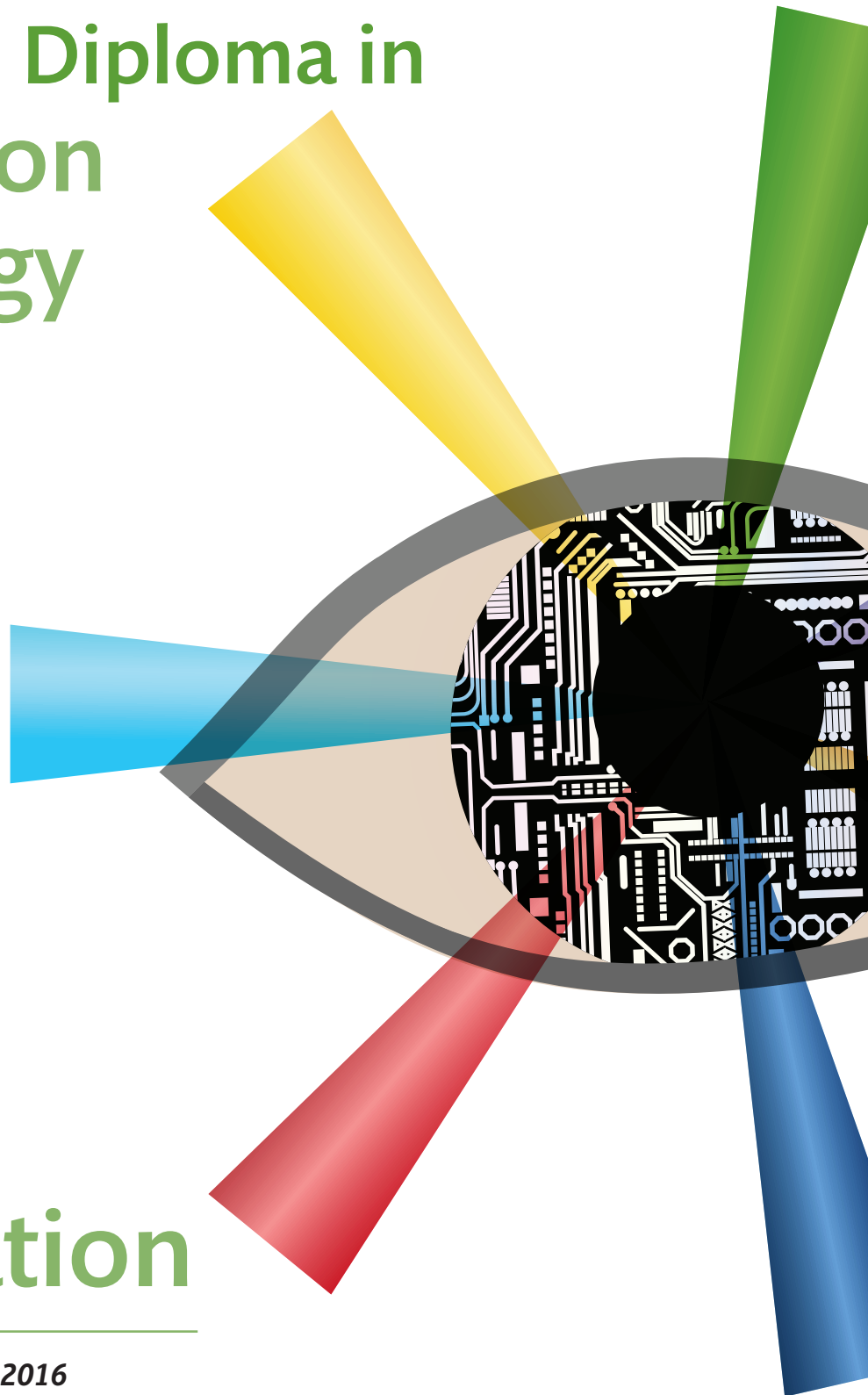# Pearson
BTEC Level 3 National Foundation Diploma in
Information Technology

Specification

First teaching from September 2016

First certification from 2018

Issue 6

Pearson
BTEC Level 3 National Foundation Diploma in Information Technology

Specification

First teaching September 2016

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Edexcel, BTEC and LCCI qualifications

Edexcel, BTEC and LCCI qualifications are awarded by Pearson, the UK's largest awarding body offering academic and vocational qualifications that are globally recognised and benchmarked. For further information, please visit our qualifications website at qualifications.pearson.com. Alternatively, you can get in touch with us using the details on our contact us page at qualifications.pearson.com/contactus

About Pearson

Pearson is the world's leading learning company, with 25,000 employees in more than 70 countries working to help people of all ages to make measurable progress in their lives through learning. We put the learner at the centre of everything we do, because wherever learning flourishes, so do people. Find out more about how we can help you and your learners at qualifications.pearson.com

This specification is Issue 6. We will inform centres of any changes to this issue. The latest issue can be found on our website.

Welcome

With a track record built over 30 years of learner success, BTEC Nationals are widely recognised by industry and higher education as the signature vocational qualification at Level 3. They provide progression to the workplace either directly or via study at a higher level. Proof comes from YouGov research, which shows that 62% of large companies have recruited employees with BTEC qualifications. What's more, well over 100,000 BTEC students apply to UK universities every year and their BTEC Nationals are accepted by over 150 UK universities and higher education institutes for relevant degree programmes either on their own or in combination with A Levels.

Why are BTECs so successful?

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

When creating the BTEC Nationals in this suite, we worked with many employers, higher education providers, colleges and schools to ensure that their needs are met. Employers are looking for recruits with a thorough grounding in the latest industry requirements and work-ready skills such as teamwork. Higher education needs students who have experience of research, extended writing and meeting deadlines.

We have addressed these requirements with:

- a range of BTEC sizes, each with a clear purpose, so there is something to suit each learner's choice of study programme and progression plans
- refreshed content that is closely aligned with employers' and higher education needs for a skilled future workforce
- assessments and projects chosen to help learners progress to the next stage. This means some are set by you to meet local needs, while others are set and marked by Pearson so that there is a core of skills and understanding that is common to all learners. For example, a written test can be used to check that learners are confident in using technical knowledge to carry out a certain job.

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

A word to learners

Today's BTEC Nationals are demanding, as you would expect of the most respected applied learning qualification in the UK. You will have to choose and complete a range of units, be organised, take some assessments that we will set and mark, and keep a portfolio of your assignments. But you can feel proud to achieve a BTEC because, whatever your plans in life – whether you decide to study further, go on to work or an apprenticeship, or set up your own business – your BTEC National will be your passport to success in the next stage of your life.

Good luck, and we hope you enjoy your course.

Collaborative development

Students completing their BTEC Nationals in Information Technology will be aiming to go on to employment, often via the stepping stone of higher education. It was, therefore, essential that we developed these qualifications in close collaboration with experts from professional bodies, businesses and universities, and with the providers who will be delivering the qualifications. To ensure that the content meets providers' needs and provides high-quality preparation for progression, we engaged experts. We are very grateful to all the university and further education lecturers, teachers, employers, professional body representatives and other individuals who have generously shared their time and expertise to help us develop these new qualifications.

In addition, universities, professional bodies and businesses have provided letters of support confirming that these qualifications meet their entry requirements. These letters can be viewed on our website.

Summary of Pearson BTEC Level 3 National Foundation Diploma in Information Technology specification Issue 6 changes

Summary of changes made between the previous issue and this current issue	Page number
The last paragraph of the *Qualification and unit content* section has been amended to allow centres delivering the qualification above to alter the content to reflect the context of the country where it is being delivered.	Page 5

If you need further information on these changes or what they mean, contact us via our website at: qualifications.pearson.com/en/support/contact-us.html.

Contents

Introduction to BTEC National qualifications for the information technology sector

This specification contains the information you need to deliver the Pearson BTEC Level 3 National Foundation Diploma in Information Technology. The specification signposts you to additional handbooks and policies. It includes all the units for this qualification.

This qualification is part of the suite of Information Technology qualifications offered by Pearson. In the suite there are qualifications that focus on different progression routes, allowing learners to choose the one best suited to their aspirations.

All qualifications in the suite share some common units and assessments, allowing learners some flexibility in moving between sizes. The qualification titles are given below.

Some BTEC National qualifications provide a broad introduction that gives learners transferable knowledge and skills. These qualifications are for post-16 learners who want to continue their education through applied learning. The qualifications prepare learners for a range of higher education courses and job roles related to a particular sector. They provide progression either by meeting entry requirements in their own right or by being accepted alongside other qualifications at the same level and adding value to them.

In the information technology sector these qualifications are:

Pearson BTEC Level 3 National Certificate in Information Technology (180 GLH) 601/7574/6

Pearson BTEC Level 3 National Extended Certificate in Information Technology (360 GLH) 601/7575/8

Pearson BTEC Level 3 National Foundation Diploma in Information Technology (510 GLH) 601/7576/X

Pearson BTEC Level 3 National Diploma in Information Technology (720 GLH) 603/0455/8

Pearson BTEC Level 3 National Extended Diploma in Information Technology (1080 GLH) 603/0454/6.

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

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

Total Qualification Time

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

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

BTEC Nationals have been designed around the number of hours of guided learning expected. Each unit in the qualification has a GLH value of 60, 90 or 120. There is then a total GLH value for the qualification.

Each qualification has a TQT value. This may vary within sectors and across the suite depending on the nature of the units in each qualification and the expected time for other required learning.

