There is a suggested maximum number of three summative assignments for this unit. The relationship of the learning aims and criteria is:

Learning aim: A (A.P1, A.P2, A.M1, A.D1)

Learning aims: B and C (B.P3, B.P4, B.M2, B.D2, C.P5, C.P6, C.M3, C.M4, C.D3)

Further information for teachers and assessors

Resource requirements

For this unit, learners must have access to:

- a wide range of hardware and software resources for the practical aspects of the unit. As a minimum, each learner will need access to computer systems with a network server, hub/router/switch and cabling (if wired), wireless router (if wireless)
- peripherals, e.g. printer/scanner
- facility to connect to the internet
- Learners can also use network simulators, such as Packet Tracer to develop their understanding of the concepts.

Essential information for assessment decisions

Learning aim A

For Distinction standard, learners must evaluate the effectiveness of two different computer networks. They must consider the effectiveness in terms of what an organisation might reasonably expect from such a network.

Learners must consider how different network features are used/applied in each of the identified networks and make a well-reasoned judgement as to their appropriateness. For example, a Personal Area Network (PAN) could be used to connect two offline devices to each other as there would be no need for a server to be implemented. The connections could be wired to ensure a more secure connection.

Learners must consider the features that have been used by the network. They must make clear judgements as to how well these have been used, considering both positive and negative aspects.

Learners must evaluate the impact potential security threats could have on an organisation, along with how effectively the organisation can mitigate against these risks. For example, an internal threat could damage the reputation of an organisation and in order to mitigate against this, security policies would be required so employees are fully aware of the consequences if they were to do anything that falls out of line of these policies.

At this level learners must make appropriate use of technical vocabulary to effectively support the points they make.

For Merit standard, learners must investigate the effectiveness of the identified networks in meeting the expectations of organisations.

They must make sound judgements as to how well different features of the network help them to meet their intended purpose. For example, a wireless connection to a printer has been used rather than a wired one as it will be in a different room etc. At this level some of the points they make may be more generic and the judgement they make may lack support.

Learners must explore the purpose of the network type and provide a partially supported judgement as to its quality and effectiveness in relation to the intended organisation and what they might reasonably expect from such a network.

Learners must assess the potential security threats and how effectively the organisation could mitigate the risks.

At this level learners must make mostly appropriate use of technical vocabulary to effectively support the points they make in their report.

For Pass standard, learners must explore two different network types and successfully identify the role and features of these within an organisation. For example, an organisation might want to share printing resources so a LAN network would be suitable for this.

Learners must explore security threats that could impact computer networks and how these threats could be reduced. At this level however, these are likely to contain several more generic threats. For example, hackers could be a threat to the network, but a firewall could possibly prevent them from accessing it.

At this level learners will make some appropriate use of technical vocabulary, but this may not be sustained.

Learning aim B

Learners will design, develop, and test their own computer network. They have a choice of designing either a **peer-to-peer** or **client-server** network, depending on hardware and software resource availability.

Learners should be given a brief, which will allow them to design a computer network. The brief should ideally be written with a 'client' in mind with clearly stated resource requirements and objectives.

The brief must include the following requirements, as a minimum:

- create at least three network users, one of whom must be a network administrator with full control over the computer network
- create at least five shared folders and seven shared files, with different access permissions for different users
- configure network users, e.g. place in groups, set login restrictions, disable accounts
- create at least one shared hardware network resource, e.g. printer, scanner, external storage device
- configure network users, e.g. add more users, remove existing users, change passwords(s), change access rights, set login restrictions, disable user accounts
- setup use of network utilities, e.g. remote desktop, instant messaging, antivirus, firewall.

For Distinction standard, learners will produce a comprehensive set of designs for a computer network in response to a given brief. Their designs must include a requirement brief that provides a comprehensive overview of the network to be designed, which will include the purpose of the network along with size and possible costs. At this level it is expected that this information will be unambiguous and the designs will meet the user needs. Learners must also consider the hardware and software components to be used in the network.

The design documents must also include set up and configuration, security, user rights, a network diagram and test plan. These documents must be of sufficient clarity and detail that if required a third party could, with minimal difficulty, create the network using the learner's design documentation.

For Merit standard, learners will produce a detailed set of designs for a computer network in response to a given brief. Their designs must include a requirement brief that provides a detailed overview of the network to be designed, which will include the purpose of the network along with size. The designs must meet most of the user needs. Learners must also consider the hardware and software components to be used in the network.

The design documents must also include set up and configuration, security, user rights, network diagram and test plan. These documents must be of reasonable quality so that if required a third party could, with minimal difficulty, partially create the network using the learner's design documentation.

For Pass standard, learners will produce basic designs for the computer network in response to a given brief. The design documents must also include a requirement brief that provides an overview of the network to be designed, which will include the purpose of the network along with size, but there may be some gaps or omissions. At this level, only some of the user needs may be met. Learners must also consider the hardware and software components to be used in the network.

The design documents may be basic and could include set up and configuration, security, user rights, a network diagram and test plan. These documents may be hampered by lack of clarity or omissions so that that a third party would require assistance when attempting to use them to create the network.

Learning aim C

For Distinction standard, learners must make effective use of hardware and software provided in a network environment to produce a fully functional computer network. At this level, the network must have sufficient functionality and performance to allow technical audiences such as managers, and/or other IT personnel to provide feedback. Appropriate security measures should have been applied to the network.

The implemented network must fully link to the designs and meet user requirements. A well-reasoned rationale for improvements must be carried out.

The network must be fully tested for functionality and performance. Feedback from others must be obtained and learners must produce evidence to demonstrate they have interpreted the situation correctly, solved any problems, and fully responded to this feedback.

Learners must consider the approaches that have been used when implementing the network. They must make clear, supported judgements as to why these approaches have been taken.

Learners must also consider any possible improvements that could be made to the network; however, these improvements do not have to be implemented. Appropriate technical language will be used effectively throughout.

For Merit standard, learners must make effective use of hardware and software provided in a network environment to produce a functional computer network. At this level, the network must have some functionality and performance to allow technical audiences such as managers, and/or other IT personnel to provide feedback. Appropriate security measures should have been applied to the network.

The finished network must link to the designs and should meet most user requirements.

The network must be tested for functionality and performance. Feedback from others must be obtained and learners must produce evidence to demonstrate they have interpreted and fully responded to this feedback.

Learners must explore the approaches that have been used when implementing the network. They must make sound judgements as to why these approaches have been taken. Learners must produce a rationale for improvements that could be made to the network, although these improvements do not need to be carried out.

At this level learners must make mostly appropriate use of technical vocabulary to effectively support the points they make in their report.

Learners must also consider any possible improvements that could be made to the network; however, these improvements do not have to be implemented.

For Pass standard, learners must make use of hardware and software provided in a network environment to produce a computer network. At this level, the network may not be fully functional, and performance may be limited but it does address some of the user requirements. Some consideration may have been given to the security measures, but they may not always address the appropriate security threats.

The finished network may not fully link to the designs. The network must be tested for functionality and performance. Feedback from others must be obtained, although it could be brief in parts and learners must produce evidence to demonstrate they have interpreted and responded to this feedback.

Learners must consider the approaches and decisions taken when implementing the network. Some judgements should be made as to why these approaches have been taken but this may not be clear. Learners will generally use appropriate terminology, although this may be inconsistent.

Links to other units and curriculum subjects

This unit links to:

- Unit 3: Setting up a Technology System
- International GCSE/core curriculum in Information Technology.

Opportunities to develop transferable employability skills

In completing this unit, learners will have the opportunity to develop skills in research and planning, problem-solving, responsibility, and communication.

Unit 5: Introduction to Programming

Level: 2

Unit type: **Internal**

Guided learning hours: **60**

Unit in brief

Learners study the key features of programming languages to develop and test software solutions.

Unit introduction

Being able to create software solutions could give you a brilliant opportunity for a varied, interesting, and challenging career that few other vocational sectors can match. Software developers or engineers develop, test, and maintain computer programs that can solve problems or improve productivity.

To create successful software solutions, you must develop good problem-solving and creative-thinking skills.

In this unit, you will learn about different programming paradigms and how to write code to develop a successful program in a chosen language.

You will develop your own software solution to fulfil a brief. You will test your solution for functionality and identify and repair faults. You will review your finished program, and evaluate possible improvements.

This unit is not platform dependent, and a range of program-development environments can be used.

Learning aims

In this unit you will:

- A** Understand the key features of different programming paradigms
- B** Develop and test a software solution
- C** Review the software solution.

Summary of unit

Learning aim	Key content areas	Assessment approach
A Understand the key features of different programming paradigms	A1 Features of event-driven programming A2 Features of object-oriented programming A3 Features of procedural programming	An investigation into each programming paradigm and their suitability for a particular problem(s).
B Develop and test a software solution	B1 Developing software B2 Testing and refining a software solution	A working program in one programming language. Testing documentation that includes the outcomes of testing and any refinements made during development. Refine the solution based on testing. A review on the suitability of the software solution.
C Review the software solution	C1 Software solution review	

Content

Learning aim A: Understand the key features of different programming paradigms

A1 Features of event-driven programming

Features of event-driven programming paradigm, and the comparative advantages and disadvantages to other approaches.

- Features:
 - event loop
 - event trigger
 - event handlers and listeners
 - top-down approach.
- Advantages, such as:
 - simple to learn
 - easy development, e.g. additional functionality through programming events such as control objects
 - flexibility, e.g. code follows a logical order from start to finish.
- Disadvantages, such as:
 - impact on system resources
 - translation limitations
 - program flow.

A2 Features of object-oriented programming

Features of object-oriented programming paradigm, and the comparative advantages and disadvantages to other approaches.

- Features:
 - identification of objects
 - data abstraction
 - modularity
 - classification
 - inheritance
 - polymorphism
 - encapsulation
 - classes
 - methods
 - bottom-up approach.
- Advantages, such as:
 - modular structure
 - easier troubleshooting
 - less coding required when developing larger programs.
- Disadvantages, such as:
 - larger program
 - more complex coding
 - a higher skill level is required than other paradigms.

A3 Features of procedural programming

Features of procedural programming paradigms, and the comparative advantages and disadvantages to other approaches.

- Key features:
 - procedures
 - functions
 - pre-defined functions
 - local variables
 - global variables
 - top-down approach.
- Advantages, such as:
 - easier to code than object-oriented
 - less memory required than for event-driven paradigm.
- Disadvantages, such as:
 - difficult to expand
 - hard to maintain.

Learning aim B: Develop and test a software solution

B1 Developing software

Processes and operations required to develop and refine software.

- Constructs and techniques
 - constants (variables with a constant value that cannot change)
 - operators (arithmetic [+ , − , * , / , %] and logical [< , <= , > , >= , AND , OR , true , false])
 - reserved words
 - input and output commands
 - local variables
 - global variables
 - objects/classes/methods
 - sequence
 - selection
 - iteration
 - subroutines/functions/procedures
 - data types:
 - character
 - string (text)
 - integer and real (numbers)
 - boolean.
 - use of data structures:
 - user-defined data types and record structures
 - arrays.
 - event handling:
 - forms
 - assigning properties to screen components, e.g. buttons, boxes, data validation and drop-down lists
 - actions.

- Good coding practices:
 - comments
 - indentation
 - suitable variable names.

B2 Testing and refining a software solution

Processes required to test and refine a software solution.

- Establish functionality against a test plan with the test data (normal, abnormal and extreme).
- Quality of code, e.g. maintainability, portability and usability.
- Document any improvements/refinements that are made to the software solution.

Learning aim C: Review the software solution

C1 Software solution review

- Criteria for reviewing effectiveness of software solution:
 - user requirements
 - fitness for purpose
 - user experience, e.g. ease of navigation
 - constraints, e.g. programming language, time, device capabilities, memory, connectivity
 - quality of the program, e.g. reliability, usability, efficiency/performance, maintainability, portability
 - strengths and improvements.

Assessment criteria

Pass	Merit	Distinction
Learning aim A: Understand the key features of different programming paradigms		A.D1 Evaluate the suitability of event-driven, object-oriented and procedural programming paradigms for a proposed software solution.
A.P1 Outline the key features of event-driven, object-oriented and procedural programming paradigms. A.P2 Outline the reasons each paradigm is suitable in given situations.	A.M1 Explain the features and suitability of event-driven, object-oriented and procedural programming paradigms for different software development purposes.	
Learning aim B: Develop and test a software solution		BC.D2 Refine the developed program against the test results, justifying changes made to the quality of the code to make it fit for purpose, and making recommendations for further improvement.
B.P3 Develop a program solution for a given brief. B.P4 Test and refine the software solution for functionality and quality.	B.M2 Refine and improve the developed program against the test results.	
Learning aim C: Review the software solution		
C.P5 Identify reasons for changes made at the testing stage. C.P6 Describe how the finished software solution meets the user requirements and is fit for purpose.	C.M3 Explain reasons for changes made at the testing stage. C.M4 Explain how the finished software solution meets the user requirements and is fit for purpose.	

Essential information for assignments

The recommended structure of assessment is shown in the unit summary, along with suitable forms of evidence. *Section 6 Internal assessment* gives information on setting assignments and there is also further information on our website.

There is a suggested maximum number of two summative assignments for this unit.

The relationship of the learning aims and criteria is:

Learning aim: A (A.P1, A.P2, A.M1, A.D1)

Learning aims: B and C (B.P3, B.P4, C.P5, C.P6, B.M2, C.M3, C.M4, BC.D2)

Further information for teachers and assessors

Resource requirements

For learners to have every opportunity to achieve success in this unit, they will require full access to at least one IDE suitable for writing, editing and testing code in the program language selected by the centre.

Essential information for assessment decisions

Learning aim A

For Distinction standard, learners will provide a clear and balanced evaluation of how suitable the three programming paradigms are for different proposed solutions. Three different programming paradigms from the unit content must be used and the advantages and disadvantages of applying them to different proposed solutions evaluated.

The evidence will demonstrate high-quality written/oral communication through use of accurate and fluent technical vocabulary to support a well-structured and considered response that clearly connects chains of reasoning. It will demonstrate a very good understanding of each programming paradigm with no inaccuracies or omissions.

For Merit standard, learners will explain the suitability of the three programming paradigms are for different proposed solutions. They will explain the different programming paradigms as outlined in the unit content.

Overall, the evidence will be logically structured. It will demonstrate a sound understanding of each programming paradigm. The evidence may contain minor inaccuracies or omissions.

For Pass standard, learners will outline the key features of each programming paradigm from the unit content along with the reasons why they could be suitable for applying to different proposed solutions.

Overall, the evidence will be basic in parts and may contain some inaccuracies or omissions.