The following table shows all the qualifications in this sector and their GLH and TQT values.

Qualifications, sizes and purposes at a glance

Title	Size and structure	Summary purpose
Pearson BTEC Level 3 National Certificate in Information Technology	180 GLH (235 TQT) Equivalent in size to 0.5 of an A Level. 2 units, both mandatory, of which 1 is external. Mandatory content (100%). External assessment (50%).	This qualification is designed for learners who are interested in a basic introduction to the study of IT alongside other fields of study, with a view to progressing to a wide range of higher education courses, not necessarily in IT.
Pearson BTEC Level 3 National Extended Certificate in Information Technology	360 GLH (475 TQT) Equivalent in size to one A Level. 4 units of which 3 are mandatory and 2 are external. Mandatory content (83%). External assessment (58%).	This qualification is designed for learners who are interested in an introduction to the study of creating IT systems to manage and share information, alongside other fields of study, with a view to progressing to a wide range of higher education courses, not necessarily in IT.
Pearson BTEC Level 3 National Foundation Diploma in Information Technology	510 GLH (675 TQT) Equivalent in size to 1.5 A Levels. 6 units of which 4 are mandatory and 2 are external. Mandatory content (76%). External assessment (41%).	This qualification is designed to support learners who wish to study IT as a one-year, full-time course, or for those wishing to take it alongside another area of complementary or contrasting study as part of a two-year, full-time study programme. It supports progression to higher education if taken as part of a programme of study that includes other appropriate BTEC Nationals or A Levels.
Pearson BTEC Level 3 National Diploma in Information Technology	720 GLH (935 TQT) Equivalent in size to two A Levels. 8 units of which 6 are mandatory and 3 are external. Mandatory content (83%). External assessment (46%).	The qualification is designed to be studied over two years and carries UCAS tariff points. It meets entry requirements in its own right for some courses in IT or related study such as an HNC or HND in Computing, Engineering or Business Management. For progression to a degree course, learners should normally study this qualification alongside other qualifications, such as an A Level or BTEC Extended Certificate in a different or complementary subject area.
Pearson BTEC Level 3 National Extended Diploma in Information Technology	1080 GLH (1445 TQT) Equivalent in size to three A Levels. 13 units of which 7 are mandatory and 4 are external. Mandatory content (67%). External assessment (42%).	The qualification is designed to be studied over two years and carries UCAS tariff points. It fully meets entry requirements for progression to a degree course in IT and related areas such as: digital technology solutions, IT management for business, computer networks security or business computing and entrepreneurship.

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 Level 3 National in Information Technology is shown in *Section 2*. **You must refer to the full structure to select units and plan your programme.**

Key

	Unit assessed externally	**M** Mandatory units	**O** Optional units	

Unit (number and title)	Unit size (GLH)	Certificate (180 GLH)	Extended Certificate (360 GLH)	Foundation Diploma (510 GLH)	Diploma (720 GLH)	Diploma Extended (1080 GLH)
1 Information Technology Systems	120		M	M	M	M
2 Creating Systems to Manage Information	90	M	M	M	M	M
3 Using Social Media in Business	90	M	M	M	M	M
4 Programming	90			M	M	M
5 Data Modelling	60		O	O	O	O
6 Website Development	60		O	O	O	O
7 Mobile Apps Development	60			O	O	O
8 Computer Games Development	60			O	O	O
9 IT Project Management	90				M	M
10 Big Data and Business Analytics	60				O	O
11 Cyber Security and Incident Management	120				M	M
12 IT Technical Support and Management	60				O	O
13 Software Testing	60				O	O
14 IT Service Delivery	120					M
15 Customising and Integrating Applications	60				O	O
16 Cloud Storage and Collaboration Tools	60				O	O
17 Digital 2D and 3D Graphics	60				O	O
18 Digital Animation and Effects	60				O	O
19 The Internet of Things	60				O	O
20 Enterprise in IT	60				O	O
21 Business Process Modelling Tools	60				O	O

Qualification and unit content

Pearson has developed the content of the new BTEC Nationals in collaboration with employers and representatives from higher education and relevant professional bodies. In this way, we have ensured that content is up to date and that it includes the knowledge, understanding, skills and attributes required in the sector.

Each qualification in the suite has its own purpose. The mandatory and optional content provides a balance of breadth and depth, while retaining a degree of choice for individual learners to study content relevant to their own interests and progression choices. Also, the content may be applied during delivery in a way that is relevant to local employment needs.

The proportion of mandatory content ensures that all learners are following a coherent programme of study and acquiring the knowledge, understanding and skills that will be recognised and valued. Learners are expected to show achievement across mandatory units as detailed in *Section 2*.

BTEC Nationals have always required applied learning that brings together knowledge and understanding (the cognitive domain) with practical and technical skills (the psychomotor domain). This is achieved through learners performing vocational tasks that encourage the development of appropriate vocational behaviours (the affective domain) and transferable skills. Transferable skills are those such as communication, teamwork, research and analysis, which are valued in both higher education and the workplace.

Our approach provides rigour and balance, and promotes the ability to apply learning immediately in new contexts. Further details can be found in *Section 2*.

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

Assessment

Assessment is specifically 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. There are three main forms of assessment that you need to be aware of: external, internal and synoptic.

Externally-assessed units

Each external assessment for a BTEC National is linked to a specific unit. All of the units developed for external assessment are of 90 or 120 GLH to allow learners to demonstrate breadth and depth of achievement. Each assessment is taken under specified conditions, then marked by Pearson and a grade awarded. Learners are permitted to resit external assessments during their programme. You should refer to our website for current policy information on permitted retakes.

The styles of external assessment used for qualifications in the Information Technology suite are:

- examinations – all learners take the same assessment at the same time, normally with a written outcome
- set tasks – learners take the assessment during a defined window and demonstrate understanding through completion of a vocational task.

Some external assessments include a period of preparation using set information. External assessments are available once or twice a year. For detailed information on the external assessments please see the table in *Section 2*. For further information on preparing for external assessment see *Section 5*.

Internally-assessed units

Most units in the sector are internally assessed and subject to external standards verification. This means that you set and assess the assignments that provide the final summative assessment of each unit, using the examples and support that Pearson provides. 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*.

In line with the requirements and guidance for internal assessment, 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.

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 see *Section 6*.

Synoptic assessment

Synoptic assessment requires learners to demonstrate that they can identify and use effectively, in an integrated way, an appropriate selection of skills, techniques, concepts, theories and knowledge from across the whole sector as relevant to a key task. BTEC learning has always encouraged learners to apply their learning in realistic contexts using scenarios and realistic activities that will permit learners to draw on and apply their learning. For these qualifications we have formally identified units which contain a synoptic assessment task. Synoptic assessment must take place after the teaching and learning of other mandatory units in order for learners to be able to draw from the full range of content. The synoptic assessment gives learners an opportunity to independently select and apply learning from across their programmes in the completion of a vocational task. Synoptic tasks may be in internally or externally assessed units. The particular unit that contains the synoptic tasks for this qualification is shown in the structure in *Section 2*.

Language of assessment

Assessment of the internal and external units for these qualifications will be available in English. All learner work must be in English. A learner taking the qualifications may be assessed in British or Irish Sign Language where it is permitted for the purpose of reasonable adjustment. For information on reasonable adjustments see *Section 7*.

Grading for units and qualifications

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

Units are assessed using a grading scale of Distinction (D), Merit (M), Pass (P), Near Pass (N) and Unclassified (U). The grade of Near Pass is used for externally-assessed units only. All mandatory and optional units contribute proportionately to the overall qualification grade, for example a unit of 120 GLH will contribute double that of a 60 GLH unit.

Qualifications in the suite are graded using a scale of P to D*, **or** PP to D*D*, **or** PPP to D*D*D*. Please see *Section 9* for more details. The relationship between qualification grading scales and unit grades will be subject to regular review as part of Pearson's standards monitoring processes on the basis of learner performance and in consultation with key users of the qualification.

UCAS Tariff points

The BTEC Nationals attract UCAS points. Please go to the UCAS website for full details of the points allocated.

1 Qualification purpose

Pearson BTEC Level 3 National Foundation Diploma in Information Technology

In this section you will find information on the purpose of this qualification and how its design meets that purpose through the qualification objective and structure. We publish a full 'Statement of Purpose' for each qualification on our website. These statements are designed to guide you and potential learners to make the most appropriate choice about the size of qualification suitable at recruitment.

Who is this qualification for?

The Pearson BTEC Level 3 National Foundation Diploma in Information Technology is intended as an Applied General qualification covering 510 GLH and equivalent in size to one and a half A Levels. It is designed for learners who are interested in exposure to a range of IT topics that will enhance their progression to higher education in this sector, a complementary sector or a contrasting sector and ultimately lead to employment.

Learners will develop a common core of IT knowledge and study areas such as the relationship between hardware and software that form an IT system, managing and processing data to support business, using IT to communicate and share information, and computational thinking skills together with the principles of designing and developing computer programs.

What does this qualification cover?

The objective of this qualification is to give learners the opportunity to develop their knowledge and skills in information technology systems, systems management, social media in business and programming. This will enable learners to progress to further study in the IT sector or other sectors.

Learners will study four mandatory units:

- Unit 1: Information Technology Systems
- Unit 2: Creating Systems to Manage Information
- Unit 3: Using Social Media in Business
- Unit 4: Programming (synoptic).

This qualification includes a choice of optional units, including:

- Unit 5: Data Modelling
- Unit 6: Website Development
- Unit 7: Mobile Apps Development
- Unit 8: Computer Games Development.

This will allow progression to a variety of degrees when combined with other suitable Level 3 qualifications.

What could this qualification lead to?

When taken alongside other Level 3 qualifications such as A Levels, this qualification gives learners the opportunity to progress to higher education to study a BTEC Higher National in Information Technology, a degree in an information technology discipline or a degree where information technology related skills and knowledge may be advantageous, such as business studies.

This qualification carries UCAS points and is recognised by higher education providers as meeting admission requirements for many relevant courses. As the content is equivalent in size to one and a half A Levels, higher education representatives have confirmed that it is appropriate to allow learners to choose their optional units from a wide range so that they can explore their own choice of areas for further study. The qualification supports entry to, for example:

- HNC in Interactive Media
- FdSC in Business Computing
- HND in Engineering

- BSc (Hons) in Information Management for Business
- BA (Hons) in Accounting and Finance
- BSc (Hons) in Information Management for Business.

Some university courses may require the achievement of specific units and learners should always check the entry requirements for degree programmes with specific higher education providers.

The qualification, when studied with other Level 3 qualifications, is aimed at progression to higher education but also enables learners to develop knowledge and skills needed for entry-level roles related to IT including vocational apprenticeship roles and trainee/entry-level roles in software development, web/content development, mobile apps design, games design, programming and IT/business analysis support.

How does the qualification provide employability skills?

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

- **cognitive and problem-solving skills:** use critical thinking, approach non-routine problems applying expert and creative solutions, use systems and technology
- **intrapersonal skills:** communicating, working collaboratively, negotiating and influencing, self-presentation
- **interpersonal 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.

How does the qualification provide transferable knowledge and skills for higher education?

All BTEC Nationals 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
- being able to give presentations and being active group members.

BTEC learners can also benefit from opportunities for deep learning where they are able to make connections among units and select areas of interest for detailed study. BTEC Nationals provide a vocational context in which learners can develop the knowledge and skills required for particular degree courses, including:

- reading technical texts
- effective writing
- analytical skills
- creative development
- preparation for assessment methods used in degrees.

2 Structure

Qualification structure

Pearson BTEC Level 3 National Foundation Diploma in Information Technology

Mandatory units

There are four mandatory units, two internal and two external. Learners must complete and achieve at Near Pass grade or above in all mandatory external units and achieve a Pass or above in all mandatory internal units.

Optional units

Learners must complete two optional units.

Pearson BTEC Level 3 National Foundation Diploma in Information Technology				
Unit number	**Unit title**	**GLH**	**Type**	**How assessed**
	Mandatory units – learners complete and achieve all units			
1	Information Technology Systems	**120**	**Mandatory**	External
2	Creating Systems to Manage Information	**90**	**Mandatory**	External
3	Using Social Media in Business	**90**	**Mandatory**	Internal
4	Programming	**90**	**Mandatory and Synoptic**	Internal
	Optional units – learners complete 2 units			
5	Data Modelling	**60**	**Optional**	Internal
6	Website Development	**60**	**Optional**	Internal
7	Mobile Apps Development	**60**	**Optional**	Internal
8	Computer Games Development	**60**	**Optional**	Internal

External assessment

This is a summary of the type and availability of external assessment, which is of units making up 41% of the total qualification GLH. See *Section 5* and the units and sample assessment materials for more information.

Unit	Type	Availability
Unit 1: Information Technology Systems	- Written examination set and marked by Pearson. 90 marks. - Two hours.	**Jan and May/June.** **First assessment May/June 2017.**
Unit 2: Creating Systems to Manage Information	- A task set and marked by Pearson and completed under supervised conditions. - In part A, learners will be provided with a brief to complete five activities in the set task in three hours on the afternoon of the first day. - In part B, learners will be provided with a brief to complete three activities in the set task in two hours on the morning of the second day. - Completed using a computer and submitted electronically. 66 marks.	**Dec/Jan and May/June** **First assessment May/June 2017**

Synoptic assessment

The mandatory synoptic assessment requires learners to apply learning from across the qualification to the completion of a defined vocational task. Within the assessment for *Unit 4: Programming*, learners draw together their understanding and skills from applying the software development cycle during their internally assessed units. Learners complete the task using knowledge and understanding from their studies of the sector and apply both transferable and specialist knowledge and skills.

In assessing the unit assignments will require learners to select from and apply their learning from across their programme. The unit provides further information.

Employer involvement in assessment and delivery

You are encouraged to give learners opportunities to be involved with employers.
See *Section 4* for more information.

3 Units

Understanding your units

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

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

- internal units
- external units.

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

Internal units

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 and it appears on certificates.
Level	All units are at Level 3 on the national framework.
Unit type	This shows if the unit is internal or external only. See structure information in *Section 2* for full details.
GLH	Units may have a GLH value of 120, 90 or 60 GLH. This indicates the numbers of hours of teaching, directed activity and assessment expected. It also shows the weighting of the unit in the final qualification grade.
Unit in brief	A brief formal statement on the content of the unit that is helpful in understanding its role in the qualification. You can use this in summary documents, brochures etc.
Unit introduction	This is designed with learners in mind. It indicates why the unit is important, how learning is structured, and how learning might be applied when progressing to employment or higher education.
Learning aims	These help to define the scope, style and depth of learning of the unit. You can see where learners should be 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 *Appendix 2*.
Summary of unit	This new section helps teachers to see at a glance the main content areas against the learning aims and the structure of the assessment. The content areas and structure of assessment are required. The forms of evidence given are suitable to fulfil the requirements.
Content	This section sets out the required teaching content of the unit. Content is compulsory except when shown as 'e.g.'. Learners should be asked to complete summative assessment only after the teaching content for the unit or learning aim(s) has been covered.

Section	Explanation
Assessment criteria	Each learning aim has Pass and Merit criteria. Each assignment has at least one Distinction criterion.
	A full glossary of terms used is given in *Appendix 2*. 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.
Further information for teachers and assessors	The section gives you information to support the implementation of assessment. It is important that this is used carefully alongside the assessment criteria.
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 *Section 10*.
Essential information for assessment decisions	This information gives guidance for each learning aim or assignment of the expectations for Pass, Merit and Distinction standard. This section contains examples and essential clarification.
Links to other units	This section shows you the main relationship among units. This section can help you to structure your programme and make best use of materials and resources.
Employer involvement	This section gives you information on the units that can be used to give learners involvement with employers. It will help you to identify the kind of involvement that is likely to be successful.

External units

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 and it appears on certificates.
Level	All units are at Level 3 on the national framework.
Unit type	This shows if the unit is internal or external only. See structure information in *Section 2* for full details.
GLH	Units may have a GLH value of 120, 90 or 60 GLH. This indicates the numbers of hours of teaching, directed activity and assessment expected. It also shows the weighting of the unit in the final qualification grade.
Unit in brief	A brief formal statement on the content of the unit.
Unit introduction	This is designed with learners in mind. It indicates why the unit is important, how learning is structured, and how learning might be applied when progressing to employment or higher education.
Summary of assessment	This sets out the type of external assessment used and the way in which it is used to assess achievement.
Assessment outcomes	These show the hierarchy of knowledge, understanding, skills and behaviours that are assessed. Includes information on how this hierarchy relates to command terms in sample assessment materials (SAMs).
Essential content	For external units all the content is obligatory, the depth of content is indicated in the assessment outcomes and sample assessment materials (SAMs). The content will be sampled through the external assessment over time, using the variety of questions or tasks shown.
Grade descriptors	We use grading descriptors when making judgements on grade boundaries. You can use them to understand what we expect to see from learners at particular grades.
Key terms typically used in assessment	These definitions will help you analyse requirements and prepare learners for assessment.
Resources	Any specific resources that you need to be able to teach and assess are listed in this section. For information on support resources see *Section 10*.
Links to other units	This section shows the main relationship among units. This section can help you to structure your programme and make best use of materials and resources.
Employer involvement	This section gives you information on the units that can be used to give learners involvement with employers. It will help you to identify the kind of involvement that is likely to be successful.

Index of units

This section contains all the units developed for this qualification. Please refer to *page 4* to check which units are available in all qualifications in the information technology sector.

Unit 1: Information Technology Systems

Level: **3**

Unit type: **External**

Guided learning hours: **120**

Unit in brief

Learners study the role of computer systems and the implications of their use in personal and professional situations.

Unit introduction

Information technology (IT) systems have a significant role in the world around us and play a part in almost everything we do. Having a sound understanding of how to effectively select and use appropriate IT systems will benefit you personally and professionally.

You will explore the relationships between the hardware and software that form an IT system, and the way that systems work individually and together, as well as the relationship between the user and the system. You will examine issues related to the use of IT systems and the impact that they have on organisations and individuals. To complete the assessment task for within this unit, you will need to draw on your learning from across your programme.

This unit will give you a fundamental and synoptic understanding of all areas of IT, supporting your progression to an IT-related higher education course.

Summary of assessment

This unit is externally assessed through a written examination set and marked by Pearson.

The examination is two hours in length. Learners will be assessed on their understanding of computer systems and the implications of their use in personal and professional situations.

The number of marks for the unit is 90.

The assessment availability is January and May/June each year. The first assessment availability is May/June 2017.