Learning aims B and C

For Distinction standard, learners must draw on knowledge across the learning aims to optimise the software solution, taking account of test results and the quality of code, e.g. maintainability, portability and usability.

They should justify these changes in terms of the requirements and the features of the language used, and any other constraints. Learners should make at least three specific suggestions for improving the completed program to ensure it is fully functional, well coded and fit for purpose. Learners do not need to implement the enhancements.

For Merit standard, learners must make use of the test results to refine the software solution.

Learners must explain the changes made during testing, and how the solution meets the requirements. The evidence will demonstrate a sound understanding of testing and refining processes. The explanation will be appropriate, but may have minor inaccuracies or omissions.

For Pass standard, learners must use an appropriate programming language to develop a solution for a given brief.

Learners must show that they have tested the solution to make sure it meets identified requirements, refining the solution as required. Learners must demonstrate how the solution meets the requirements, is fit for purpose, and identify any changes made during testing.

Learner descriptions of the effectiveness of the solution will be generally accurate. Their evidence may be basic in parts, for example covering more generic statements that do not link to the context. The evidence may contain some inaccuracies or omissions.

Links to other units and curriculum subjects

This unit links to:

- Unit 8: Introduction to App Development
- International GCSE/core curriculum in Information Technology.

Opportunities to develop transferable employability skills

In completing this unit, learners will have the opportunity to develop skills in research and planning, problem-solving, responsibility, and communication.

Unit 6: Introduction to Digital Graphics and Animation

Level: 2

Unit type: **Internal**

Guided learning hours: **60**

Unit in brief

Learners will design and create digital graphics and animation in response to a client brief.

Unit introduction

Digital graphics and animation are used in nearly all modern digital products to enhance the product and meet user needs. Whether it is characters in a computer game, the interface for a smartphone application (app), or diagrams designed to provide information on a website, digital graphics and animation make the product more engaging for the user and are vital to the success of the product.

In this unit, you will learn about the principles of graphics and animation. You will explore how graphics are used in different situations, and how the different styles, features and properties of graphics impact on their use and effectiveness.

You will learn how to design, create and edit graphics and animation to meet identified requirements, and how to work in a legal and ethical manner when producing graphics for an identified purpose.

Learning aims

In this unit you will:

- A** Explore the use of graphics and animation in digital products
- B** Design digital graphics and animation to meet a client brief
- C** Develop digital graphics and animation to meet a client brief.

Summary of unit

Learning aim	Key content areas	Assessment approach
A Explore the use of graphics and animation in digital products	A1 The purpose of digital graphics and animation A2 Properties of graphics and animation used in digital products	A report exploring the use of digital graphics and animation in a range of contexts.
B Design digital graphics and animation to meet a client brief	B1 Generating ideas B2 Design documents for digital graphics and animation B3 Legal and ethical considerations	A portfolio of evidence produced in response to a brief to include: <ul style="list-style-type: none"> · initial design ideas · detailed design documents for graphic and animation products · a record of pre-existing assets to be used including details of copyright and other legal considerations · a commentary on ethical factors that have been considered in the designs · final digital graphic and animation files.
C Develop digital graphics and animation to meet a client brief	C1 Digital graphics tools C2 Digital animation tools C3 Preparing products for use in a digital product	

Content

Learning aim A: Explore the use of graphics and animation in digital products

A1 The purpose of digital graphics and animation

Use of digital graphics to enhance digital products.

- The purpose of graphics and animation in a digital product:
 - to help explain a concept, e.g. a diagram, chart etc.
 - to improve accessibility for the user
 - to be used as an asset, e.g. button for a user interface, character in a computer game
 - to convey information, e.g. table, chart, infographic
 - to entertain, e.g. a comic, cartoon, meme.
- Characteristics of intended audiences that affect the design and use of digital graphics, e.g. age, interests, level of education.
- Use of digital design elements to help digital graphics and animations meet their intended purpose:
 - use of text – amount of text, font style, size, complexity of language, use of technical terms
 - design style – realistic/photographic, diagram, cartoon, map, 2D/3D
 - use of colour
 - image composition – foreground and background elements, use of visual hierarchy, positioning of elements, e.g. left of screen, next to specific elements.
- Use of digital effects to enhance the graphic or animation and help meet its intended purpose, e.g. blurring, rotation, fading, transitions.

A2 Properties of graphics and animation used in digital products

The properties of digital graphics and animation and the impact on their use and appropriateness for inclusion in digital products.

- Difference in the storage and rendering of bitmap/raster-based and vector-based graphics.
- Typical uses of raster-based and vector-based graphics or animation:
 - raster-based, e.g. photographs, website graphics, print advertising, packaging, computer game assets
 - vector-based, e.g. user interfaces, logos, illustrations, buttons for interactive media products, icons, fonts.
- Properties of graphics and animation that impact on their use and effectiveness – resolution, dimensions, file type, colour mode, compression, file size.
- Impact of the properties of graphics and animations on the:
 - effectiveness of the product, e.g. clarity of message, engagement, readability, ease of use
 - appropriateness for the intended audience
 - load times
 - file size
 - compatibility.

Learning aim B: Design digital graphics and animation to meet a client brief

Conveying design ideas for digital graphics and animations for technical and non-technical audiences in response to a brief.

B1 Generating ideas

- Methods for generating initial ideas in response to a brief:
 - research of similar products
 - mood boards
 - brainstorming
 - thumbnail sketches.
- Seeking feedback from others and refining ideas.

B2 Design documents for digital graphics and animation

- Project design brief to include details of:
 - the target product
 - the target audience
 - any technical considerations, e.g. devices it will be used on, installed application or web-based, performance requirements.
- Design documentation for digital graphics including:
 - a detailed sketch of each graphic
 - colour palettes
 - details of text to be used – content, font/typeface, sizes, styles
 - how digital effects will be used
 - properties of the target graphics, e.g. file size, file types, compression.
- Design documentation and storyboards for digital animation including:
 - summary of the overall story or message
 - detailed sketches of key frames/scenes
 - colour palettes
 - details of text to be used – content, font/typeface, sizes, styles
 - use of digital effects and sounds
 - timings and frame rates
 - intended properties of the target animation, e.g. file size, file types, compression.
- Use of assets/content created by others:
 - identify assets/content to be used
 - summary of any editing or manipulation of the asset that will be required, e.g. cropping, change of file type.

B3 Legal and ethical considerations

Legal and ethical considerations when planning, preparing and developing digital graphics and animation.

- Recording and attributing sources of assets/content created by others:
 - the specific source of the asset, e.g. URL
 - licensing or copyright restrictions to be considered
 - evidence of permissions for use (if required).
- Ethical factors to consider when producing digital content:
 - privacy and confidentiality
 - representation of people of different genders, races, religious beliefs, etc.
 - inappropriate or age-restricted content
 - accessibility.

Learning aim C: Develop digital graphics and animation to meet a client brief

C1 Digital graphics tools

Software tools to produce and prepare raster-based and vector-based graphics to meet the requirements of a brief.

- Tools and techniques for creating digital graphics:
 - freehand draw
 - grouping
 - colour balance
 - filters
 - selection
 - hue and saturation
 - masking
 - layering
 - retouching
 - opacity/transparency
 - importing from external sources
 - editing and combining paths.

C2 Digital animation tools

Software tools to produce digital animation to meet the requirements of a brief.

- Producing and preparing vector-based and raster-based assets for inclusion in an animation as required.
- Tools and techniques for creating digital animation:
 - frame rates
 - onion skinning
 - tweening
 - transitions
 - camera angles
 - movement
 - picture duration
 - rendering
 - importing and applying sound and other externally created assets.

C3 Preparing products for use in a digital product

Preparing digital graphics and animation so that they are suitable for use in an identified digital product.

- Saving, exporting and optimising final graphics and animation so that they are ready for use, including appropriate selection of:
 - resolution
 - dimensions
 - bit depth
 - colour modes
 - file type
 - compression methods
 - file sizes.

Assessment criteria

Pass	Merit	Distinction
Learning aim A: Explore the use of graphics and animation in digital products		A.D1 Evaluate the effectiveness of the use of digital graphics and animation in identified products.
A.P1 Describe the use of digital graphics and animations in identified digital products. A.P2 Describe how the design and properties of digital graphics and animations impact on the effectiveness of identified products.	A.M1 Assess the effectiveness of digital graphics and animation in identified products.	
Learning aim B: Design digital graphics and animation to meet a client brief		B.D2 Produce comprehensive designs for digital graphics and animation, including an assessment of relevant legal and ethical factors, in response to a client's brief.
B.P3 Produce basic designs for digital graphics and animation to meet the client's brief. B.P4 Identify legal and ethical factors considered when responding to the client's brief.	B.M2 Produce detailed and effective designs for digital graphics and animation, including an explanation of relevant legal and ethical factors, in response to a client's brief.	
Learning aim C: Develop digital graphics and animation to meet a client brief		C.D3 Produce effective and optimised digital graphics and animation making use of a range of software tools to fully meet the identified client's needs.
C.P5 Produce digital graphics and animation that make basic use of some appropriate software tools in response to a client's brief.	C.M3 Produce digital graphics and animation making use of a range of software tools to meet the identified client's needs.	

Essential information for assignments

The recommended structure of assessment is shown in the unit summary, along with suitable forms of evidence. *Section 6 Internal assessment* gives information on setting assignments and there is also further information on our website.

There is a suggested maximum number of three summative assignments for this unit.

The relationship of the learning aims and criteria is:

Learning aim: A (A.P1, A.P2 A.M1, A.D1)

Learning aims: B and C (B.P3, B.P4, C.P5, B.M2, C.M3, B.D2, C.D3)

Further information for teachers and assessors

Resource requirements

For this unit, learners must have access to hardware and software that allow them to plan and create digital graphics and animation. Software resources may include:

- Inkscape – Open source vector graphics creation and editing software – <https://inkscape.org/>
- GIMP – Open source graphic editor – <https://www.gimp.org/>
- Blender – Open source 3D creation suite – <https://www.blender.org/>
- Pencil – Open source 2D animation tool – <https://www.pencil2d.org/>
- Synfig Studio – Open source 2D animation software – <https://www.synfig.org/>

Essential information for assessment decisions

Learning aim A

While there is no requirement for a specific number of products, it is recommended that learners examine at least three different digital products. Learners may select the products themselves or tutors may direct learners to suitable products. The products selected must provide suitable opportunity for learners to consider a range of intended audiences and purposes and different uses of digital graphics and animation. Learners should present their evaluation in the form of a report.

For Distinction standard, learners must evaluate the effectiveness of graphics and animation in a number of different digital products.

The evaluation must consider how different elements that make up the identified digital graphics and animations help them meet their intended purpose (including use of text, style, colour, composition and digital effects). Learners should also consider how the properties of the graphics and animations impact on the way they are used, and reach a value judgement as to how well the graphics meet the requirements of the audience and product. Learner must provide supported justifications for the assessment they make.

At this level learners should make appropriate use of technical vocabulary to effectively support the points they make in their report.

For Merit standard, learners must assess the effectiveness of graphics and animation in a number of different digital products.

Their assessment should consider how different elements that make up the identified digital graphics and animations help them meet their intended purpose (including use of text, style, colour, composition and digital effects), but at this level some of the points they make may be more generic and the judgment may not always be supported.

Learners must explore the properties of the graphics and animation and describe how these may impact on their use, but there may be some minor technical inaccuracies, or the exploration of the technical aspects will, at times, not go into sufficient depth. They will consider how this will impact on the product they are included in, but consideration of subsequent impact on the user will not be fully explored.

At this level learners should make mostly appropriate use of technical vocabulary to effectively support the points they make in their report.

For Pass standard, learners will describe the use of digital graphics and animations in identified digital products. They will include a description of how the images are designed and constructed and how these relate to the intended audience.

Learners will describe how the design and properties of digital graphics and animations impact on the effectiveness of identified products. At this level learner responses will make some accurate observations but will not demonstrate multiple chains of reasoning. For example, they might identify that the size of an image could cause problems with load times, but they are unlikely to expand on this.

At this level learners will make some appropriate use of technical vocabulary.

Learning aim B

For Distinction standard, learners must produce comprehensive designs for digital graphics and animation in response to a given scenario.

Learners' research into similar products could be in the form of annotated screen shots of existing products. Their annotations will show insightful consideration of the features of these products and how these can be applied to their own designs. Learners' draft ideas in response to the brief should demonstrate a wide range of design-based skills, for example using mood boards, records of brainstorming sessions and thumbnail sketches. At this stage learners do not need to produce detailed designs for every graphic and animation to be created, but should provide enough detail to allow others to provide feedback on the merits of the suggested ideas, and potential improvements/refinements.

Learners should use the feedback that they receive, along with their initial ideas, to develop a set of detailed design documentation for the graphics and animation they intend to create. The design documentation should be of sufficient clarity and detail (as listed in content area B2) so that, if required, a third party could create the intended products using the learner's design documentation, with minimal difficulty.

Learners must provide a detailed record of the sources of any assets created by others, e.g. sound files, graphics that they intend to use in their products. Their sources table should provide accurate details of where the original source can be found and any editing that will be required. Learners should also, either as a separate document or as part of their sources table, provide relevant details of any restrictions and permissions, as listed in B3. Learners should also produce a supporting document providing an accurate and detailed description of how they have considered ethical factors in the design decision that they have made.

For Merit standard learners must produce detailed and effective designs for digital graphics and animation in response to a given scenario.

Learners' research into similar products that exist could be in the form of annotated screen shots of existing products. The annotations will show some a considered assessment of the features of these products and how these can be applied to their own designs.

Learners' draft ideas in response to the brief will demonstrate a range of design-based skills, for example using mood boards. Learners' ideas as to what will be produced will be appropriate and generally well-considered, but they may not always be sufficient for others to make detailed contributions as to the merits of the suggested ideas, and potential improvements/refinements.

At this level there will be some evidence as to how the feedback that they received on their initial ideas influenced designs, but this will not always be clear.

Learners will produce a set of detailed design documentation for the graphics and animation they intend to create. At this level the design documentation should be of reasonable quality, so that a third party could mostly create the intended products, but there may be some minor difficulties due to lack of detail or clarity in places.

Learners must record the sources of any assets created by others, e.g. sound files, graphics that they intend to use in their products. Their sources table should provide details of where the original source can be found, and any editing that will be required but this may not always be clear. Learners should also provide details of any restrictions and permissions that are relevant (as listed in B3.1), either as a separate document or as part of their sources table. Learners should also produce a supporting document describing how they have considered ethical factors in the design decisions that they have made, but this may not always be fully supported or clearly related to their product. Their documents will be mostly well-reasoned but there may be some inaccuracies or misconceptions.

For Pass standard, learners must produce basic designs for digital graphics and animation in response to a given scenario.