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

Assessment outcomes

AO1 Demonstrate knowledge and understanding of information technology terms, standards, concepts and processes

Command words: complete, draw, give, identify, name, state

Marks: ranges from 1 to 6 marks

AO2 Apply knowledge and understanding of information technology terms, standards, concepts and processes

Command words: calculate, complete, demonstrate, describe, draw, explain, produce

Marks: ranges from 1 to 10 marks

AO3 Select and use information technologies and procedures to explore likely outcomes and find solutions to problems in context

Command words: calculate, demonstrate, develop, explain, produce

Marks: ranges from 1 to 6 marks

AO4 Analyse and evaluate information, technologies and procedures in order to recommend and justify solutions to IT problems

Command words: analyse, demonstrate, discuss, produce, write

Marks: ranges from 6 to 12 marks

AO5 Make connections between the application of technologies, procedures, outcomes and solutions to resolve IT problems

Command words: evaluate, produce, write

Marks: ranges from 6 to 12 marks

Essential content

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

A Digital devices in IT systems

The concepts and implications of the use of, and relationships among, the devices that form IT systems.

A1 Digital devices, their functions and use

The features and uses of digital devices in IT systems to meet the needs of individuals and organisations.

- Digital devices that form part or all of IT systems:
  o multifunctional devices
  o personal computers
  o mobile devices
  o servers
  o entertainment systems
  o digital cameras – still, video
  o navigation systems
  o data capture and collection systems
  o communication devices and systems.
- The function and use of digital devices for:
  o education and training
  o personal
  o social
  o retail
  o organisational use – business operations, internal and external dissemination of information
  o creative tasks.

A2 Peripheral devices and media

The features and uses of peripheral devices and media in IT systems to meet the needs of individuals and organisations.

- Peripheral devices used with other digital devices to form part of an IT system:
  o input devices
  o output devices
  o storage devices.
- Manual and automatic data processing.
- Accessibility devices.
- Characteristics and implications of storage media used to form part of an IT system.

A3 Computer software in an IT system

The concepts and implications of the use of, and relationships between, hardware and software that form large- and small-scale IT systems and their impact on individuals and organisations.

- Types of operating system:
  o real-time operating system
  o single-user single task
  o single-user multi-tasking
  o multi-user.

- The role of the operating system in managing:
  - networking
  - security
  - memory management
  - multi-tasking
  - device drivers.
- Factors affecting the choice and use of user interfaces:
  - graphical
  - command line
  - menu based
  - adapted.
- Factors affecting the choice of operating system.
- Factors affecting use and performance of an operating system.
- Utility software:
  - the purpose, features and uses of utility software
  - factors affecting the choice, use and performance of utility software.
- Application software:
  - the purpose, features and uses of application software
  - factors affecting the choice, use and performance of application software.
- The principles and implications of open source and proprietary operating systems and software.
- The impact and features of user interfaces in computer software.
- The features of common file types and formats used for:
  - images
  - videos
  - application software.
- The implications on IT systems, individuals and organisations of the use and selection of file types and formats.

A4 Emerging technologies

How emerging technologies can be used by individuals and organisations.
- The concepts and implications of how emerging technologies affect the performance of IT systems.
- Implications of emerging technologies on the personal use of IT systems.
- Implications of emerging technologies on the use of IT systems in organisations.

A5 Choosing IT systems

How the features of an IT system can affect its performance and/or the performance of a larger IT system.
- Factors affecting the choice of digital technology:
  - user experience – ease of use, performance, availability, accessibility
  - user needs
  - specifications
  - compatibility
  - connectivity
  - cost
  - efficiency
  - implementation – timescales, testing, migration to new system(s)
  - productivity
  - security.

B Transmitting data

The concepts, process and implications of transferring data within and between IT systems.

B1 Connectivity

- Wireless and wired methods of connecting devices and transmitting data within and between IT systems.
- How the features of connection types can meet the needs of individuals and organisations.
- The implications of selecting and using different connection types.
- The impact of connection types on the performance of an IT system.

B2 Networks

The concepts and implications for individuals and organisations of connecting devices to form a network.

- The features, use and purpose of different networks:
  o personal area network (PAN)
  o local area network (LAN)
  o wide area network (WAN)
  o virtual private network (VPN).
- Factors affecting the choice of network:
  o user experience – ease of use, performance, availability, accessibility
  o user needs
  o specifications
  o connectivity
  o cost
  o efficiency
  o compatibility
  o implementation: timescales, testing, downtime
  o productivity
  o security.
- How the features of a network and its component parts affect the performance of an IT system.

B3 Issues relating to transmission of data

How the features and processes of data transmission affect the use and performance of IT systems.

- Protocols used to govern and control data transmission for common tasks:
  o email
  o voice and video calls over the internet
  o web pages
  o secure payment systems.
- Security issues and considerations when transmitting data over different connection types and networks.
- Factors affecting bandwidth and latency.
- The implications of bandwidth and latency on the use and performance of an IT system.
- Types of compression:
  o lossy
  o lossless.
- The applications and implications of data compression.
- The use and implications of codecs when using and transmitting audio and video in digital format.

C Operating online

The implications for individuals and organisations of using online IT systems.

C1 Online systems

The features, impact and implications of the use of online IT systems to store data and perform tasks.

- The personal and professional uses and applications of cloud storage.
- The personal and professional uses and applications of cloud computing.
- The impact and implications on individuals of using cloud storage and computing.
- The impact and implications on organisations of using cloud storage and computing.
- Systems that enable and support remote working:
  - VPNs
  - remote desktop technologies.
- Factors affecting the use and selection of online systems:
  - security
  - cost
  - ease of use
  - features
  - connectivity.

C2 Online communities

The features of online communities and the implications of their widespread use for organisations and individuals.

- Ways of communicating and interacting with online communities:
  - social media
  - blog, microblog, vlog
  - wiki
  - chatrooms
  - instant messaging
  - podcasts
  - forums.
- The implications for individuals of using and accessing online communities:
  - user experience – ease of use, performance, availability, accessibility
  - meeting needs
  - cost
  - privacy
  - security.
- The implications for organisations of using and accessing online communities:
  - employee and customer experience – ease of use, performance, availability, accessibility
  - customer needs
  - cost
  - implementation – timescales, testing
  - replacement or integration with current systems
  - productivity
  - working practices
  - security.

D Protecting data and information

The issues and implications of storing and transmitting information in digital form.

D1 Threats to data, information and systems

The implications of accidental and malicious threats to the security and integrity of data, held in, and used by, IT systems.

- The characteristics of threats to data:
  - viruses and other malware
  - hackers
  - phishing
  - accidental damage.
- The impact of threats to data, information and systems on individuals.
- The impact of threats to data, information and systems on organisations.

D2 Protecting data

The features, uses and implications of systems and procedures used to protect the data of individuals and organisations.

- Processes and implications of techniques for protecting data and systems:
  - file permissions
  - access levels
  - backup and recovery procedures
  - passwords
  - physical access control
  - digital certificates
  - protocols.
- The features, characteristics and implications of using antivirus software to protect data.
- The features, characteristics and implications of using firewalls to protect data.
- The features, applications and implications of encryption methods used to protect:
  - stored data
  - data during transmission.
- The role of current legislation in protecting data and IT systems from attack and misuse.
- The impact on individuals and organisations of legislation designed to protect data and IT systems.
- The purpose, role and impact, on individuals and organisations, of codes of practice for the protection of data produced by the Information Commissioner's Office (UK) and professional bodies.

E Impact of IT systems

The uses, issues and implications of IT systems and their impact on individuals and organisations.

E1 Online services

How the features of online services are used to meet the needs of individuals and organisations.

- The features and implications of using online services to support:
  - retail
  - financial services
  - education and training
  - news and information
  - entertainment and leisure
  - productivity
  - booking systems.

- The uses, impact and implications for individuals and organisations of:
  - transactional data
  - targeted marketing
  - collaborative working.

E2 Impact on organisations

- The features and implications of IT systems used by organisations for:
  - stock control
  - data logging
  - data analysis
  - general office tasks
  - creative tasks
  - advertising
  - manufacturing
  - security.
- The impact and implications for organisations of IT systems in terms of:
  - user experience – ease of use, performance, availability, accessibility
  - employee and customer needs
  - cost
  - implementation – timescales, testing, downtime
  - replacement or integration with current systems
  - productivity
  - working practices
  - staff training needs (initial and ongoing)
  - user support
  - security.

E3 Using and manipulating data

The uses, processes and implications for individuals and organisations of accessing and using data and information in digital form.

- Sources of data:
  - primary
  - secondary.
- Judging and ensuring the reliability of data.
- The characteristics and implications of methods of collecting data and opinions:
  - survey
  - questionnaire
  - focus groups
  - interview.
- Reasons for ensuring data accuracy.
- Methods of ensuring data accuracy:
  - verification
  - validation.
- Methods of extracting and sorting data.
- Numerical and data modelling.
- Presenting data and results.

- The characteristics and implications of user interfaces for data collection and processing systems:
  - ease of use
  - accessibility
  - error reduction
  - intuitiveness
  - functionality
  - performance
  - compatibility.

F Issues

The concepts, impacts and implications of issues resulting from the use of IT systems.

F1 Moral and ethical issues

The implications, for individuals, organisations and wider society, of moral and ethical factors of using information technology.

- The moral and ethical factors of the use of information technology:
  - privacy
  - environmental
  - unequal access to information technology
  - online behaviour and netiquette
  - globalisation
  - freedom of speech and censorship
  - acceptable use.
- The purpose and role of codes of practice produced by professional bodies for the use of IT systems.
- The impact of codes of practice on individuals and organisations.