Learners' research into similar products that exist could be in the form of annotated screen shots of existing products. The annotations will show that they have taken into consideration some of the relevant features of similar products. Descriptions as to how these can be applied to their own designs are likely to be appropriate, but may be superficial or generic.

Learners' draft ideas in response to the brief must demonstrate an understanding of design processes, for example using mood boards. Their ideas will give some indication as to what will be produced, however these may not always be clear, making it difficult for others to make contributions as to the merits of the suggested ideas, or any potential improvements/refinements.

At this level there may be some evidence of appropriate use of feedback received to improve their work, but it will be limited.

Learners will produce a set of basic design documentation for the graphics and animation they intend to create. The product and some key design features/tools will be identified in the design documentation, however, it is unlikely that a third party would be able to use them to create the intended products without significant assistance.

Learners must record the sources of any assets created by others, e.g. sound files, graphics that they intend to use in their products. Their sources table should provide mostly accurate details of where the original source can be found. But details of editing required is likely to be omitted or very weak.

Learners will provide some appropriate details of any legal and ethical factors they have considered. However, at this level it is likely to be quite superficial and/or generic.

Learning aim C

Learners will produce digital graphics and animation in response to a brief, as detailed in plans.

For Distinction standard, learners must make effective use of tools and features provided in graphic and animation software to produce a range of graphics and animations to meet the identified client needs. The products produced will show clear brand identity and be suitable for the target audience. At this level, the work produced will show a good understanding of technical aspects of digital graphics and animation, as well as good aesthetic considerations to produce highly effective products.

The final versions of the products will be optimised for inclusion in the target product.

The learners' final digital graphics and animation should be exported into file formats that are suitable for inclusion in the target product, but there is no need to produce the target product for this unit's assessment.

For Merit standard, learners must make mostly appropriate use of tools and features provided in graphic and animation software to produce a range of graphics and animations to mostly meet the identified client needs.

The products produced will show clear brand identity and be suitable for the target audience. At this level, the work produced will show a sound understanding of technical aspects of digital graphics and animation, as well as sound aesthetic considerations to produce highly effective products. However, while most are appropriate, there may still be some features chosen that are less effective or less appropriate for the intended purpose.

The final versions of the products will be exported into file formats that are suitable for inclusion in the target product but may not be fully optimised.

For Pass standard, learners must make some appropriate use of tools and features provided in graphic and animation software to produce a range of basic graphics and animations that make some appropriate use of a limited range of digital graphics and animation tools to meet some of the identified client needs.

The products produced will be mostly suitable for the target audience and/or product but will lack a cohesive brand identity.

At this level, the work produced will show a basic understanding of technical aspects of digital graphics and animation, but there may be some tools or features that are not applied correctly.

The graphics will show some understanding of basic aesthetic considerations, for example they may have chosen and applied suitable colour schemes, but may not always consider relative sizing of components as effectively, or may not apply more advanced tools which would make the work fit the product more cohesively.

The graphics and animations the learner produces will meet most aspects of the brief at a basic level.

The final versions of the products may be exported but these may not always be suitable for inclusion in the target product.

Links to other units and curriculum subjects

This unit links to:

- Unit 1: Using IT to Support Information and Communication in Organisations
- Unit 7: Introduction to Website Development
- Unit 8: Introduction to App Development
- Unit 9: Introduction to Game Design
- International GCSE/core curriculum in Information Technology.

Employer involvement

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

- guest speakers and interview opportunities
- work experience
- business material as exemplars
- visits to appropriate business organisations.

Opportunities to develop transferable employability skills

In completing this unit, learners will have the opportunity to develop research and planning skills as well as creative skills.

They also have opportunities to develop communication skills and how to combine these with creative skills to communicate in different ways depending on purpose and audience.

Unit 7: Introduction to Website Development

Level: 2

Unit type: **Internal**

Guided learning hours: **60**

Unit in brief

Learners investigate the key features of website development to design, develop and test a website.

Unit introduction

With the internet being central to how most organisations and individuals communicate and do business, the creation and maintenance of websites is an important job role. There is a strong demand in the job market for website-developers with appropriate technical and creative skills.

In this unit, you will investigate the features and uses of websites by exploring their purpose and function in different contexts, and how their integrated components and applications interact with each other. You will also learn how to design, develop, and test a website to meet a given brief and user requirements.

Learning aims

In this unit you will:

- A** Understand the uses and features of websites
- B** Design a website to meet user requirements
- C** Develop and test a website to meet user requirements.

Summary of unit

Learning aim	Key content areas	Assessment approach
A Understand the uses and features of websites	A1 Uses of websites by organisations A2 Components of websites	An investigation into different websites to explain their uses and the key components used in meeting their purposes.
B Design a website to meet user requirements	B1 Factors affecting website design B2 Design documentation for a website	Design and develop a website for a given brief. Test and optimise the website based on testing.
C Develop and test a website to meet user requirements	C1 Developing websites C2 Testing websites	

Content

Learning aim A: Understand the uses and features of websites

Factors affecting effective website design, characteristics, and performance.

A1 Uses of websites by organisations

- Purpose of websites, including:
 - promoting products, e.g. e-commerce, or providing a service, e.g. news site, information site, social media, education
 - targeting specific audiences, e.g. gamers, buyers, social networkers, students
- Performance of websites, including:
 - mobile compatibility
 - user friendly and accessible to all users
 - fast load times
 - well formatted content.

A2 Components of websites

- Common frontend components of a website, including:
 - navigation, e.g. hyperlinks, action buttons, hot spots, email links
 - branding, e.g. company logo, organisational colours and font
 - aesthetics, e.g. colours, layout, graphics/video/animation, audio, text, styles (use of style sheets)
 - accessibility, e.g. text to speech.
- Common backend components of a website, including:
 - e-commerce facilities, e.g. order processing
 - shopping cart
 - search facility
 - chat facility, e.g. customer services portal
 - contact forms.

Learning aim B: Design a website to meet user requirements

B1 Factors affecting website design

- Interpreting user requirements, to include:
 - purpose of the website
 - complexity of the website, e.g. frontend and backend components
 - target audience, e.g. age, interests, accessibility.

B2 Design documentation for a website

Components and preparation of design documentation.

- Description of website tasks.
- Description of website features.
- Accessibility considerations, where relevant:
 - vision
 - hearing
 - physical and motor skills
 - learning and literacy.

- User experience (UX) design:
 - information architecture
 - wireframing
 - clickable prototype.
- User interface (UI) design:
 - style guides
 - rendered design
 - rendered click-through design.
- Assets to be used:
 - graphics
 - audio
 - video.
 - animation.
- Application of common frontend/backend website components.

Learning aim C: Develop and test a website to meet user requirements

C1 Developing websites

Tools, features and processes for creating web pages.

- Tools and features including:
 - text
 - tables
 - forms, e.g. text field, text area, buttons, radio buttons, check boxes
 - frames
 - navigation, e.g. menus, hyperlinks (internal and external), anchors
 - interactive components, e.g. hot spots, pop-ups, buttons, menus, rollover images
 - colour schemes, styles and templates, e.g. cascading style sheets, page layout,
 - size and position (text, links, assets, forms), text wrapping, background colours.
- Processes including:
 - embedded multimedia/digital asset content, e.g. digital graphics, digital video, digital audio, digital animation
 - other formatting, e.g. HyperText Markup Language (HTML), Dynamic HyperText Markup Language (DHTML)
 - accessibility features, e.g. alternative tags, zoom features, text-to-speech
 - check browser compatibility to present web pages.

C2 Testing websites

Procedures for testing and refining websites during development.

- Testing websites for functionality, quality and usability.
- Collecting and responding to feedback from others, e.g. on content, presentation, navigation, usability, accessibility, performance and purpose.
- Improve and/or refine the website to improve accessibility, e.g. alternative text tags, zoom features, text to speech features.
- Improve and/or refine the website to enhance performance, e.g. export and compress digital assets, add dynamic functionality.

Assessment criteria

Pass	Merit	Distinction
Learning aim A: Understand the uses and features of websites		A.D1 Evaluate the effectiveness of different websites used by organisations in relation to their purposes and key components.
A.P1 Outline key purposes of different websites used by organisations. A.P2 Outline key components of different websites used by organisations.	A.M1 Explain purposes and key components of different websites used by organisations.	
Learning aim B: Design a website to meet user requirements		B.D2 Produce a comprehensive website design for a given brief. C.D3 Develop a website using own comprehensive design, refining against the test results, including a justified rationale for changes and further improvement.
B.P3 Identify the purpose and user requirements for a given website brief. B.P4 Produce a basic website design to meet user requirements.	B.M2 Produce a detailed website design for a given brief.	
Learning aim C: Develop and test a website to meet user requirements		
C.P5 Develop a website using own design, testing and refining for functionality, quality and usability using feedback from others. C.P6 Explain reasons for changes made to website following feedback and testing.	C.M3 Develop a website using own detailed design, refining the website against the test results, including rationale for changes made.	

Essential information for assignments

The recommended structure of assessment is shown in the unit summary, along with suitable forms of evidence. *Section 6 Internal assessment* gives information on setting assignments and there is also further information on our website.

There is a suggested maximum number of two summative assignments for this unit. The relationship of the learning aims and criteria is:

Learning aim: A (A.P1, A.P2, A.M1, A.D1)

Learning aims: B and C (B.P3, B.P4, C.P5, C.P6, B.M2, C.M3, B.D2, C.D3)

Further information for teachers and assessors

Resource requirements

For learners to have every opportunity to achieve success in this unit, they will require full access to at least one web development application for creating their website.

Essential information for assessment decisions

Learning aim A

For Distinction standard, learners will provide a clear and considered evaluation of how two different websites are effective in relation to their purpose and key components. The frontend and backend components must also be considered. The two websites must have different purposes, e.g. one could be to provide a news service and the other could be selling products.

The evidence will make clear connections between the website design and its purpose, and demonstrate learners' sound awareness of ways in which the key components aid or inhibit the purpose.

For Merit standard, learners will explain the purpose and key components of two different websites. They must explore the frontend and backend components as outlined in the unit content.

The evidence will make some connections between the website design and its purpose.

Learners will demonstrate an awareness of ways in which the key components aid or inhibit the purpose. Some well-reasoned judgements will have been made about the user-experience for a wide range of potential users.

Overall, the evidence will be logically structured. It may be basic in parts, for example covering more generic statements that do not link to the context. The evidence may contain minor inaccuracies or omissions, for example, the name of a regulation may be incorrect.

For Pass standard, learners will outline the key purpose of each website along with the key components as outlined in the unit content.

Overall, the evidence will be logically structured. It may be basic in parts, for example covering more generic statements that do not link to the context. The evidence may contain minor inaccuracies or omissions, for example, the name of a regulation may be incorrect.

Learning aim B

For Distinction standard, learners must draw on knowledge across the learning aim to produce a comprehensive design for a website. The website must contain a minimum of five linked pages.

Learners must thoroughly consider the factors affecting the design of the website, e.g. the user requirements must be fully understood. The design documentation will fully examine considerations needed to produce the desired user experience and user interface, these will meet all criteria given in the design brief. For example, learners will have considered accessibility, have UX and UI designs as well as assets to be used and frontend/backend components to be used.

For Merit standard, learners must consider the factors affecting the design of the website. The design documentation will evidence that they have generally considered the desired user experience and will meet the criteria given in the design brief, although some of their approaches may be generic in nature. For example, learners will have considered accessibility, produced some UX and UI designs, but they may not have considered suitable assets to be used or suitable frontend/backend components to be used.

For Pass standard, Learners must consider the factors affecting the design of the website. The design documentation will evidence that they have generally considered the desired user experience, although there may be some omissions, and will mostly meet the criteria given in the design brief. Their approaches to the design will be appropriate but may be limited in scope. For example, learners will have attempted UX and UI designs, but they may not have fully considered accessibility and may not have considered assets to be used or frontend/backend components to be used.

Learning aim C

For Distinction standard, learners must draw on knowledge across the learning aim to develop a website based on their own comprehensive designs and fully justify their thinking and decisions in the completed rationale. The finished product must fully link to the designs and should make use of all the tools and features as outlined in the unit content.

The website must be fully tested for functionality, quality and usability as well as obtaining feedback from others. Learners must produce evidence to demonstrate they have interpreted and fully responded to this feedback.

Learners must produce evidence of refining the website based on testing and produce a justified rationale for changes made and possible further improvements.

For Merit standard, learners must develop a website based on their own detailed designs.

The finished product must provide some link to the designs and should make use of most of the tools and features as outlined in the unit content.

There must be some evidence of the website being tested for functionality, quality and usability as well as obtaining feedback from others as outlined in the unit content.

Learners must produce some evidence of refining the website based on testing and produce a rationale for changes made.

For Pass standard, learners must develop a website based on their own designs. The finished product may not provide an obvious link to the designs but has used some of the tools and features as outlined in the unit content.

There must be evidence of the website being tested for functionality, quality and usability as well as obtaining feedback from others as outlined in the unit content, although this evidence may be brief in parts.

Learners must produce an explanation of why any changes or refinements were made to the website following testing.

Overall, the evidence will be logically structured. It may be basic in parts, for example covering more generic statements that do not link to the context. The evidence may contain minor inaccuracies or omissions, for example, the name of a regulation may be incorrect.

Links to other units and curriculum subjects

This unit links to:

- Unit 8: Introduction to App Development
- International GCSE/core curriculum in Information Technology.

Opportunities to develop transferable employability skills

In completing this unit, learners will have the opportunity to develop skills in:

- research and planning
- critical thinking
- problem solving
- creativity
- innovation.

Unit 8: Introduction to App Development

Level: 2

Unit type: **Internal**

Guided learning hours: **60**

Unit in brief

Learners study the key features of developing and testing mobile applications (apps).

Unit introduction

The rise of mobile technology, particularly smartphones and tablets, has reinvigorated and transformed the software development market, with countless apps produced daily that inform, educate, or simply entertain.

In this unit, you will discover how to design and create an app, typically through a hybrid of programming constructs. You will focus on the interface techniques of the target device, including voice recognition and gesture control, and on the correct use of third-party libraries that assist development.

Learning aims

In this unit you will:

- A** Investigate apps and mobile devices
- B** Design an app to meet given requirements
- C** Develop and test an app to meet given requirements.