F2 Legal issues

The legal issues relating to the use of IT systems and the implications for individuals, organisations and wider society.

- The role of current legislation (and subsequent additions and amendments) in protecting users and their data from attack and misuse:
  - Computer Misuse Act 1990
  - Police and Justice Act 2006 (Computer Misuse)
  - Copyright, Designs and Patents Act 1988
  - The Copyright (Computer Programs) Regulations 1992
  - The Health and Safety (Display Screen Equipment) Regulations 1992
  - Data protection legislation
  - Consumer Rights Act 2015.
- Guidelines and current legislation (and subsequent additions and amendments) designed to ensure the accessibility of IT systems:
  - Disability Discrimination Acts 1995 and 2005
  - Equality Act 2010
  - British Standards Institute (BSI) codes of practice
  - Open Accessibility Framework (OAF)
  - Web Content Accessibility Guidelines (WCAG) 1.0 and 2.0 World Wide Web Consortium (W3C®).
- The moral and ethical factors of the use of IT systems:
  - health and safety
  - copyright
  - computer misuse
  - protection of data
  - privacy
  - accessibility.

Grade descriptors

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

Level 3 Pass

Learners are able to apply knowledge and understanding of key information technology concepts to a range of familiar vocational contexts. They can apply knowledge and understanding of IT systems to deconstruct problems in common situations and apply standard IT conventions to produce solutions with supporting reasoning. Learners can identify the impact of effective and ineffective uses of IT systems and recommend ways in which IT can be developed and/or improved. They can explore and make judgements on the impact of the use of IT on individuals and organisations.

Level 3 Distinction

Learners are able to analyse complex information, data and situations, in vocational contexts, in order to draw conclusions and make valid observations. They can synthesise their knowledge and understanding of IT systems to deconstruct complex problems, drawing on various sources of information to develop effective solutions. Learners can evaluate the effectiveness of IT systems and make justified recommendations for further developments and future actions. They can make valid, justified judgements on the impact of IT on individuals, organisations and wider society.

Key terms typically used in assessment

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

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

Command or term	Definition
Analyse	Learners examine in detail a scenario or problem to discover its meaning or essential features. Learners will break down the problem into its parts and show how they inter-relate. There is no requirement for any conclusion.
Assess	Learners give careful consideration to all the factors or events that apply and identify which are the most important or relevant. Make a judgement on the importance of something.
Calculate	Learners apply some form of mathematical or computational process.
Complete	Learners complete a diagram or process. Can apply to problems/solutions of varying complexity.
Demonstrate	Learners illustrate and explain how an identified computer system or process functions. May take the form of an extended writing response, a diagram or a combination of the two.

Command or term	Definition
Describe	Learners provide an account of something, or highlight a number of key features of a given topic. May also be used in relation to the stages of a process.
Discuss	Learners investigate a problem or scenario showing reasoning or argument.
Draw	Learners represent understanding through the use of a diagram or flowchart.
Explain	Learners denote a series of linked points needed and/or justify or expand on an identified point required.
Evaluate	Learners review and synthesise information to provide a supported judgement about the topic or problem. Typically, a conclusion will be required.
Identify	Learners assess factual information, typically when making use of given stimuli. Requires a single-word or short-sentence answer.
Produce	Learners provide a solution that applies established constructs to a given computing problem.
State, name, give	Learners assess factual information. Requires a single-word or short-sentence answer.
Write	Learners produce a solution, or mechanism used as part of, a solution to a given computing problem.

Links to other units

The assessment for this unit should draw on knowledge, understanding and skills developed from:
- Unit 2: Creating Systems to Manage Information
- Unit 3: Using Social Media in Business.

This unit would relate to teaching of:
- Unit 5: Data Modelling
- Unit 6: Website Development.

Employer involvement

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

Unit 2: Creating Systems to Manage Information

Level: **3**

Unit type: **External**

Guided learning hours: **90**

Unit in brief

Learners study the design, creation, testing and evaluation of a relational database system to manage information.

Unit introduction

In order to produce information to support many business processes as well as our social lives, relational databases are widely used to manage and process data. From the smallest in-house systems to stock control systems for large online retailers, databases are repositories of information that are a significant part of organisational operating requirements.

You will examine the structure of data and its origins, and how an efficient data design follows through to an effective and useful database. You will examine a given scenario and develop an effective design solution to produce a database system. You will then test your solution to ensure that it works correctly. Finally, you will evaluate each stage of the development process and the effectiveness of your database solution. To complete the assessment tasks for within this unit, you will need to draw on your learning from across your programme.

The skills you gain in this unit support progression to IT-related higher education courses and to employment in a role that requires computing-related expertise.

Summary of assessment

This unit is externally assessed through a task set and marked by Pearson.

The set task will be completed under supervised conditions. Part A will be carried out in three hours on the afternoon of the first day. Part B will be carried out in two hours on the morning of the second day.

The set task will assess learners' ability to design, create, test and evaluate a relational database system to manage information.

The number of marks for the unit is 66.

The assessment availability is December/January and May/June each year. The first assessment availability is May/June 2017.

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

Assessment outcomes

AO1 Demonstrate knowledge of database development terminology, standards, concepts and processes

AO2 Apply knowledge and understanding of database development terminology, standards, concepts and processes to create a software product to meet a client brief

AO3 Analyse information about database problems and data from test results to optimise the performance of a database solution

AO4 Evaluate evidence to make informed judgements about the success of a database's design and performance

AO5 Be able to develop a database solution to meet a client brief with appropriate justification

Essential content

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

A The purpose and structure of relational database management systems

A1 Relational database management systems

- Types of relational database management systems (RDBMS) and their characteristics.
- RDBMS based on relational models:
  - relational data structures – relation, attribute, domain, tuple, cardinality and relational database
  - relational algebra sets – symbols, union, intersect, join, select
  - database relations – entity relationship, generic, semantic
  - relational keys – super key, candidate key, primary key, foreign key
  - integrity constraints – entity integrity, referential integrity
  - entity relationships – one-to-one, one-to-many, many-to-many.

A2 Manipulating data structures and data in relational databases

Use of RDBMS software tools and structured query language (SQL) for defining, modifying and removing data structures and data:

- updating, inserting, deletion
- retrieval of data for queries, reports
- administration of users
- security, integrity, recovery.

A3 Normalisation

The role of normalisation to develop efficient data structures:

- anomalies – update, insertion, deletion
- primary keys, foreign keys, composite keys
- indexing
- referential integrity
- data dictionary – tables, fields, data types, validation
- cascading update
- deletion techniques
- joins, unions, intersects
- stages of normalisation:
  - un-normalised form (UNF)
  - first normal form (1NF)
  - second normal form (2NF)
  - third normal form (3NF).

B Standard methods and techniques to design relational database solutions

B1 Relational database design

Selection of RDBMS and SQL software, tools, techniques and processes.

- Database design: conceptual, logical and physical modelling and entity relationship modelling.
- Relational algebra: one to many, one to one, many to many, AND, OR, NOT, >, <, ≥, ≤
- RDMS and SQL software selection.
- Application design: user interface, software applications.
- Database implementation techniques: prototyping, data conversion, testing.
- Quality, effectiveness and appropriateness of the solution: correctness of data, relationships between data, data integrity, normalisation.

B2 Design documentation

The features and characteristics of relational database design techniques and their application to solve problems:

- requirements of the brief (audience, purpose and client's requirements)
- security and legal considerations:
  - Data protection legislation
  - The European Union (EU) Directive on Data Protection (legislation must be current and applicable to England, Wales, Northern Ireland)
- data structure designs:
  - data dictionaries and their use: tables, field attributes, validation
  - use of naming conventions
  - entity relationship diagrams
  - normalisation
- user interface design:
  - data entry/input – verification, validation, calculated fields, masks, directed input
  - reports – fields, queries, presentation of data, calculations
  - task automation – imports, updates, deletions
- extracting and presenting data:
  - queries using multiple criteria, form values and wild cards
  - action queries
  - calculated queries
  - reports
- design and use of test plans: to check correctness of data, functionality, accessibility, usability.

C Creating a relation database structure

C1 Producing a database solution

Select and configure appropriate RDBMS and SQL tools to produce a database solution to meet client's requirements:

- creating, setting up and maintaining data tables
- creating links, relationships between data tables
- applying data validation rules
- generating outputs – user-generated queries, automated queries, reports
- user interface – navigation, data-entry forms, sub-forms
- automated functions
- populating the database:
  - importing
  - adding data
  - manipulating data
- devising and using SQL statements to extract, manipulate and modify data.

C2 Testing and refining the database solution

- Different types of testing: referential integrity, functionality, security.
- Selection and use of appropriate test data: erroneous data, extreme data.
- Recording appropriate test documentation.
- Using testing outcomes to improve and refine a database solution.

D Evaluating a database development project

The characteristics, concepts, impact and implications of testing methodologies to monitor and evaluate database design, the database created, testing processes and success of the solution.

D1 Database design evaluation

Evaluating a design against the given requirements:

- use and application of an entity-relationship diagram, data dictionary, normalisation
- coverage of functionality requirements and identification of any omissions
- identification of design strengths and potential further improvements to meet given requirements.

D2 Evaluation of database testing

Evaluating the application of test data to ensure that the database solution meets requirements.