Summary of unit

Learning aim	Key content areas	Assessment approach
A Investigate apps and mobile devices	A1 Typical uses of apps A2 Features of apps A3 Mobile platforms	An investigation into apps for a given purpose.
B Design an app to meet given requirements	B1 Factors affecting app design B2 Design documentation for an app	Production of an app for a given purpose. Testing documentation that includes the outcomes of testing and any refinements made during development. Refining the app based on testing.
C Develop and test an app to meet given requirements	C1 Programming constructs C2 Testing and refining an app	

Content

Learning aim A: Investigate apps and mobile devices

A1 Typical uses of apps

- Uses of apps, including:
 - providing information, e.g. news sites, social media
 - navigation in the physical world, e.g. online maps, global positioning system (GPS) navigation, location identification, nearest facilities such as train stations or food outlet
 - entertainment, e.g. music and video streaming, online gaming
 - leisure and fitness, e.g. fitness tracking, daily steps, workout trackers, diet and calorie monitoring
 - communication, e.g. group messaging, video calling and conferencing
 - augmented reality.

A2 Features of apps

- Key features and characteristics:
 - user-friendliness, e.g. the features of the interface/screens that are presented to the user, ways that the user communicates with the app and makes things happen
 - dependence on hardware
 - interface elements
 - integration with standard operating-system software, e.g. contacts list, text messaging
 - platforms and compatibility.

A3 Mobile platforms

Considerations in relation to mobile platforms when developing apps.

- Awareness of platform types:
 - commercial deployment platforms:
 - Apple iOS® for iPhone, iPad
 - android
 - Windows®
 - free deployment platforms:
 - Java ME
 - web browser.
- Integration with special hardware:
 - multi-touch screen
 - camera
 - microphone
 - Global Positioning System (GPS)
 - accelerometer
 - fingerprint sensor.
- Integration with special software:
 - voice recognition
 - gesture recognition
 - face recognition.

Learning aim B: Design an app to meet given requirements

B1 Factors affecting app design

- Interpreting user requirements, to include:
 - functionality of the app
 - complexity of the app, e.g. basic features and standard UI options, custom UI and real-time features, media processing and real-time sync
 - target audience, e.g. age, interests, accessibility
 - technical features (integration with special hardware/software).

B2 Design documentation for an app

Components and preparation of design documentation.

- Target platform for Apple iOS®, android, Windows®).
- Accessibility considerations, where relevant:
 - vision
 - hearing
 - physical and motor skills
 - learning and literacy.
- User experience (UX) design:
 - information architecture
 - wireframing
 - clickable prototype.
- User interface (UI) design:
 - style guides
 - rendered design
 - rendered click-through design.
- Programming design:
 - pre-defined code
 - flow charts
 - pseudocode
 - control structures
 - data validation.
- Assets to be used:
 - graphics
 - audio
 - video.
- Rationale for design choices and decisions in relation to user requirements.

Learning aim C: Develop and test an app to meet given requirements

C1 Programming constructs

- Processes and operations required to develop and refine software:
 - constants
 - operators
 - arithmetic
 - relational
 - logical.

- Handling data in an app:
 - input and output commands
 - local variables
 - global variables
 - data types:
 - char, integer, real/float, boolean, string.
- Control structures:
 - sequence
 - selection
 - iteration.
- Event driven features of an app:
 - event triggers:
 - touch screen
 - physical button presses
 - gesture-based
 - motion-based
 - sound-based.
 - event handling:
 - common event handlers – on load, click/touch, got focus, lost focus, key/swipe down, key/touch press, text changed
 - custom event handlers
 - adding event handlers
 - raising event handlers
 - removing event handlers.
- Device capabilities for apps:
 - language APIs
 - Android sensor
 - Apple iOS® core motion framework
 - orientation of device:
 - autodetection
 - force orientation mode.

C2 Testing and refining an app

Methods and processes required to test app functionality.

- Functionality testing against a test plan with the test data, e.g. normal, abnormal and extreme.
- Documenting improvements and refinements made to the software solution.
- Refining the app, to include:
 - exporting assets to different file formats
 - improving efficiency of the code
 - redeveloping the user interface.

Assessment criteria

Pass	Merit	Distinction
Learning aim A: Investigate apps and mobile devices		
A.P1 Outline the key features of different apps. A.P2 Outline the uses and mobile platforms for different apps.	A.M1 Explain the features, uses and mobile platforms for different apps.	A.D1 Evaluate the features, uses and mobile platforms for different apps.
Learning aim B: Design an app to meet given requirements		
B.P3 Identify purpose and user requirements for an app. B.P4 Produce a simple app design for a given brief.	B.M2 Produce a detailed app design for a given brief.	B.D2 Produce a comprehensive app design for a given brief.
Learning aim C: Develop and test an app to meet given requirements		
C.P5 Develop and test an app for a given brief. C.P6 Identify the changes made as a result of testing to make the app fit for purpose.	C.M3 Develop and refine the app against the test results. C.M4 Explain the changes made as a result of testing to make the app fit for purpose.	C.D3 Refine the developed app against the test results justifying changes made to the quality of the code to make it fit for purpose and making recommendations for further improvement.

Essential information for assignments

The recommended structure of assessment is shown in the unit summary, along with suitable forms of evidence. *Section 6 Internal assessment* gives information on setting assignments and there is also further information on our website.

There is a suggested maximum number of two summative assignments for this unit. The relationship of the learning aims and criteria is:

Learning aim: A (A.P1, A.P2, A.M1, A.D1)

Learning aims: B and C (B.P3, B.P4, C.P5, C.P6, B.M2, C.M3, C.M4, B.D2, C.D3)

Further information for teachers and assessors

Resource requirements

For learners to have every opportunity to achieve success in this unit, they will require full access to at least one IDE suitable for writing, editing and testing code in the program language selected by the centre.

Essential information for assessment decisions

Learning aim A

Learners review features, uses and platforms of two different apps.

For Distinction standard, learners will provide a clear and balanced evaluation of the two apps designed for a given purpose. The uses, features and platforms will be addressed as outlined in the unit content.

The evidence will demonstrate high-quality written/oral communication through use of accurate and fluent technical vocabulary to support a well-structured and considered response that clearly connects chains of reasoning.

For Merit standard, learners will provide an explanation of the uses, features, and platforms of two apps designed for a given purpose, as outlined in the unit content.

Overall, the evidence will be logically structured and sound. It may occasionally be basic in parts, for example including more generic statements that do not link to the context. The evidence may contain minor inaccuracies or omissions.

For Pass standard, learners will outline the uses of two apps from the unit content along with the features and platforms, and the outlines will be generally correct and appropriate, for example, that Google maps is used for navigation purposes in the real world, providing a user-friendly interface and uses features such as AR for street view.

Learning aim B

For Distinction standard, learners must draw on knowledge across the learning aim to produce a comprehensive design for an app.

Learners must thoroughly consider the factors affecting the design of the app and can fully justify their thinking and decisions in the completed design rationale. The design documentation will fully examine considerations needed to produce the desired user experience and will meet all criteria given in the design brief. For example, learners will have considered accessibility, have UX & UI designs as well as logical flowcharts/pseudocode for program design.

These documents must be of sufficient clarity and detail that if required a third party could, with minimal difficulty, create the mobile app using the learner's design documentation.

At this level learners must make appropriate use of technical vocabulary to effectively support the points they make.

For Merit standard, Learners must consider the factors affecting the design of the app and can explain their decisions in the completed design rationale. The design documentation will evidence that they have generally considered the desired user experience and will meet the criteria given in the design brief, although some of their approaches may be generic in nature. For example, learners will have considered accessibility, produced some UX and UI designs, but they may not have logical flowcharts/pseudocode for program design.

At this level, the design documentation must be of a reasonable quality, so that a third party could mostly create the mobile app, but there may be some minor difficulties due to lack of detail or clarity in places.

For Pass standard, Learners must consider the factors affecting the design of the app and will outline their decisions in the completed design rationale. The design documentation will evidence that they have generally considered the desired user experience, although there may be some omissions, and will mostly meet the criteria given in the design brief. Their approaches to the design will be appropriate but may be limited in scope. For example, learners will have attempted UX and UI designs, but they may not have fully considered accessibility and may not have logical flowcharts/pseudocode for program design.

At this level the designs will provide details of app features that are clearly identifiable, and accurate communication of some key design features/tools, but they may be hampered by lack of clarity or omissions so that a third party would require assistance when attempting to use them to create the mobile app.

Overall, the evidence will be logically structured. It may be basic in parts, for example covering more generic statements that do not link to the context. The evidence may contain minor inaccuracies or omissions.

Learning aim C

For Distinction standard, learners must draw on knowledge across the learning aim to develop an app based on their own comprehensive designs.

Learners must make effective use of tools and features provided in an app development environment to produce an app that clearly and effectively demonstrates the style, purpose and user requirements of the app. At this level, the app must contain sufficient detail and functionality to allow technical audiences such as managers other developers to provide feedback.

The app must be fully tested for functionality, quality and usability as outlined in the unit content.

Learners must produce evidence of refining the app based on testing and produce a justified rationale for changes made to the code and possible further improvements.

For Merit standard, learners must develop an app based on their own detailed designs.

Learners must make effective use of tools and features provided in an app development environment to produce an app that clearly and effectively demonstrates some parts of the style, purpose, and user requirements of the app. At this level, the app must contain sufficient detail and functionality but may have small issues although it will allow technical audiences such as managers or other developers to provide feedback.

There must be some evidence of the app being tested for functionality, quality and usability as outlined in the unit content.

Learners must produce some evidence of refining the app based on testing and produce a rationale for changes made.

For Pass standard, learners must develop an app based on their own designs.

Learners must make use of tools and features provided in an app development environment to produce an app that demonstrates the style, purpose and some user requirements of the app. At this level, the app must contain some detail and some functionality to allow technical audiences such as managers or other developers to provide feedback. Parts of the app will be fully functional but may contain some issues relating to quality.

There must be evidence of the app being tested for functionality, quality and usability as outlined in the unit content, although this evidence may be brief in parts.

Learners must identify the changes made as a result of testing to make the app fit for purpose, which can either be annotated in the code or in a written document.

Overall, the evidence will be logically structured. It may be basic in parts, for example covering more generic statements that do not link to the context. The evidence may contain minor inaccuracies or omissions.

Links to other units and curriculum subjects

This unit links to:

- Unit 5: Introduction to Programming
- International GCSE/core curriculum in Information Technology.

Opportunities to develop transferable employability skills

In completing this unit, learners will have the opportunity to develop skills in research and planning, problem-solving, responsibility, and communication.

Unit 9: Introduction to Games Design

Level: 2

Unit type: **Internal**

Guided learning hours: **60**

Unit in brief

Learners will investigate the features of computer games and how they are designed to meet the expectations of the intended user. Learners will design and promote an idea for a game.

Unit introduction

Computer games development is a large and growing industry that spans the technology and entertainment sectors. From casual games by independent developers that can be played on a smartphone, to the latest 'Triple A' multiplayer game, it is a vast, varied and potentially lucrative industry for computer developers to access.

In this unit, you will explore the basics of computer game design including how the features and design of a game are geared to specific audiences, and the ways in which the expectations of a potential user can be met. You will consider the related technologies and how these affect the gaming experience.

You will apply analytical skills to investigate some existing games and technologies in order to design and promote a game idea in response to a brief.

Learning aims

In this unit you will:

- A** Investigate how computer games meet user expectations
- B** Design a computer game in response to a brief
- C** Present computer game designs to different audiences.

Summary of unit

Learning aim	Key content areas	Assessment approach
A Investigate how computer games meet user expectations	A1 Features of computer games A2 Computer game technologies A3 Target audience	A report exploring the features of computer games for different audiences.
B Design a computer game in response to a brief	B1 Technical design documentation B2 Visual design documentation	A portfolio of evidence produced in response to a brief to include: Detailed game designs including a project brief, visual and technical design documents. A prototype of the game. A selection of formal and promotional materials to convey the game idea to technical audiences.
C Present computer game designs to different audiences	C1 Prototyping C2 Pitching a game design	

Content

Learning aim A: Investigate how computer games meet user expectations

A1 Features of computer games

Features of games that affect style, gameplay and user experience.

- Genre, e.g. puzzle, simulation, platform, action, RPG, MMORPG, arcade, sports, racing.
- Graphic/visual style, e.g. cartoon, realistic, retro, 2D, 3D.
- Gameplay, e.g. rules, plot, objectives, challenges, goals.
- Game mechanics, e.g. player/computer actions, scoring, win conditions, turns, dice.
- Interaction model, e.g. single player, multiplayer.
- Player perspective, e.g. 1st Person, 3rd Person, world view.
- Input method, e.g. keyboard and mouse, game controller, touch screen, motion controller/sensor.
- Delivery/access method, e.g. digital download/install, online, physical media.

A2 Computer game technologies

Characteristics of different computer game technologies and their impact on user experience.

- Gaming technologies:
 - target devices, e.g. personal computers, consoles, mobile devices
 - web based games i.e. games designed to be played in a browser/integrated into a web page
 - cloud based gaming services, e.g. Google Stadia®, GeForce NOW®
 - input and output devices, e.g. 3D headsets, game controllers, motion controllers, touch screens, speakers
 - data connections, e.g. Ethernet, Wi-Fi, cellular/mobile networks
 - storage, e.g. hard drive, optical media, cloud
 - new and emerging technologies.
- Benefits and drawbacks of different gaming technologies.
- Considerations and implications for users including:
 - availability
 - costs, e.g. purchasing costs of game, subscriptions, data costs, equipment, in-app purchases
 - ease of use and accessibility
 - performance, e.g. load times, reaction times, input lag
 - user experience, e.g. gameplay, uniqueness, intuitiveness of controls.

A3 Target audience

The characteristics of a game's intended audience and how these affect the design of a game.

- User/audience characteristics including:
 - age
 - interests
 - physical accessibility considerations, e.g. partially sighted, reduced motor function.

- Gaming preferences, needs and experience including:
 - casual or immersive gaming
 - single player or multiplayer
 - play style, e.g. player-vs-player (PVP), player-vs-environment (PVE), co-op (local/online).

Learning aim B: Design a computer game in response to a brief

B1 Technical design documentation

Game design and documentation for technical and logical requirements of a game when responding to a brief.

- Requirements of the brief, including audience and purpose of the game.
- Game features (as listed in A1).
- Game technologies to be used.
- Game logic and structure design including:
 - Storyboard, e.g. storyline, cutscenes, introduction/instruction levels
 - Flowchart, e.g. logic for game mechanics, user input/decisions, game storyline branching
 - Pseudocode, e.g. planning sections of the game code, solving logical problems for game mechanics.

B2 Visual design documentation

Game design and documentation for visual requirements of a game when responding to a brief.

- Game visuals designs including:
 - colour schemes
 - style guide
 - playable and non-playable characters
 - map/level design
 - background music.
- Sources table for assets/content created by others:
 - identify assets/content to be used
 - summary of any editing or manipulation of the asset that will be required, e.g. cropping, change of file type.

Learning aim C: Present computer game designs to different audiences

C1 Prototyping

Use of game prototypes to demonstrate implementation of select gameplay features.

- Visual style, e.g. playable and non-playable characters, level design, sprite animation.
- Control mechanisms, e.g. player input/control, automated non playable characters.
- Scoring mechanism.
- Asset integration, e.g. raster and vector graphics, animations/videos/ cutscenes, audio.

C2 Pitching a game design

Use and selection of different mediums to present a game design idea to a technical audience.

- Pitching a game to a technical audience including:
 - methods of pitching a game design idea, e.g. formal presentation, business report, feasibility report
 - selection of technical details to be conveyed
 - key features of the game to be included
 - wider considerations, e.g. marketing considerations, trends, costs, uniqueness of idea, similarity to other games
 - repurposing of game content to include in a pitch
 - use of written, verbal and visual assets to convey intended meaning
 - use of tone and language for intended audience and communication method.

Assessment criteria

Pass	Merit	Distinction
Learning aim A: Investigate how computer games meet user expectations		A.D1 Evaluate the effectiveness of computer games in meeting user expectations.
A.P1 Describe how features of computer games meet the expectations of users. A.P2 Explain the benefits and drawbacks of games' technologies used in identified games.	A.M1 Assess the effectiveness of computer games in meeting user expectations.	
Learning aim B: Design a computer game in response to a brief		B.D2 Produce comprehensive technical and visual designs for a computer game.
B.P3 Produce basic technical designs for a computer game. B.P4 Produce basic visual designs for a computer game.	B.M2 Produce detailed and effective technical and visual designs for a computer game.	
Learning aim C: Present computer game designs to different audiences		C.D3 Present your game idea to a technical audience, making convincing use of comprehensive formal communication and a convincing and effective game prototype.
C.P5 Produce a basic game prototype. C.P6 Communicate your game idea to a technical audience, using an appropriate method.	C.M3 Present your game idea to a technical audience, making mostly effective use of formal communication and a mostly effective game prototype.	

Essential information for assignments

The recommended structure of assessment is shown in the unit summary, along with suitable forms of evidence. *Section 6 Internal assessment* gives information on setting assignments and there is also further information on our website.

There is a suggested maximum number of two summative assignments for this unit.

The relationship of the learning aims and criteria is:

Learning aim: A (A.P1, A.P2, A.M1, A.D1)

Learning aims: B and C (B.P3, B.P4, C.P5, C.P6, B.M2, C.M3, B.D2, C.D3)

Further information for teachers and assessors

Resource requirements

For this unit, learners must have access to hardware and software that will allow them to design a game and produce a prototype and promotional materials. This may include office productivity software, graphic and animation software (as listed in Unit 6), and game development environments.

Game development environments may include:

- GameMaker Studio – a low code game development environment
<https://www.yoyogames.com/gamemaker>
- GameSalad – a low code multiplatform game development environment
<https://gamesalad.com/>
- Construct 3 – a low code multiplatform game development environment
Limited free version available <https://www.construct.net/en>
- GoDot Engine – 2D and 3D game design engine (free and open source)
<https://godotengine.org/>
- Stencyl – drag and drop based development environment
<http://www.stencyl.com/>
- Scratch – drag and drop, code block development environment
<https://scratch.mit.edu/>

Essential information for assessment decisions

Learning aim A

While there is no requirement for a specific number of games to be reviewed, it is recommended that at least three different games are considered. Learners may select the games themselves or tutors may direct learners to suitable games. The games selected must provide suitable opportunity for learners to consider a range of intended audiences, features and technologies. Learners must present their review in the form of a report.

For Distinction standard, learners must evaluate the effectiveness of a number of different games. They must consider the effectiveness in terms of what a user might reasonably expect from such a game.

Learners must consider how different game features are used/applied in each of the identified games and make a value judgment as to their quality or appropriateness.

Learners must consider the technologies that have been used in the game or to deliver the game to the user. They must make supported judgements as to the how well these have been used, considering both positive and negative aspects. For example, one game they look at may include the use of Augmented Reality (AR) to impose game characters in the real world while the player explores their surroundings. While this may be creative and engaging, the gaming experience may be hampered on devices with lower quality cameras, or this may exclude younger or less physically able users from playing the game.

Learners must provide well-reasoned and supported justifications for the assessment judgements they make.

At this level learners must make appropriate use of technical vocabulary to effectively support the points they make in their report.

For Merit standard, learners must assess the effectiveness of the identified games in meeting the expectations of the intended users.

They must make judgements as to how well different features used in the game help them to meet their intended purpose. At this level some of the points they make may be more generic and the judgement they make may lack support. They must also consider how the technologies used in/by the games affect their quality and appropriateness.

Learners must explore the purpose of the game and provide partially supported judgements as to their quality and effectiveness in relation to the intended users, and what they might reasonably expect from such a game.

At this level learners must make mostly appropriate use of technical vocabulary to effectively support the points they make in their report.

For Pass standard, learners must provide accurate descriptions of features used in the identified games. They must provide descriptions of how the games are designed and implemented, and how these relate to the expectations of the intended users. At this level however, descriptions are likely to contain a number of more generic considerations.

Learners will explain accurately some of the benefits and drawbacks of the technologies used in the identified games and consider these in relation to user expectations, providing some examples of how these might impact the user. However, at this level the identified benefits, drawbacks and examples will be more generic. The points made will be relevant to the identified game but will lack support.

At this level learners will make some appropriate use of technical vocabulary but this may not be sustained.

Learning aim B

Learners may wish to perform some research, in addition to what they did for Learning Aim A, to examine a range of games similar to that which they intend to design, so that they can get an idea of user expectations, trends etc. They **do not** however need to document that research for this learning aim.

For Distinction standard, learners will produce a comprehensive set of designs for a computer game in response to a given brief. Their designs must include a requirements-brief that provides a comprehensive overview of the game to be designed, which will include the intended audience and purpose of the game. At this level it is expected that this information will be unambiguous.

The design documents must also include designs for the visuals of the game, logic and structure designs and details of the features and technologies to be used in the game. These documents must be of sufficient clarity and detail that if required a third party could, with minimal difficulty, create the prototype and formal pitch materials using the learner's design documentation.

Learners must record the sources of any assets created by others, e.g. sound files, animations that they intend to use in their products. Their sources table must provide details of where the original source can be found and any editing and permissions that will be required.

For Merit standard, learners will produce a detailed and effective set of designs for a computer game in response to a given brief. The design documents must also include designs for the visuals of the game, logic and structure designs, and details of the features and technologies to be used in the game. At this level the design documentation must be of a reasonable quality so that a third party could mostly create the prototype and formal pitch materials, but there may be some minor difficulties due to lack of detail or clarity in places.

Learners must record the sources of any assets created by others, e.g. sound files, animations that they intend to use in their game. Their sources table must provide details of where the original source can be found, and any editing that will be required but this may not always be clear and reference to permissions may be vague in places.

For Pass standard, learners will produce basic designs for a computer game in response to a given brief. The design documents must also include designs for the visuals of the game, logic and structure designs, and details of the features and technologies to be used in the game but there may be some gaps or omissions. At this level the game designs will provide details of game features that are clearly identifiable, and accurate communication of some key design features/tools, but they may be hampered by lack of clarity or omissions so that a third party would require assistance when attempting to use them to create the prototype.

Learners must record the sources of any assets created by others, e.g. sound files, animations that they intend to use in their game. Their sources table must provide details of where the original source can be found. Details of editing and permissions required are likely to be omitted or superficial.

Learning aim C

The prototype **does not** need to be a complete game, it could be a single or even partial level (depending on the type of game). Learners must understand that the purpose of a prototype of this style of task would be to show others what could be made if the game went into full production.

For Distinction standard, learners must make effective use of tools and features provided in a game development environment to produce a prototype for the game that clearly and effectively demonstrates the style, purpose and game mechanics of the game. At this level the prototype must contain sufficient detail and game play to allow technical audiences such as managers or other developers to provide feedback or make decisions on whether to put the game in to full production.

The learner must also produce a set of comprehensive and effective materials to pitch their game design ideas to a technical audience (such as a manager in a game development company). They must make effective use of tools and features provided through their chosen medium and platform to present their pitch. They must provide sufficient details of the game, technical details and wider considerations to convince the audience to put the game in to full production.

For Merit standard, learners must make effective use of tools and features provided in a game development environment to produce a prototype for the game that demonstrates effectively some parts of the game. While it may provide some insight in to the style, purpose and mechanics of the game, at this level the prototype may have some small issues, or may not fully demonstrate some of the game mechanics, resulting in a product that would allow technical audiences such as managers or other developers

to provide feedback or make decisions, but would require them to ask for additional information before they could fully decide on whether to put the game in to full production.

The learner must also produce effective materials to pitch their game design ideas to a technical audience (such as a manager in a game development company). The selection of content, medium and platform must be appropriate for the intended task. However, it may be the case that while most are appropriate there may still be some features chosen that are less effective or less appropriate for the intended purpose.

For Pass standard, learners will produce a basic prototype of the game they have designed. At this level the prototype will provide some insight into the intended style, purpose and mechanics of the game. Parts of the game will be playable and some idea of the game visuals will be demonstrated. However, the prototype may be of limited scope or contain some issues relating to quality. The prototype will allow some basic user testing, but a technical audience would need to ask a number of additional questions before they could fully decide on whether to put the game into full production. Learners must produce some materials to pitch their game idea to a technical audience (such as a manager) to convince them to put the game in to production. Communication, in terms of tools, platforms chosen and quality, will be appropriate but may be of limited scope, or provide only superficial information. For example, while they may provide some technical information in a presentation intended for management, they may have also included less relevant information or presented it in an ambiguous way.

Links to other units and curriculum subjects

This unit links to:

- Unit 1: Using IT to Support Information and Communication in Organisations
- Unit 6: Introduction to Digital Graphics and Animation
- Unit 7: Introduction to Website Development
- International GCSE/core curriculum in Information Technology.

Employer involvement

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

- guest speakers and interview opportunities
- work experience
- business material as exemplars
- visits to appropriate business organisations.

Opportunities to develop transferable employability skills

In completing this unit, learners will have the opportunity to develop research and planning skills as well as problem-solving skills.

Learners will also have opportunities to develop communication skills and including how to communicate in different ways depending on purpose and audience.

Unit 10: Introduction to Database Systems

Level: 2

Unit type: **Internal**

Guided learning hours: 60

Unit in brief

Learners will investigate the use of database systems in organisations and how they support business processes. They will use database software to create and test a relational database to support the decision-making process.

Unit introduction

Database systems play an important role in today's business processes. Without databases storing and interrogating information for decision-making, organisations would not be as efficient. Database systems provide different ways for users to access data, such as sorting the data to provide answers to specific queries, and organising the data into reports for easy interpretation.

In this unit, you will explore how different organisations use database systems, and examine how the information databases provide can assist the decision-making process. You will carry out data manipulations, design and develop a database system using a database application, and review your database system to ensure that it meets the user requirements.

Learning aims

In this unit you will:

- A** Understand the purpose and features of database systems in organisations
- B** Develop a relational database system to meet user requirements
- C** Review the effectiveness of the database system in line with user requirements.

Summary of unit

Learning aim	Key content areas	Assessment approach
A Understand the purpose and features of database systems in organisations	A1 Database role, structure and relationships A2 Types of database systems A3 Tools and techniques	A written report that examines the purpose, function, type, tools and techniques used in database systems.
B Develop a relational database system to meet user requirements	B1 Design and development of a database system B2 Data manipulation B3 Factors affecting the design of a database system	Design and develop a database system to meet user requirements.
C Review the effectiveness of the database system in line with user requirements	C1 Review of the effectiveness of the database system	A written report that evaluates the effectiveness of the system to meet user requirements.

Content

Learning aim A: Understand the purpose and features of database systems in organisations

Features of database systems and their role in supporting decision making.

A1 Database role, structure and relationships

Purpose and role of database system:

- Purpose of a database, e.g. management and organisation of data:
 - centralised data storage
 - reduces data redundancy
 - reduces updating errors
 - increased consistency
 - improved data integrity
 - improved data access and reporting
 - up to date information
 - automated features
 - improved data security
 - reduced costs, e.g. data entry, storage.
- Organise data:
 - database structure including data, tables, records, rows/tuples
 - relationships including one-to-one, one-to-many, many-to-many
 - entity relationship, primary key, foreign key, secondary key.
- Store and extract information:
 - data management, e.g. select, input, edit, delete
 - perform calculations, e.g. analysing financial data, invoice generation
 - presentation of information, e.g. queries, reports.
- Data accuracy, compatibility, consistency, and security.

A2 Types of database systems

Type, features and functions of databases that support business processes.

- Centralised database, e.g. payroll, inventory/stock control, customer/supplier/ patients, scheduling, data analysis, financial management/accounts.
- Personal database, e.g. address book, birthdays, passwords.
- Relational Database/Relational Database Management Systems (RDBMS), e.g. booking system, patient records.

A3 Tools and techniques

The function of different software tools and techniques used in database systems.

- Database functions including retrieve data, update data, modify data, edit data, delete data, search for data, validation and verification rules, index, forms/subforms, sorts, queries, export/ import data.
- Entity Relationship Model (ERD) including entities, attributes, relationships.
- Structured Query Language (SQL), manipulate and retrieve data.
- Reducing redundancy, e.g. normalisation.

Learning aim B: Develop a relational database system to meet user requirements

B1 Design and development of a database system

- Purpose and requirements.
- Constraints.
- Table relationship and structure to include table and field properties, primary key, foreign key.
- Data/field types, size and formats including text, number/numeric, yes/no or true/false date/time, currency.
- Verification and validation.
- Query structure to include table, fields, criteria.
- Data output design including screen designs (input, output).

B2 Data manipulation

Purpose and techniques used in the manipulation of data.

- Report layout including titles, page layout, colours, field selection, date/time, grouping, introductions and images.
- Sorting records using a single field (alphabetically or numerically, ascending and descending) and sort records using multiple fields.
- Creating queries, e.g. with single criteria on one or two fields using relational operators, queries with multiple criteria using at least two tables, making use of logical operators, e.g. AND, OR, NOT, and wildcards.
- Automation, security and usability, e.g. macros, security to protect the database, provide onscreen user navigation and instructions.

B3 Factors affecting the design of a database system

- Functionality of the database system.
- User friendly interface and functions.
- Security.
- Compatibility with other software/systems.
- Scalability and cost.

Learning aim C: Review the effectiveness of the database system in line with user requirements

C1 Review of the effectiveness of the database system

Considerations when reviewing the success of the database system and how it meets the user requirements.

- Purpose and requirements.
- Constraints.
- Fitness for purpose.
- Use of database software tools and techniques
- Strengths and improvements.