- Different types of testing:
  - o normal test data
  - o erroneous test data
  - o extreme test data.
- Recording of actual results and analysis.
- Commenting on results.
- Test records:
  - o completion of test records
  - o taking of and storing screenshots of tests.
- Making use of testing outcomes.
- Using iterative processes to improve accuracy, readability and robustness.
- Identifying and recording which tests were successfully met and which test data issues were not resolved.

D3 Evaluation of the database

Evaluating the software outcome against the given requirements.

- Strengths and weaknesses of the database:
  - o solution fitness for purpose
  - o intuitiveness and ease of use
  - o constraints of the database software used
  - o maintainability of the database
  - o extent to which database meets the given requirements.

Grade descriptors

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

Level 3 Pass

Learners are able to use their knowledge and understanding of database design and development terminology, standards, concepts and processes and apply problem-solving skills to design and develop a solution in context. Learners demonstrate their understanding of how to use standard database constructs to develop a functioning solution that evidences testing and evaluation.

Level 3 Distinction

Learners are able to evaluate a given problem and develop a detailed and complex solution to meet all requirements of the brief. They apply an in-depth understanding of database constructs, using test results to produce an optimised solution. Learners are able to evaluate the quality, performance and usability of their database with supporting justification.

Key terms typically used in assessment

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

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

Command or term	Definition
Annotated screen shot	Image copy of a computer screen (obtained by pressing the print screen key then pasting in a document) with added annotations explaining what the image shows.
Database structure	The structure is composed of fields (a single piece of data, e.g. name, date of birth, etc.), records (a complete set of fields, e.g. an employee's personnel record) and tables (a collection of records, e.g. all employees' personnel records).
Data dictionary	A centralised repository of information on data, such as meaning, relationships to other data, origin, usage, tables, fields and format.
Entity-relationship diagram	A diagrammatical representation of database tables and the relationships (and types of relationship) among them.
Evaluate	A review and synthesis of each stage of database design and development processes and outcomes to provide a supported judgement about the quality. Typically, a conclusion will be required.

Command or term	Definition
Normalisation	The process of organising raw data into separate related tables to minimise data redundancy.
Query	An SQL select statement that extracts data from a table or tables which match(es) defined criteria.
Test log	Used to plan and record program testing, record the outcomes of testing and the changes made to solve problems.
Report	A database report presents information from a database. Information should be displayed simply and efficiently. Printed reports from the database should allow the viewing of information quickly and easily.
User interface	The visual part of the database through which a user interacts with a computer or software. A good interface is intuitive and allows a user to easily enter the required data accurately. A user interface is implemented using screen forms with titles, labelled boxes for data-entry, buttons to perform actions and other features to make interaction as easy as possible.

Links to other units

The assessment for this unit should draw on knowledge, understanding and skills developed from:

- Unit 3: Using Social Media in Business.

Employer involvement

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

- guest speakers
- technical workshops hosted by staff from local organisations/businesses
- opportunities for observation of organisational/business application during work experience.

Unit 3: Using Social Media in Business

Level: **3**

Unit type: **Internal**

Guided learning hours: **90**

Unit in brief

Learners explore how businesses use social media to promote their products and services. Learners also implement social media activities in a business to meet requirements.

Unit introduction

Social media websites are a popular way for people to communicate and share information with friends and family. People spend a lot of time on social media websites and they give businesses opportunities to interact with people, for example to promote their business, to encourage people to visit their e-commerce site and buy, to provide customer service. You may be familiar with social media for personal use and in this unit you will discover how it can be used in a business context.

You will explore different social media websites, the ways in which they can be used and the potential pitfalls when using them for business purposes. You will develop a plan to use social media strategies for business purposes to achieve specific aims and objectives. You will then implement the plan, developing and posting content and interacting with others. Finally, you will collect data on the business use of social media and review the effectiveness of your efforts.

Understanding how to use social media for business purposes is useful for employment in information technology and in a variety of business sectors. Also, social media skills are closely linked with web and mobile applications development. This unit gives you a starting point for progression to roles such as social media specialist, content developer and web developer.

Learning aims

In this unit you will:

A Explore the impact of social media on the ways in which businesses promote their products and services

B Develop a plan to use social media in a business to meet requirements

C Implement the use of social media in a business.

Summary of unit

Learning aim	Key content areas	Recommended assessment approach
A Explore the impact of social media on the ways in which businesses promote their products and services	**A1** Social media websites **A2** Business uses of social media **A3** Risks and issues	A report that explores how a business can use social media to raise its profile and promote products and services.
B Develop a plan to use social media in a business to meet requirements	**B1** Social media planning processes **B2** Business requirements **B3** Content planning and publishing **B4** Developing an online community **B5** Developing a social media policy **B6** Reviewing and refining plans	Documentation showing the planning, preparation and implementation of the use of social media in a business, which meets identified requirements. Established social media pages dedicated to the business, which fulfil the requirements given in the plan, accompanied by supporting documentation.
C Implement the use of social media in a business	**C1** Creating accounts and profiles **C2** Content creation and publication **C3** Implementation of online community building **C4** Data gathering and analysis **C5** Skills, knowledge and behaviours	Statistical data generated by social media websites, including an analysis of how it was used to optimise the use of social media. A report evaluating the use of social media in a business against the plan, showing how well it meets business requirements.

Content

Learning aim A: Explore the impact of social media on the ways in which businesses promote their products and services

A1 Social media websites

- Developments in social media affect the way businesses promote products and services:
  - ○ social media websites are constantly evolving and new features are introduced regularly
  - ○ features, structure and target audience of different social media websites, e.g. Facebook™, Twitter™, LinkedIn®, Google™ + and YouTube™.
- How businesses can use social media websites to support their business aims and needs, including:
  - ○ creating an image or brand
  - ○ promoting products and/or services
  - ○ communicating with customers
  - ○ customer service
  - ○ resolving queries and managing issues.
- Features of social media websites tailored to business needs, including:
  - ○ advertising
  - ○ linking to previous e-commerce site search history and display of search-related adverts
  - ○ website and mobile device integration
  - ○ relationship to search engine optimization (SEO)
  - ○ profile on the sites, describing the business to visitors
  - ○ usage data indicating profile of followers and effectiveness of posts, e.g. Facebook Insights™, Twitter Analytics™ and Google Analytics™
  - ○ audience profiles (age, gender, income) of social media websites.

A2 Business uses of social media

- Posting different content formats, e.g. text, images, video, links, polls and quizzes.
- Content focus and meaning, e.g. information, promotion, humour, special offers and customer service.
- Developing an audience and encouraging people to follow or 'like' the business through the creation and use of engaging content.
- Keywords and their use in posted content.
- Developing contacts by following and linking relevant businesses and individuals, and sharing content posted by others.
- Direct and indirect advertising.
- Links to other commercial information, e.g. company website, e-commerce websites.
- Relationship between social media website and company website, e.g. using:
  - ○ social media buttons on the company website
  - ○ company website links within social media posts that encourage visits to e-commerce site to make purchases
  - ○ social media news feeds on the company website.

A3 Risks and issues

- Negative comments on social media sites and damage to reputation.
- Time constraints on social media interaction, return on time investment.
- Unforeseen consequences of posted content.
- Security issues related to increased company profile as a result of use of social media:
  - ○ dangers of virus infection
  - ○ potential for blackmail/ransom
  - ○ theft of company-sensitive information or personal information.

Learning aim B: Develop a plan to use social media in a business to meet requirements

B1 Social media planning processes

Processes to consider when planning the potential use of social media in a business, including:

- the specific business requirements
- content planning and publishing
- developing online communities
- enforcing social media policies.

B2 Business requirements

- Working with a client to set requirements for the use of social media and the potential benefits for the business when compared to traditional promotion methods.
- Establishing timescales and responsibilities for the use of social media within a business.
- Identifying criteria for measuring success of the use of social media within a business.
- Selection of social media websites to use by matching site profiles to requirements in terms of a business use of social media.
- Identifying targets for the use of social media, number of followers, 'likes' and shares.

B3 Content planning and publishing

Planning posts and other content to be published on social media websites, including:

- identifying a target audience (e.g. age, gender, interests, income)
- linking type of content to target audience to ensure it is engaging
- researching keywords (e.g. Google Adwords™) and creating keyword strategies to help users identify content
- researching the best time to publish content and creating a publishing schedule (type of content, frequency, day and time).

B4 Developing an online community

Working with a client to develop a strategy to encourage online community building, including:

- use of promotional techniques, e.g. requesting feedback, surveys, special offers and creating links between social media websites and company e-commerce site
- monitoring social media website streams and responding to queries, requests and complaints.

B5 Developing a social media policy

Working with a client to create a social media policy applicable to businesses, including:

- company philosophy (identifying and reflecting this in posted content)
- promotion of honesty and respect in posted content
- ways to ensure confidentiality of information
- methods of dealing with security issues
- separation of company and personal content
- legal and ethical considerations.

B6 Reviewing and refining plans

Working with a client and other relevant stakeholders to improve the quality, effectiveness and appropriateness of the plans, including:

- gathering feedback from a client and potential users
- communicating with a client, e.g. email, verbal communication
- scheduling and documenting meetings
- agreeing and adjusting timescales
- refining ideas and solutions.

Learning aim C: Implement the use of social media in a business

Selection and use of appropriate social media website tools and techniques to implement a plan.

C1 Creating accounts and profiles

- Sign-up, creation and administration of social media website business accounts.
- Creation and set-up of a company profile.
- Customisation and configuration of the company profile, including privacy settings, colour schemes, images, text and other assets that follow branding guidelines.