Assessment criteria

Pass	Merit	Distinction
Learning aim A: Understand the purpose and features of database systems in organisations		A.D1 Analyse how database systems support and impact the decision-making process.
A.P1 Identify how database systems support and impact the decision-making process.	A.M1 Describe how database systems support and impact the decision-making process.	
Learning aim B: Develop a relational database system to meet user requirements		B.D2 Produce a comprehensive design and develop an effective database system demonstrating an awareness of user requirements.
B.P2 Produce a basic design for a relational database. B.P3 Demonstrate the use of database tools and techniques to develop a basic database system demonstrating an awareness of some user requirements.	B.M2 Produce a detailed design for a relational database. B.M3 Demonstrate the use of a range of database tools and techniques to develop a detailed database system demonstrating an awareness of user requirements.	
Learning aim C: Review the effectiveness of the database system in line with user requirements		C.D3 Evaluate the effectiveness of the database software tools and techniques used to meet user requirements.
C.P4 Describe the ways in which the database software tools and techniques are used to meet user requirements.	C.M4 Assess the effectiveness of the database software tools and techniques used to meet user requirements.	

Essential information for assignments

The recommended structure of assessment is shown in the unit summary, along with suitable forms of evidence. *Section 6 Internal assessment* gives information on setting assignments and there is also further information on our website.

There is a suggested maximum number of three summative assignments for this unit. The relationship of the learning aims and criteria is:

Learning aim: A (A.P1, A.M1, A.D1)

Learning aim: B (B.P2, B.P3, B.M2, B.M3, B.D2)

Learning aim: C (C.P4, C.M4, C.D3)

Further information for teachers and assessors

Resource requirements

For this unit, learners must have access to a variety of different database systems to enable them to investigate database tools and techniques used to support the business process.

Learners require access to database software that allows the creation and use of relational database structures.

For learning aim A, learners will require access to a local database system so that they can integrate the purpose, function, type, tools and techniques used in the database and how it is used to support the business process.

Essential information for assessment decisions

Learning aim A

For Distinction standard, learners must provide a comprehensive analysis of the purpose and type of database systems used in the business process, and the tools and techniques used. Learners must explore how the database systems manage and organise data, and draw conclusions as to how the tools and techniques used (such as data-update, searching, or data-validation and verification and output reports), impact on decision-making. Learners will provide a wide range of relevant examples.

For Merit standard, learners must provide a description of the purpose and type of database systems used in the business process and the tools and techniques used. Learners must consider how database systems manage and organise data and draw some conclusions as to how the tools and techniques used (such as data-update, searching, or data-validation and verification and output reports), impact on decision-making. Learners will provide some relevant examples.

For Pass standard, learners must identify the purpose and type of database systems used in the business process and the tools and techniques used. Learners must outline how database systems manage and organise data and draw a basic conclusion as to how the tools and techniques used (such as data-update, searching, or data-validation and verification and output reports) impact on decision-making. Details exploring how the database system supports and impacts on the decision-making process will be appropriate, but maybe generic or lacking in detail.

Learning aim B

For Distinction standard, learners must create a comprehensive design that clearly meets the user requirements and identifies the purpose and constraints of the database. A comprehensive database structure will:

- include relationships, data types and formats
- define primary and foreign key(s)
- include the validation and verification procedures that would apply to the data.

The design will include a comprehensive input and output screen/form for a main menu with options to access data entry sub-forms, run queries and view reports. All forms should be customised to meet the audience and purpose, e.g. titles and user instructions.

Learners should correctly demonstrate the use of the tools and techniques used to generate:

- at least six appropriate queries that extract meaningful information
- at least three reports to present clear and meaningful information
- customised data-entry forms, to enable entry of data into single and multiple tables with appropriate field formats
- main menu with the option to access the sub-forms.

For Merit standard, learners must create a detailed design that clearly meets most of the user requirements, and that identifies the purpose and constraints of the database. A detailed database structure will:

- include some relationships, data types and formats
- define some primary and foreign key(s)
- include some validation and verification procedures that would apply to the data.

The design will include a detailed input and output screen/form for a main menu with options to access data entry sub-forms, run queries and view reports.

Most forms should be customised to meet the audience and purpose, e.g. titles and user instructions.

Learners should correctly demonstrate the use of the tools and techniques to generate:

- at least four appropriate queries that extract some clear information
- at least two reports to present generally clear and meaningful information
- customised data-entry forms, to enable entry of data into single and multiple tables with appropriate field formats
- main menu with the option to access the sub-forms.

For Pass standard, learners must create a basic design that clearly meets key user requirements and identifies some of the purpose and constraints of the database. The basic database structure will:

- include some relationship data types and formats
- define some primary and foreign key(s)
- include limited validation and verification procedures that would apply to the data.

The design will include a basic input and output screen/form for a main menu, with options to access data entry sub-forms, run queries and view reports. They will demonstrate some basic customisation of the forms to meet audience and purpose, e.g. titles.

Learners should correctly demonstrate the use of the tools and techniques to generate:

- at least three appropriate queries that extract some basic information
- at least two reports to present some basic information, although there may be occasional omissions in the detail.

These will demonstrate some awareness of user requirements. Learners should generally demonstrate the correct use of the tools and techniques to generate and present basic information.

Learning aim C

For Distinction standard, learners must judge the success of the database system in meeting the user requirements, demonstrating a sound awareness of these requirements. Learners must make well-reasoned judgements as to the effectiveness of the software tools and techniques used, giving a wide range of relevant examples to support the conclusions.

For Merit standard, learners must judge the success of the database system in meeting the user requirements, demonstrating a clear awareness of these requirements. Learners must make sound judgements as to the effectiveness of the software tools and techniques used, giving some relevant examples to support the conclusions although there may be occasional omissions in the detail. Learners will use relevant examples to support the explanation.

For Pass standard, learners must judge the success of the database system in meeting the user requirements, demonstrating some awareness of these requirements. Learners must make some judgements as to the effectiveness of the software tools and techniques used, giving some relevant examples, although there may be some gaps in their reasoning and the examples given will be appropriate but limited.

Links to other units and curriculum subjects

This unit links to:

- Unit 1: Using IT to Support Information and Communication in Organisations
- Unit 2: Data and Spreadsheet Modelling
- International GCSE/core curriculum in Information Technology.

Employer involvement

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

- guest speakers and interview opportunities
- work experience
- business material as exemplars
- visits to appropriate business organisations.

Opportunities to develop transferable employability skills

In completing this unit, learners will have the opportunity to develop skills in research and planning, problem-solving, responsibility, and communication.

4 Planning your programme

How do I choose the right BTEC International Level 2 qualification for my learners?

BTEC International Level 2 qualifications come in a range of sizes, each with a specific purpose. You will need to recruit learners very carefully to ensure that they start on the right size of qualification to fit into their study programme and that they take the right pathways or optional units to allow them to progress to the next stage.

Some learners may want to take a number of complementary qualifications or keep their progression options open. These learners may be suited to taking a BTEC International Level 2 Award or Certificate. Learners who then decide to continue with a fuller vocational programme can transfer to a BTEC International Level 2 Extended Certificate or Diploma.

Some learners are sure of the sector in which they wish to work and are aiming for progression into that sector via higher education. These learners should be directed to the two-year BTEC International Level 2 Diploma as the most suitable qualification.

Is there a learner entry requirement?

As a centre, it is your responsibility to ensure that the learners you recruit have a reasonable expectation of success on the programme. There are no formal entry requirements, but we expect learners to have sufficient learning to study at this level.

If learners are studying in English, we recommend that they have attained at least Level B2 in the Common European Framework of Reference for Languages or Pearson Global Scale of English 51. Please see resources available from Pearson at www.pearson.com/english.

What is involved in becoming an approved centre?

All centres must be approved before they can offer these qualifications – so that they are ready to assess learners and so that we can provide the support that is needed. Further information is given in *Section 8 Quality assurance*.

What level of sector knowledge is needed to teach these qualifications?

We do not set any requirements for teachers but recommend that centres assess the overall skills and knowledge of the teaching team to ensure that they are relevant and up to date. This will give learners a rich programme to prepare them for employment in the sector.

What resources are required to deliver these qualifications?

As part of your centre approval, you will need to show that the necessary material resources and workspaces are available to deliver BTEC International Level 2 qualifications. For some units, specific resources are required.

How can Pearson Progress help with planning for these qualifications?

Pearson Progress is a digital support system that supports the delivery, assessment and quality assurance of BTECs in centres. It supports teachers with activities such as course creation, creating and verifying assignments and creating assessment plans and recording assessment decisions.

For further information, see *Section 10 Resources and support*.

Which modes of delivery can be used for these qualifications?

You are free to deliver BTEC International Level 2 qualifications using any form of delivery that meets the needs of your learners. We recommend making use of a wide variety of modes, including direct instruction in classrooms or work environments, investigative and practical work, group and peer work, private study and e-learning.

What are the recommendations for employer involvement?

BTEC International Level 2 qualifications are vocational qualifications and, as an approved centre, you are encouraged to work with employers on design, delivery and assessment to ensure that it is engaging and relevant, and that it equips learners for progression. There are suggestions in many of the units about how employers could become involved in delivery and/or assessment but these are not intended to be exhaustive and there will be other possibilities at local level.

What support is available?

We provide a wealth of support materials, including curriculum plans, delivery guides, sample Pearson Set Assignments, Authorised Assignment Briefs and examples of marked learner work.

You will be allocated a Standards Verifier early on in the planning stage to support you with planning your assessments. There will be extensive training programmes as well as support from our Subject Advisor team.

For further details see *Section 10 Resources and support*.

5 Assessment structure

Introduction

BTEC International Level 2 qualifications are assessed using a combination of *internal assessments*, which are set and marked by teachers, and *Pearson Set Assignments*, which are set by Pearson and marked by teachers.

- Mandatory units have a combination of internal and Pearson Set Assignments.
- All optional units are internally assessed.

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. You must plan the assignments so that learners can demonstrate learning from across their programme.

In administering an internal assignment or a Pearson Set Assignment, 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 7 Administrative arrangements*.

Internal assessment

Our approach to internal assessment for these qualifications will be broadly familiar to experienced centres. It 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 6 Internal assessment*.

Pearson Set Assignment units

A summary of the set assignments for this qualification is given in *Section 2 Structure*. You should check this information carefully, together with the details of the unit being assessed, so that you can timetable learning and assessment periods appropriately. Learners must take the authorised Pearson Set Assignment for the set assignment unit. Teachers are not permitted to create their own assessments for set assignment units. Some assignments may need to be taken in controlled conditions. These are described in each unit.

Please see *Section 6* for resubmission and retaking regulations.

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 *BTEC International Quality Assurance Handbook*.

All members of the assessment team need to refer to this document.

For BTEC International Level 2 qualifications, 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. Centres 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 international standards.

All units in these qualifications are internally assessed but Pearson sets the assignments for some of the units.

Principles of internal assessment (applies to all units)

Assessment through assignments

For all units, the format of assessment is an assignment taken after the content of the unit, or part of the unit if several assignments are used, has been delivered.

An assignment may take a variety of forms, including practical and written types.

An assignment is a distinct activity, completed independently by learners, that is separate from teaching, practice, exploration and other activities that learners complete with direction from teachers.

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. 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. For most units, teachers will set the assignments. For Pearson Set Assignment units, Pearson will set the assignment.

Assessment decisions through applying unit-based criteria

Assessment decisions for BTEC International Level 2 qualifications are based on the specific criteria given in each unit and set at each grade level. To ensure that standards are consistent in the qualification and across the suite as a whole, the criteria for each unit have been defined according to a framework. The way in which individual units are written provides a balance of assessment of understanding, practical skills and vocational attributes appropriate to the purpose of qualifications.

The assessment criteria for a unit are hierarchical and holistic. For example, if a Merit criterion requires the learner to show 'analysis' and the related Pass criterion requires the learner to 'explain', then to satisfy the Merit criterion, a learner will need to cover both 'explain' and 'analyse'. The unit assessment grid shows the relationships between the criteria so that assessors can apply all the criteria to the learner's evidence at the same time. In *Appendix 2: Glossary of terms used*, we have set out a definition of terms that assessors need to understand.

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 therefore 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 therefore 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 qualification.

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.

The assessment team

It is important that there is an effective team for internal assessment. There are three key roles involved in implementing assessment processes in your centre, each with different interrelated responsibilities; the roles are listed below. There is detailed information in the *BTEC International Quality Assurance Handbook*.

- The Lead Internal Verifier (the Lead IV) has overall responsibility for the programme, its assessment and internal verification, record keeping and liaison with the standards verifier, ensuring our requirements are met. The Lead IV acts as an assessor, standardises and supports the rest of the assessment team, making sure that they have the information they need about our assessment requirements and organises training, making use of our standardisation, guidance and support materials.
- Internal Verifiers (IVs) oversee all assessment activities in consultation with the Lead IV. They check that assignments and assessment decisions are valid and that they meet our requirements. IVs will be standardised by working with the Lead IV. Normally, IVs are also assessors but they do not verify their own assessments.
- Assessors set or use assignments to assess learners. Before making any assessment decisions, assessors participate in standardisation activities led by the Lead IV. They work with the Lead IV and IVs to ensure that the assessment is planned and carried out in line with our requirements.

Effective organisation

Internal assessment needs to be well organised so that the progress of learners can be tracked and so that we can monitor that assessment is being carried out. We support you through, for example, providing training materials and sample documentation.

Our online Pearson Progress service can help support you in planning and record keeping. Further information on using Pearson Progress can be found in *Section 10 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 qualifications. 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 learners 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.

Making valid assessment decisions

Authenticity of learner work

Once an assessment has begun, learners must not be given feedback on progress towards fulfilling the targeted criteria.

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 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.

Assessors must complete a declaration that:

- to the best of their knowledge 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 7 Administrative arrangements*.

Making assessment decisions using criteria

Assessors make judgements using the criteria. 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. For example, the inclusion of a concluding section may be insufficient to satisfy a criterion requiring 'evaluation'.

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

- the *Essential information for assessment decisions* section in each unit gives examples and definitions related to terms used in the criteria
- the explanation of key terms in *Appendix 2: Glossary of terms used*
- examples of assessed work provided by Pearson
- your Lead IV and assessment team's collective experience.

Pass and Merit criteria relate to individual learning aims. The Distinction criteria as a whole relate to outstanding evidence across the unit. Therefore, criteria may relate to one learning aim (for example A.D1) or to several learning aims (for example AB.D1). Distinction criteria make sure that learners have shown that they can perform consistently at an outstanding level across the unit and/or that they are able to draw learning together across learning aims.

Issuing assessment decisions and feedback

Once the assessment team has completed the assessment process for an assignment, the outcome is a formal assessment decision. This is recorded formally and reported to learners.