C2 Content creation and publication

- Carry out research in order to produce engaging content for the intended target audience.
- Produce, publish and manage content.
- Improve visibility of published content.
- Methods to encourage audience interaction, e.g. use of images, phrasing of text content, timing of posts to coincide with times when followers are online.
- Integration of information across company e-commerce website and social media websites.
- Adapting and testing content on different device platforms, e.g. mobile phones, tablets and notebooks.

C3 Implementation of online community building

- Implementation of an online community building strategy, including:
  - o use of hashtags, sharing and tagging
  - o finding and joining groups and contributing information
  - o following people and businesses.
- Monitoring and responding to comments; importance of prompt responses.
- Using tools and techniques to automate content posting.

C4 Data gathering and analysis

Gathering and interpreting data on social media websites using dedicated tools, e.g. Facebook Insights, Twitter Analytics, Google Analytics and TweetReach™.

- Identifying interaction relating to individual posts.
- Identifying audience profiles, e.g. age, location.
- Monitoring number of 'likes' and 'shares'.
- Comparison of intended target audience versus actual audience.
- Identification of posts and types of content which create the highest levels of interaction.
- Identifying the number of visitors who 'click through' to company e-commerce website.

C5 Skills, knowledge and behaviours

- Planning and recording, including the setting of relevant targets with timescales, how and when feedback from others, such as customers and social media followers, will be gathered.
- Reviewing and responding to outcomes, including the use of feedback from others, e.g. customers and social media followers who can provide feedback on the quality and suitability of the features against the business requirements.
- Demonstrating own behaviours and their impact on outcomes, to include professionalism, etiquette, supportive of others, timely and appropriate leadership, accountability and individual responsibility.
- Evaluating outcomes to help inform high-quality justified recommendations and decisions.
- Evaluating targets to obtain insights into own performance.

- Media and communication skills, including:
  - the ability to convey intended meaning, e.g. written (email, design documentation, recording documentation, reports, visual aids for presentation use); verbal communication requirements (one to one and group, informal and formal situations)
  - use of tone and language for verbal and written communications to convey intended meaning and make a positive and constructive impact on audience, e.g. positive and engaging tone, technical/vocational language suitable for intended audience, avoidance of jargon
  - responding constructively to the contributions of others, e.g. supportive, managing contributions so all have the opportunity to contribute, responding to objections, managing expectations, resolving conflict.

Assessment criteria

Pass	Merit	Distinction
Learning aim A: Explore the impact of social media on the ways in which businesses promote their products and services		**A.D1** Evaluate the business use of social media to interact with customers and promote products or services to a target audience.
A.P1 Explain the different ways in which a business can use social media. **A.P2** Explain the audience profiles of different social media websites.	**A.M1** Assess the different ways in which a business can use social media to attract a target audience.	
Learning aim B: Develop a plan to use social media in a business to meet requirements		**BC.D2** Evaluate the plan and use of social media in a business against business requirements. **BC.D3** Demonstrate individual responsibility, creativity, and effective self-management in the planning and use of social media in a business context.
B.P3 Produce a plan to use social media in a business to meet its business requirements. **B.P4** Review the plan with others in order to identify and inform improvements.	**B.M2** Justify planning decisions made, showing how the plan will fulfil its purpose and business requirements.	
Learning aim C: Implement the use of social media in a business		
C.P5 Produce business-related content using appropriate features of social media which meet the requirements of the plan. **C.P6** Review data obtained on social media usage and interaction.	**C.M3** Optimise the content, format and features of social media which meet the requirements of the plan.	

Essential information for assignments

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

There is a 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, BC.D2, BC.D3)

Further information for teachers and assessors

Resource requirements

For this unit, learners must have access to a variety of social media websites that will allow them to plan and implement the use of the social media features.

Essential information for assessment decisions

Learning aim A

For distinction standard, learners will produce a comprehensive, well-balanced evaluation of how a business uses social media, making realistic and well-explained business-related observations on the benefits and disadvantages, while considering their target customers or audience. Learners will provide real-life, relevant examples of how businesses have used social media effectively and how some businesses have not managed the risks involved effectively. Learners must articulate their arguments fluently and their views concisely, providing an evaluation that makes reasoned, valid judgements.

The evidence will demonstrate high-quality written/oral communication through the 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 present a reasoned and well-explained assessment of a range of different ways that a business can use social media to interact with the target audience for their products and/or services. The discussion will be balanced and supported by clear examples. Learners will focus their comments on the business uses of the sites and not personal uses. The evidence must be technically accurate and demonstrate good-quality written or oral communication.

For pass standard, learners will provide detailed information, supported by real-life examples, covering all the ways that businesses can use social media (as listed in the unit content). They will research the different audience profiles for the main social media sites, explain how the different sites appeal to their different audiences and relate it to how different business can use social media. The evidence may have some inaccuracies and include a limited range of examples.

Learning aims B and C

For distinction standard, learners will draw on and show synthesis of knowledge across the learning aims in order to evaluate both the plan to use social media and its implementation. Learners must provide a reasoned and realistic review of the outcomes, identifying both the positive and negative aspects. For example, they can explain why some things they planned to do did not happen or did not work out as they had expected. Learners also need to show that they have considered the legal and ethical implications of the material that they posted on social media sites. Learners will make reasoned, appropriate suggestions as to how the use of social media could be improved in the future. They will undertake a detailed examination of the data collected on the interaction achieved and the profile of the people who have interacted with their social media posts. This information will link clearly to a discussion of how well the data matches their intentions. For example, learners may discover that the age and location profile of the people interacting with their posts does not match the target audience of the business concerned. In this case, they would need to discuss possible reasons for the mismatch and how this issue could be resolved.

Learners will take individual responsibility for their own work, for example identifying potential issues and resolving these, reviewing their work and making improvements, keeping their work safe and secure and showing responsible use of quoted materials. Creativity will be shown, for example, through evidence of taking innovative approaches to problem solving and the originality of their solution. The evaluation of behaviours will consider learners' use of 'soft skills' in relation to the vocational context of the project, such as liaising with clients and time management. Learners will evaluate their own behaviours throughout the project and the impact they had on the outcomes. Learners will refer to tangible evidence to support their evaluation, such as meeting notes, correspondence and time plans.

For merit standard, learners will provide a clear, accurate and well-reasoned justification of the choices they made in the planning of the use of social media. Learners will show a clear link to the required business objectives. Learners also need to show that they have considered the legal and ethical implications of the material that they posted on social media sites. The usage data collected by learners will also assess how effective each of their posts has been at achieving their stated aim and how effective it has been in encouraging interaction with the audience. Learners will apply their knowledge through selection and application of appropriate tools and techniques to optimise the effectiveness of their future posts and other social media features. They will make accurate and reasoned suggestions as to how the outcomes could be improved if the task were to be repeated.

For pass standard, learners will produce a plan that meets the business requirements and identifies the target audience. The plan will also identify timescales and keywords, and include a content-posting schedule. Learners will show an awareness of legal and ethical implications of the content they plan to post.

Learners will review their plan, and ask others such as the client/employer and customers/audience to assist them in this process and provide evidence of their review.

Learners will select a variety of social media websites and implement their plan and interact with their followers. Some simulation may be required in order to provide the interaction and fellow learners can play the role of 'customers' for each other. Learners can provide evidence in the form of annotated screenshots showing how they have implemented the plan they have created.

Learners must collect and review a range of data using features such as Facebook Insights, Google Analytics and Twitter Analytics, showing the interaction that individual posts have created and the profile of their audience. This data will be used to optimise their future posts, for example by adjusting the wording, content and timing of posts, as well as demonstrating use of any other new features.

Links to other units

This unit links to:
- Unit 1: Information Technology Systems
- Unit 2: Creating Systems to Manage Information
- Unit 6: Website Development.

Employer involvement

This unit would benefit from employer involvement in the form of:
- guest speakers
- technical workshops involving staff from local organisations/businesses
- contribution of design/ideas to unit assignment/scenario/case study/project materials, including own organisation/business materials as exemplars where appropriate
- feedback from staff from local organisations/businesses on plans/designs/items developed
- opportunities for observation of organisational/business application during work experience
- support from local organisation/business staff as mentors.

Unit 4: Programming

Level: **3**

Unit type: **Internal**

Guided learning hours: **90**

Unit in brief

Learners study the underpinning concepts and implications of programming languages to design, develop and test computer programs.

Unit introduction

Organisations and individuals increasingly depend on the functions and services offered by computing devices such as smartphones, tablets, laptops and personal desktop computers. You make use of computing programs when using an operating system or application programs such as word processing and spreadsheets. Understanding the concepts of high-quality software application design and development is key to ensuring that products are effective. As a programmer, you will need to understand the characteristics of different programming languages in order to select and apply appropriate methodologies to meet a client's needs.

Many organisations and businesses rely on computer programs to help deliver products and services. Organisations and businesses (often known as 'clients') work closely with programmers to help design and build computer programs that fulfil their requirements. To complete the assessment task within this unit, you will need to draw on your learning from across your programme of study and apply programming skills to provide a solution for a new IT-related problem.

You will learn about computational thinking skills and the principles of designing and developing computer programs. You will apply computational thinking skills to design, develop, test, refine and review computer programs for a given range of purposes. By developing your analytical, problem-solving and programming skills, this unit will help you to progress to higher education or to employment as a software developer.