The information given to the learner:

- must show the formal decision and how it has been reached, indicating how or where criteria have been met
- may show why attainment against criteria has not been demonstrated
- must not provide feedback on how to improve evidence
- must be validated by an IV before it is given to the learner.

Planning and record keeping

For internal processes to be effective, an assessment team needs to be well organised and keep effective records. The centre will work closely with us so that we can ensure that standards are being satisfied and achieved. This process gives stakeholders confidence in the assessment approach.

The programme must have an assessment plan validated by the Lead IV.

When producing a plan, the assessment team needs to consider:

- the time required for training and standardisation of the assessment team
- the time available to undertake teaching and carry out assessment, taking account of when learners may complete assessments and when quality assurance will take place
- the completion dates for different assignments and the name of each Assessor
- who is acting as the Internal Verifier for each assignment and the date by which the assignment needs to be internally verified

- setting an approach to sampling assessor decisions through internal verification that covers all assignments, assessors and a range of assessment decisions
- how to manage the assessment and verification of learners' work so that they can be given formal decisions promptly
- how resubmission opportunities can be scheduled.

The Lead IV will also maintain records of assessment undertaken. The key records are:

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

There are examples of records and further information in the *BTEC International Quality Assurance Handbook*.

Setting effective assignments (applies to all units without Pearson Set Assignments)

Setting the number and structure of assignments

This section does not apply to set assignment units. In setting your assignments, you need to work with the structure of assignments shown in the *Essential information for assignments* section of a unit. This shows the structure of the learning aims and criteria that you must follow and the recommended number of assignments that you should use. For these units we provide sample Authorised Assignment Briefs and we give you suggestions on how to create suitable assignments. You can find these materials on our website. In designing your own assignment briefs, you should bear in mind the following points:

- The number of assignments for a unit must not exceed the number shown in *Essential information for assignments*. However, you may choose to combine assignments, for example, to create a single assignment for the whole unit.
- You may also choose to combine all or parts of different units into single assignments, provided that all units and all their associated learning aims are fully addressed in the programme overall. If you choose to take this approach, you need to make sure that learners are fully prepared so that they can provide all the required evidence for assessment and that you are able to track achievement in the records.
- A learning aim must always be assessed as a whole and must not be split into two or more assignments.
- The assignment must be targeted to the learning aims but the learning aims and their associated criteria are not tasks in themselves. Criteria are expressed in terms of the outcome shown in the evidence.
- For units containing synoptic assessment, the planned assignments must allow learners to select and apply their learning, using appropriate self-management of tasks.
- You do not have to follow the order of the learning aims of a unit in setting assignments but later learning aims often require learners to apply the content of earlier learning aims and they may require learners to draw their learning together.

- 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.
- As assignments provide a final assessment, they will draw on the specified range of teaching content for the learning aims. The specified 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 one practical performance, or an investigation of one organisation, then they will address all the relevant range of content that applies in that instance.

Providing an assignment brief

A good assignment brief is one that, through providing challenging and realistic tasks, motivates learners to provide appropriate evidence of what they have learned.

An assignment brief should have:

- a vocational scenario – this could be a simple situation or a full, detailed set of vocational requirements that motivates the learner to apply their learning through the assignment
- clear instructions to the learner about what they are required to do, normally set out through a series of tasks
- an audience or purpose for which the evidence is being provided
- an explanation of how the assignment relates to the unit(s) being assessed.

Forms of evidence

BTECs have always allowed for a variety of forms of evidence to be used – provided that they are suited to the type of learning aim being assessed. For many units, the practical demonstration of skills is necessary and, for others, learners will need to carry out their own research and analysis. The units give you information on what would be suitable forms of evidence to give learners the opportunity to apply a range of employability or transferable skills. Centres may choose to use different suitable forms of evidence to those proposed. Overall, learners should be assessed using varied forms of evidence.

Full definitions of types of assessment are given in *Appendix 2: Glossary of terms used*. These are some of the main types of assessment:

- written reports
- projects
- time-constrained practical assessments with observation records and supporting evidence
- recordings of performance
- sketchbooks, working logbooks, reflective journals
- presentations with assessor questioning.

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
- allow the learner to produce evidence that is their own independent work
- allow a verifier to independently reassess the learner to check the assessor's decisions.

For example, when you are using performance evidence, you need to think about how supporting evidence can be captured through recordings, photographs or task sheets. Centres need to take particular care that learners are enabled to produce independent work. For example, if learners are asked to use real examples, then best practice would be to encourage them to use their own or to give the group a number of examples that can be used in varied combinations.

Late completion, resubmission and retakes (applies to all units including Pearson Set Assignment units)

Dealing with late completion of assignments for internally-assessed units

Learners must have a clear understanding of the centre policy on completing assignments by the deadlines that you give them. Learners may be given authorised extensions for legitimate reasons, such as illness at the time of submission, in line with your centre policies.

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 do not complete assignments by your planned deadline or by the authorised extension deadline may not have the opportunity to subsequently resubmit.

If you accept a late completion by a learner, then the assignment should be assessed normally when it is submitted, using the relevant assessment criteria.

Resubmission of improved evidence for internally-assessed units

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 can be done in such a way that it 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 assessor considers that the learner will be able to provide improved evidence without further guidance and that the original evidence submitted has been authenticated by both the learner and assessor and remains valid.

Once an assessment decision has been given to the learner, the resubmission opportunity must have a deadline within 15 working days after the timely issue of assessment feedback to learners, which is within term time in the same academic year.

A resubmission opportunity must not be provided where learners:

- have not completed the assignment by the deadline without the centre's agreement
- have submitted work that is not authentic.

We recognise that there are circumstances where the resubmission period may fall outside of the 15-day limit owing to a lack of resources being available, for example, where learners may need to access a performance space or have access to specialist equipment. Where it is practical to do so, for example, evaluations, presentations, extended writing, resubmission must remain within the normal 15-day period.

Retake of internal assessment

A learner who has not achieved the level of performance required to pass the relevant learning aims after resubmission of an assignment may be offered a single retake opportunity using a new assignment. The retake may be achieved at a Pass only.

The Lead Internal Verifier must authorise a retake of an assignment only in exceptional circumstances where they believe it is necessary, appropriate and fair to do so.

The retake is not timebound and the assignment can be attempted by the learner on a date agreed between the Lead IV and assessor within the same academic year.

For further information on offering a retake opportunity, you should refer to the *BTEC Centre Guide to Internal Assessment*. Information on writing assignments for retakes is given on our website (www.btec.co.uk/keydocuments).

7 Administrative arrangements

Introduction

This section focuses on the administrative requirements for delivering a BTEC qualification. It is of particular 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 assessment. You need to refer to the *International Information Manual* for information on making registrations for the qualification.

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

Assessments need to be administered carefully to ensure that all learners are treated fairly, and that results and certification are issued on time to allow learners to progress to their chosen progression opportunities.

Our equality policy requires that all learners should 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 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 that 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 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 the *International Information Manual*. We may ask to audit your records, so they must be retained as specified.

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 *Guidance for reasonable adjustments 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 above). You can give 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 if they are 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 not being conducted fairly. 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 the document *Enquiries and appeals about Pearson vocational qualifications and end point assessment policy*.

Conducting set assignments

Centres must make arrangements for the secure delivery of Pearson Set Assignments.

At least one Pearson Set Assignment will be available each year for each unit with an additional one provided for resit. Centres must not select an assignment that learners have attempted already.

Each set assignment unit will contain instructions in the *Essential information for assignments* section on how to conduct the assessment of that unit.

Some set assignments will need to be taken with limited controls. Limited controls are described in each unit and may include the following conditions:

- Time: each assignment has a recommended time period. This is for advice only and can be adjusted depending on the needs of learners.
- Supervision: you should be confident of the authenticity of learners' work. This may mean that learners should be supervised.
- Resources: all learners should have access to the same types of resources to complete the assignment.
- Research: learners should be given the opportunity to carry out research outside of the learning context if required for the assignment.

Schools and colleges must be able to confirm that learner evidence is authentic.

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 and maladministration in vocational qualifications*, available on our website.

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 and maladministration in vocational qualifications* document gives comprehensive 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 and 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.

Learner malpractice

Learner malpractice refers to any act by a learner that compromises or which seeks to compromise the process of assessment or which undermines the integrity of the qualifications or the validity of results/certificates.

Learner malpractice in examinations **must** be reported to Pearson using a *JCQ Form M1* (available at www.jcq.org.uk/exams-office/malpractice). The form should be emailed to candidatemalpractice@pearson.com. Please provide as much information and supporting documentation as possible. Note that the final decision regarding appropriate sanctions lies with Pearson.

Failure to report malpractice constitutes staff or centre malpractice.

Staff/centre malpractice

Staff and centre malpractice includes both deliberate malpractice and maladministration of our qualifications. As with learner malpractice, staff and centre malpractice is any act that compromises or which seeks to compromise the process of assessment, or which undermines the integrity of the qualifications or the validity of results/certificates.

All cases of suspected staff malpractice and maladministration **must** be reported immediately, before any investigation is undertaken by the centre, to Pearson on a *JCQ Form M2* (available at www.jcq.org.uk/exams-office/malpractice).

The form, supporting documentation and as much information as possible should be emailed to pqsmalpractice@pearson.com. Note that the final decision regarding appropriate sanctions lies with Pearson.

Failure to report malpractice itself constitutes malpractice.

More-detailed guidance on malpractice can be found in the latest version of the document *JCQ Suspected Malpractice Policies and Procedures*, available at www.jcq.org.uk/exams-office/malpractice.

Sanctions and appeals

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

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

- 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 of staff) and from individual members (in respect of a decision taken against them personally). Further information on appeals can be found in our document *Enquiries and appeals about Pearson vocational qualifications and end point assessment 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 components for a qualification, the centre can claim certification for the learner, provided that quality assurance has been successfully completed. For the relevant procedures, please refer to our *International Information Manual*. You can use the information provided on qualification grading to check overall qualification grades.

Changes to qualification requests

Where a learner who has taken a qualification wants to resit a unit to improve their qualification grade, you firstly need to decline their overall qualification grade. You may decline the grade before the certificate is issued.

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 the following documentation. These documents are reviewed annually and are reissued if updates are required.

- *BTEC International 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.
- *International Information Manual*: this gives procedures for registering learners for qualifications, transferring registrations and claiming certificates.
- *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.

8 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 and diversity legislation and/or regulations.
- Centres should refer to the *Further information for teachers and assessors* section in individual units to check for any specific resources required.

Continuing quality assurance and standards verification

On an annual basis, we produce the *BTEC International Quality Assurance Handbook*. It contains detailed guidance on the quality processes required to underpin robust assessment and internal verification.

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; the centre must abide by these conditions throughout the period of delivery
- Pearson makes available to approved centres resources and processes that exemplify assessment and appropriate standards. Approved centres must use these 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.

The methods we use to do this for BTEC Level 2 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
- 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, for example, making sure that synoptic units are placed appropriately in the order of delivery of the programme.

Centres that do not fully address and maintain rigorous approaches to delivering, assessing and quality assurance cannot seek certification for individual programmes or for all BTEC Level 2 programmes. 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.

9 Understanding the qualification grade

Awarding and reporting for the qualification

This section explains the rules that we apply in awarding a qualification and in providing an overall qualification grade for each learner. It shows how all the qualifications in this sector are graded.

Eligibility for an award

In order to be awarded a qualification, a learner must complete all units, AND achieve a Pass or above in all mandatory units unless otherwise specified. Refer to the structure in *Section 2 Structure*.

To achieve any qualification grade, learners must:

- complete and have an outcome (D, M, P or U) for all units within a valid combination
- achieve the **required units at Pass or above** shown in *Section 2*, abiding by the minimum requirements in the compensation table below
- achieve the **minimum number of points** at a grade threshold.

It is the responsibility of a centre to ensure that a correct unit combination is adhered to. Learners who do not achieve the required minimum grade (P) in units shown in the structure will not achieve a qualification.

Learners who do not achieve sufficient points for a qualification or who do not achieve all the required units may be eligible to achieve a smaller qualification in the same suite, provided they have completed and achieved the correct combination of units and met the appropriate qualification grade points threshold.

Calculation of the qualification grade

These qualifications are Level 2 qualifications and the certification may show a grade ranging from Level 2 Pass to Level 2 Distinction*. Please refer to the *Calculation of qualification grade* table for the full list of grades. Each individual unit will be awarded a grade of Level 2 Pass, Merit, Distinction. Learners whose level of achievement is below a Level 2 Pass will receive an unclassified (U) for that unit. Distinction* is not available at unit level. Award of Distinction* (D*) D* is an aggregated grade for the qualification, based on the learner's overall performance. In order to achieve this grade, learners will have to demonstrate a strong performance across the qualification as a whole.

To achieve a Level 2 qualification, learners must:

- complete and report an outcome for all units within the permitted combination (NB Unclassified is a permitted unit outcome), and
- achieve the minimum number of points at a grade threshold – see the *Calculation of qualification grade* table with the following allowable tolerances.

Qualification	Units required at Pass or above	Unit equivalence
Award (120 GLH)	All units must be achieved at Pass or above	0 units
Certificate (240 GLH)	All units must be achieved at Pass or above	0 units
Extended Certificate (360 GLH)	Mandatory units must be achieved at Pass or above, 60 GLH only at U grade permitted from optional units	e.g. 1 ´ 60 GLH unit
Diploma (480 GLH)	Mandatory units must be achieved at Pass or above, 120 GLH only at U grade permitted from optional units	e.g. 2 ´ 60 GLH units OR 1 ´ 120 GLH unit

Points available for unit size and grades

The table below shows the **number of points scored per 10 guided learning hours** at each grade.

Points per grade per 10 Guided Learning Hours			
Unclassified	Level 2 Pass (P)	Level 2 Merit (M)	Level 2 Distinction (D)
0	4	6	8

We will automatically calculate the qualification grade for your learners when your learner unit grades are submitted. Learners will be awarded qualification grades for achieving the sufficient number of points within the ranges shown in the *Calculation of qualification grade* table.

Example

A learner achieves a Level 2 Pass grade for a unit. The unit size is 30 guided learning hours (GLH). Therefore, they gain 12 points for that unit, i.e. 4 points for each 10 GLH, so 12 points for 30 GLH.

Calculation of qualification grade

Award		Certificate		Extended Certificate		Diploma	
120 GLH		240 GLH		360 GLH		480 GLH	
Grade	Points threshold	Grade	Points threshold	Grade	Points threshold	Grade	Points threshold
U	0	U	0	U	0	U	0
Level 2 Pass	48	Level 2 PP	96	Level 2 PP	144	Level 2 PP	192
		Level 2 MP	114	Level 2 MP	174	Level 2 MP	234
Level 2 Merit	66	Level 2 MM	132	Level 2 MM	204	Level 2 MM	276
		Level 2 DM	150	Level 2 DM	234	Level 2 DM	318
Level 2 Distinction	84	Level 2 DD	168	Level 2 DD	264	Level 2 DD	360
		Level 2 D*D	174	Level 2 D*D	270	Level 2 D*D	366
Level 2 Distinction*	90	Level 2 D*D*	180	Level 2 D*D*	276	Level 2 D*D*	372

This table shows the minimum thresholds for calculating 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.

The tables below give examples of how the overall grade is determined.

Examples used are for illustrative purposes only. Other unit combinations are possible, see *Section 2 Structure*.

Example 1

Achievement of a Certificate with a Level 2 MM grade

	GLH	Weighting (GLH/10)	Grade	Grade points	Points per unit (weighting × grade points)
Unit 1	60	6	Level 2 Merit	6	36
Unit 2	60	6	Level 2 Pass	4	24
Unit 3	60	6	Level 2 Merit	6	36
Unit 4	60	6	Level 2 Merit	6	36
Qualification grade totals	240	24	Level 2 MM		132

The learner has sufficient points for a Level 2 MM grade.

Example 2

Achievement of a Certificate with a Level 2 D*D* grade

	GLH	Weighting (GLH/10)	Grade	Grade points	Points per unit (weighting × grade points)
Unit 1	60	6	Level 2 Distinction	6	48
Unit 2	60	6	Level 2 Distinction	8	48
Unit 3	60	6	Level 2 Merit	6	36
Unit 4	60	6	Level 2 Distinction	8	48
Qualification grade totals	240	24	Level 2 D*D*		180

The learner has sufficient points for a Level 2 D*D* grade.

Example 3

Achievement of an Extended Certificate with a Level 2 MP grade

	GLH	Weighting (GLH/10)	Grade	Grade points	Points per unit (weighting × grade points)
Unit 1	60	6	Level 2 Pass	4	24
Unit 2	60	6	Level 2 Pass	4	24
Unit 3	60	6	Level 2 Merit	6	36
Unit 4	60	6	Level 2 Pass	4	24
Unit 5	60	6	Level 2 Pass	4	24
Unit 6	60	6	Level 2 Distinction	8	48
Qualification grade totals	360	36	Level 2 MP		180

The learner has sufficient points for a Level 2 MP grade.

Example 4

Achievement of an Extended Certificate with a Level 2 PP grade

	GLH	Weighting (GLH/10)	Grade	Grade points	Points per unit (weighting × grade points)
Unit 1	60	6	Level 2 Pass	4	24
Unit 2	60	6	Level 2 Pass	4	24
Unit 3	60	6	Ungraded	0	0
Unit 4	60	6	Level 2 Pass	4	24
Unit 5	60	6	Level 2 Pass	4	24
Unit 6	60	6	Level 2 Distinction	8	48
Qualification grade totals	360	48	Level 2 PP		144

The learner has sufficient points for a Level 2 PP grade.
Note that this includes one ungraded optional unit,
which is the maximum permitted.

Example 5

Achievement of a Diploma with a Level 2 MM grade

	GLH	Weighting (GLH/10)	Grade	Grade points	Points per unit (weighting × grade points)
Unit 1	60	6	Level 2 Merit	6	36
Unit 2	60	6	Level 2 Pass	4	24
Unit 3	60	6	Level 2 Merit	6	36
Unit 4	60	6	Level 2 Merit	6	36
Unit 5	60	6	Level 2 Merit	6	36
Unit 6	60	6	Level 2 Pass	4	24
Unit 7	60	6	Level 2 Distinction	8	48
Unit 8	60	6	Level 2 Distinction	8	48
Qualification grade totals	480	48	Level 2 MM		288

The learner has sufficient points for a Level 2 MM grade.

Example 6

Achievement of a Diploma with a Level 2 DD grade

	GLH	Weighting (GLH/10)	Grade	Grade points	Points per unit (weighting × grade points)
Unit 1	60	6	Level 2 Distinction	8	48
Unit 2	60	6	Level 2 Distinction	8	48
Unit 3	60	6	Level 2 Merit	6	36
Unit 4	60	6	Level 2 Distinction	8	48
Unit 5	60	6	Level 2 Merit	6	36
Unit 6	60	6	Level 2 Distinction	8	48
Unit 7	60	6	Level 2 Distinction	8	48
Unit 8	60	6	Level 2 Distinction	8	48
Qualification grade totals	480	48	Level 2 DD		360

The learner has sufficient points for a Level 2 DD grade.

10 Resources and support

Our aim is to give you a wealth of resources and support to enable you to deliver BTEC International Level 2 qualifications with confidence. You will find a list of resources to support teaching and learning, and professional development on our website.

Support for setting up your course and preparing to teach

Specification

The specification (for teaching from September 2022) gives you details of the administration of the qualifications and information on the units for the qualifications.

Pearson Progress

Pearson Progress is a digital support system that helps you to manage the assessment and quality assurance of the Pearson BTEC International Level 2 Information Technology qualifications. It supports delivery, assessment and quality assurance of BTECs in centres and supports teachers and students as follows:

- course creation
- creating and verifying assignments
- creating assessment plans and recording assessment decisions
- upload of assignment evidence
- tracking progress of every learner.

The system is accessible for teachers and learners so that both teachers and learners can track their progress.

Support for teaching and learning

Pearson Learning Services provide a range of engaging resources to enable you to start teaching BTEC International Level 2 qualifications. These may include the following free materials:

- delivery guides, which give you important advice on how to choose the right course for your learners and how to ensure you are fully prepared to deliver the course. They explain the key features of the BTEC International Level 2 Information Technology qualifications, for example employer involvement and employability skills. They also cover guidance on assessment and quality assurance.
- sample schemes of work are provided for each mandatory unit as well as a selection of optional units. These are available in Word™ format for ease of customisation
- slide presentations for use in your teaching to outline the key concepts of a unit
- delivery plans that help you structure delivery of a qualification.

We also provide paid for resources and courseware which may include:

- teacher resource packs developed by Pearson including materials and activities to fully support your teaching of units
- student books, designed to support the teaching and learning journey. These include case studies, discussion prompts, key content and supporting images to help learners develop their understanding. Items from the student books will link with other resources, which will support teaching and learning.

Support for assessment

Sample assessment materials for internally-assessed units

For internal units assessed with a Pearson Set Assignment we will provide a sample assignment as an example of the form of assessment for the unit. For the remaining internally set units, we allow you to set your own assignments, according to your learners' preferences and to link with your local employment profile.

We provide a service in the form of Authorised Assignment Briefs and sample Pearson Set Assignments, which are approved by Pearson Standards Verifiers. They are available via our website.

Pearson English

Pearson provides a full range of support for English learning including diagnostics, qualifications and learning resources. Please see www.pearson.com/english

Training and support from Pearson

People to talk to

There are many people available to support you and give you advice and guidance on delivery of your BTEC International Level 2 qualifications. They include the following.

- Subject Advisors – available for all sectors. They understand all Pearson qualifications in their sector and can answer sector-specific queries on planning, teaching, learning and assessment.
- Standards Verifiers – they can support you with preparing your assignments, ensuring that your assessment plan is set up correctly, and support you in preparing learner work and providing quality assurance through sampling.
- Regional teams – they are regionally based and have a full overview of the BTEC qualifications and of the support and resources that Pearson provides. Regions 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

Pearson provides a range of training and professional development events to support the introduction, delivery, assessment and administration of BTEC International Level 2 qualifications. These sector-specific events, developed and delivered by specialists, are available both face to face and online.

'Getting Ready to Teach'

These events are designed to get teachers ready for delivery of the BTEC International Level 2 qualifications. They include an overview of qualification structures, planning and preparation for internal assessment, and quality assurance.

Teaching and learning

Beyond the 'Getting Ready to Teach' professional development events, there are opportunities for teachers to attend sector- and role-specific events. These events are designed to connect practice to theory; they provide teacher support and networking opportunities with delivery, learning and assessment methodology.

Details of our training and professional development programme can be found on our website.

Appendix 1: Transferable employability skills

The need for transferable skills

In recent years, higher-education institutions and employers have consistently flagged the need for learners to develop a range of transferable skills to enable them to respond with confidence to the demands of undergraduate study and the world of work.

The Organisation for Economic Co-operation and Development (OECD) defines skills, or competencies, as 'the bundle of knowledge, attributes and capacities that can be learned and that enable individuals to successfully and consistently perform an activity or task and can be built upon and extended through learning'. ^[1]

To support the design of our qualifications, the Pearson Research Team selected and evaluated seven global 21st-century skills frameworks. Following on from this process, we identified the National Research Council's (NRC) framework ^[2] as the most evidence-based and robust skills framework, and have used this as a basis for our adapted skills framework.

The framework includes cognitive, intrapersonal skills and interpersonal skills.

The NRC framework is included alongside literacy and numeracy skills.



The skills have been interpreted for this specification to ensure that they are appropriate for the subject. All of the skills listed are evident or accessible in the teaching, learning and/or assessment of the qualifications. Some skills are directly assessed. Pearson materials will support you in identifying these skills and in developing these skills in learners.

The table overleaf sets out the framework and gives an indication of the skills that can be found in information technology, it indicates the interpretation of the skills in this area. A full interpretation of each skill, with mapping to show opportunities for learner development, is given on the subject pages of our website:

<http://qualifications.pearson.com>.

¹ OECD – *Better Skills, Better Jobs, Better Lives* (OECD Publishing, 2012)

² Koenig, J. A. (2011) *Assessing 21st Century Skills: Summary of a Workshop* (National Academies Press, 2011)

Cognitive skills	Cognitive processes and strategies	Critical thinking Problem solving Analysis Reasoning/argumentation Interpretation Decision making Adaptive learning Executive function	Developing the ability to analyse situations and solve problems through the use of information technologies, that meet the needs of groups or individuals in different contexts.
	Creativity	Creativity Innovation	
Intrapersonal skills	Intellectual openness	Adaptability Personal and social responsibility Continuous learning Intellectual interest and curiosity	Taking responsibility for reviewing and adapting the suitability of a software solution.
	Work ethic/ conscientiousness	Initiative Self-direction Responsibility Perseverance Productivity Self-regulation (metacognition, forethought, reflection) Ethics Integrity	
	Positive core self-evaluation	Self-monitoring/ self-evaluation/ self-reinforcement	
Interpersonal skills	Teamwork and collaboration	Communication Collaboration Teamwork Cooperation Empathy/perspective taking Negotiation	Obtaining and using feedback from users to improve the operation of networks and systems.
	Leadership	Responsibility Assertive communication Self-presentation	

Appendix 2: Glossary of terms used

This is a summary of the key terms used to define the requirements in the units.

Term	Definition
Analyse	<p>The learner presents the outcome of methodical and detailed examination either:</p> <ul style="list-style-type: none">· breaking down a theme, topic or situation in order to interpret and study the interrelationships between the parts <p>and/or</p> <ul style="list-style-type: none">· of information or data to interpret and study key trends and interrelationships. <p>Analysis can be through performance, practice, written or, less commonly, verbal presentation.</p>
Assess	<p>Learners present a careful consideration of varied factors or events that apply to a specific situation or, to identify those which are the most important or relevant and arrive at a conclusion.</p>
Carry out	<p>Learners demonstrate skills, often referring to given processes or techniques.</p>
Communicate/Present	<p>The learner can convey ideas or information to others.</p>
Connect/Configure/Prepare/Install	<p>Related to use and demonstration of practical equipment, techniques, and procedures.</p>
Create/Design	<p>To produce work in response to a brief or to meet an intention.</p>
Demonstrate	<p>Learners' work, performance or practice evidences the ability to carry out and apply knowledge, understanding and/or skills in a practical situation.</p>
Describe	<p>The learner gives a clear, objective account in their own words showing recall, and in some cases application, of the relevant features and information about a subject.</p>

Term	Definition
Develop	Learners acquire and apply skills through practical activities to create a functioning product, service or system that is fit for audience and purpose.
Evaluate	<p>Learners' work draws on varied information, themes or concepts to consider aspects such as:</p> <ul style="list-style-type: none"> · strengths or weaknesses · advantages or disadvantages · alternative actions · relevance or significance. <p>Learners' inquiries should lead to a supported judgement showing relationship to its context. This will often be in a conclusion.</p>
Examine	Learners select and apply knowledge to less familiar contexts.
Explain	Learners' work shows clear details and gives reasons and/or evidence to support an opinion, view or argument. It could show how conclusions are drawn (arrived at). The learner can show that they comprehend the origins, functions and objectives of a subject, and its suitability for purpose.
Explore	Skills and/or knowledge involving practical testing or trialling.
Identify	Usually requires some key information to be selected from a given stimulus or resource.
Implement	Learners plan, execute and monitor the control of a project using an appropriate methodology.
Investigate	<p>Learners' work, performance or practice tests the:</p> <ul style="list-style-type: none"> · qualities of materials · techniques · processes · contexts <p>through practical exploration.</p>
Outline	Learner work, performance or practice provides a summary or overview, or a brief description of something.

Term	Definition
Plan	Learners create a way of doing a task or series of tasks to achieve specific requirements or objectives showing progress from start to finish.
Produce	When learners are required to create/make/establish.
Refine	Learners make minor changes so as to improve or clarify (a theory, method, technique, design, process or a product).
Review	<p>The learner can make a formal assessment of work produced.</p> <p>The assessment allows the learner to:</p> <ul style="list-style-type: none"> · appraise existing information or prior events; and · reconsider information with the intention of making changes, if necessary.
Test	Learners take measures to check the quality, performance, or reliability of something, especially before putting it into widespread use or practice.
Understand	Learners demonstrate knowledge related to defined situations.

This is a key summary of the types of evidence used for BTEC International Level 2 qualifications.

Type of evidence	Definition and purpose
Case study	A specific example to which all learners must select and apply knowledge. Used to show application to a realistic context where direct experience cannot be gained.
Individual project	A self-directed, large-scale activity requiring planning, research, exploration, outcome and review. Used to show self-management, project management and/or deep learning, including synopticity.
Log	A record made by learners of how a process of development was carried out, including experimental stages, testing, selection and rejection of alternatives, practice or development steps.
Portfolio	Digital or physical, showing a selection of work that contributes towards a project or for a specific purpose.
Practical task (artefact/outcome)	Learners carry out a defined or self-defined task to produce an outcome.
Presentation	To show presentation skills, including communication. To direct to a given audience and goal. To extract and summarise information.
Written task/report	Individual completion of a task in a work-related format, e.g. a report, marketing communication, set of instructions.

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