Learning aims

In this unit you will:

A Examine the computational thinking skills and principles of computer programming

B Design a software solution to meet client requirements

C Develop a software solution to meet client requirements.

Summary of unit

Learning aim	Key content areas	Recommended assessment approach
A Examine the computational thinking skills and principles of computer programming	**A1** Computational thinking skills **A2** Uses of software applications **A3** Features and characteristics of programming languages **A4** Constructs and techniques and their implementation in different languages **A5** Principles of logic applied to program design **A6** Quality of software applications	A report evaluating computational thinking skills and how the principles of software design and computer programming are applied to create effective, high-quality software applications.
B Design a software solution to meet client requirements	**B1** Software development life cycle **B2** Software solutions design	A project brief identifying the scope of the problem and user/client requirements. Design documentation for the suggested solution. User feedback and design refinement documentation. Development and support documentation, including development and testing logs, meeting notes and a report that evaluates the outcomes and development of the project.
C Develop a software solution to meet client requirements	**C1** Software solutions development **C2** Testing software solutions **C3** Improvement, refinement and optimisation of software applications **C4** Review of software solutions **C5** Skills, knowledge and behaviours	

Content

Learning aim A: Examine the computational thinking skills and principles of computer programming

A1 Computational thinking skills

Application of computational thinking skills involved in analysing problems and processes, in order to identify solutions that can be developed into software applications.

- Decomposition:
  - o identifying and describing problems and processes
  - o breaking down problems and processes into distinct steps
  - o describing problems and processes as a set of structured steps
  - o communicating the key features of problems and processes to others as relevant.
- Pattern recognition:
  - o identifying common elements or features in problems or systems
  - o identifying and interpreting common differences between processes or problems
  - o identifying individual elements within problems
  - o describing patterns that have been identified
  - o making predictions based on identified patterns.
- Pattern generalisation and abstraction:
  - o identifying information required to solve an identified problem
  - o filtering out information required to solve an identified problem.
- Representing parts of a problem or system in general terms by identifying:
  - o variables
  - o constants
  - o key processes
  - o repeated processes
  - o inputs
  - o outputs.

A2 Uses of software applications

The uses and implications of software applications in solving problems and fulfilling needs, including:

- gaming and entertainment
- productivity
- information storage and management
- repetitive tasks or dangerous tasks
- social media
- search engines.

A3 Features and characteristics of programming languages

- The uses and applications of different types of high and low-level programming languages, developed to assist in the solution of particular problems, such as:
  - o procedural, e.g. C, Perl®, Python™
  - o object-orientated, e.g. C++, C#®, Java®
  - o event-driven, e.g. Visual Basic®
  - o machine, e.g. Assembler
  - o mark-up, e.g. HTML.

- Factors to compare and contrast in programming languages, including:
  - o hardware and software needed for running and developing a program
  - o special devices required
  - o performance
  - o preferred application areas
  - o development time
  - o ease of development.

A4 Constructs and techniques and their implementation in different languages

- Programming languages, constructs and techniques, including:
  - o command words
  - o constants and variables, local and global variables
  - o data types – character, string, integer, real, Boolean
  - o statements – assignment, input and output, sequence, iteration, selection
  - o logical operations.
- Other constructs, such as:
  - o subroutines, functions and procedures
  - o string handling, including examining single characters and substrings
  - o arrays – two-dimensional and three-dimensional, splitting and joining
  - o file handling – open, read, write, close, database
  - o data structures
  - o event handling.
- Documentation of code.

A5 Principles of logic applied to program design

Principles, including:

- iteration – repetition of a computational procedure applied to the result of a previous application
- mathematical logic – inference, consistency, completeness, verification by truth tables
- propositional dynamic logic to demonstrate the function of algorithms
- use of sets, e.g. properties and interrelationships of sets of data, search/filter sets of data.

A6 Quality of software applications

How the design and implementation of a software application affects quality, including:

- efficiency/performance, e.g. the system resources consumed by the program, CPU cycles, processor time, memory space, accessing storage media
- maintainability, e.g. ease with which a program can be modified by its present or future developer in order to carry out corrective, perfective or adaptive maintenance
- portability, e.g. range of computer hardware, operating systems and platforms on which the source code can be run/compiled/interpreted
- reliability, e.g. accuracy and the consistency of its outputs
- robustness, e.g. quality of coding and testing to ensure that extreme and erroneous data can be processed without causing the program to crash
- usability, e.g. ease with which an end user can use the program.

Learning aim B: Design a software solution to meet client requirements

B1 Software development life cycle

Application of the software development life-cycle stages, including:

- assessment of the requirements for an identified problem
- design specification, e.g. scope, inputs/outputs, user interface, timescales
- develop code
- implementation
- test, e.g. white box and black box testing, refinement, optimisation
- maintenance, e.g. corrective, adaptive and increased functionality.

B2 Software solutions design

- Problem definition statements, to include: intended users, full summary of the problem to be solved, constraints, benefits, nature of interactivity, complexity of problem.
- Purpose and any other requirements as defined in a client brief.
- Features of software:
  - description of main program tasks, input and output formats
  - diagrammatic illustrations, to include screen layouts, user interfaces, navigation
  - algorithms and processing stages, to include flowcharts, pseudocode and events
  - data structures
  - data storage
  - control structures
  - data validation
  - error handling and reporting.
- Choice of language.
- List of pre-defined programs and/or code snippets.
- List of ready-made and/or original assets such as a digital animation, digital graphic, digital audio and video.
- Feedback from others to help refine alternative design ideas/prototypes and make decisions.
- Test plan with test data to include typical, extreme and erroneous data.
- Technical and design constraints, e.g. connectivity, memory storage, programming languages.

Learning aim C: Develop a software solution to meet client requirements

C1 Software solutions development

The process of software development, including:

- the development environment to produce code
- the development and refinement of software programs using a suitable programming language
- library routines, standard code and user generated subroutines used to add to the efficiency of a program.

C2 Testing software solutions

Testing of the programs, including:

- test plan
- test data – typical, extreme and erroneous data
- selection and use of appropriate types of testing to test part or all of a program, e.g. functional testing, stability, compatibility.

C3 Improvement, refinement and optimisation of software applications

Methods of improving, refining and optimising, e.g.:

- annotated code to allow effective repair/debugging of the program and maintainability
- program compilation for a designated platform or environment
- review – quality of a program in terms of reliability, usability, efficiency/performance, maintainability, portability
- eliciting feedback from users
- making use of the outcomes of testing and feedback
- documenting changes to the design and solution.

C4 Review of software solutions

Evaluation of software solutions, including:

- suitability for audience and purpose
- ease of use
- quality of the software solution, e.g. reliability, usability, efficiency/performance, maintainability, portability
- constraints of the programming language
- other constraints, e.g. time, programmer knowledge, rules of languages vary with implementation
- strengths and weaknesses of the software solutions
- improvements that can be made
- optimising software solutions, e.g. improving robustness, improving efficiency of the code, adding additional functionality.

C5 Skills, knowledge and behaviours

- Planning and recording, including the setting of relevant targets with timescales, how and when feedback from others will be gathered.
- Reviewing and responding to outcomes, including the use of feedback from others, e.g. IT professionals and users who can provide feedback on the quality of the program and its suitability when assessed against the original requirements.
- Demonstrating own behaviours and their impact on outcomes, to include professionalism, etiquette, supportive of others, timely and appropriate leadership, accountability and individual responsibility.
- Evaluating outcomes to help inform high-quality justified recommendations and decisions.
- Evaluating targets to obtain insights into own performance.
- Media and communication skills, including:
  - the ability to convey intended meaning, e.g. written (email, design documentation, recording documentation, reports, visual aids for presentation use); verbal communication requirements (one to one and group informal and formal situations)
  - use of tone and language for verbal and written communications to convey intended meaning and make a positive and constructive impact on audience, e.g. positive and engaging tone, technical/ vocational language suitable for intended audience, and avoidance of jargon
  - responding constructively to the contributions of others, e.g. supportive, managing contributions so all have the opportunity to contribute, responding to objections, managing expectations and resolving conflict.

Assessment criteria

Pass	Merit	Distinction
Learning aim A: Examine the computational thinking skills and principles of computer programming		
A.P1 Explain how computational thinking skills are applied in finding solutions that can be interpreted into software applications. **A.P2** Explain how principles of computer programming are applied in different languages to produce software applications. **A.P3** Explain how the principles of software design are used to produce high-quality software applications that meet the needs of users.	**A.M1** Analyse how computational thinking skills can impact software design and the quality of the software applications produced.	**A.D1** Evaluate how computational thinking skills can impact software design and the quality of the software applications produced.
Learning aim B: Design a software solution to meet client requirements		
B.P4 Produce a design for a computer program to meet client requirements. **B.P5** Review the design with others to identify and inform improvements to the proposed solution.	**B.M2** Justify design decisions, showing how the design will result in an effective solution.	**BC.D2** Evaluate the design and optimised computer program against client requirements. **BC.D3** Demonstrate individual responsibility, creativity and effective self-management in the design, development and review of the computer program.
Learning aim C: Develop a software solution to meet client requirements		
C.P6 Produce a computer program that meets client requirements. **C.P7** Review the extent to which the computer program meets client requirements.	**C.M3** Optimise the computer program to meet client requirements.	

Essential information for assignments

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

There is a 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.P3, A.M1, A.D1)

Learning aims: B and C (B.P4, B.P5, C.P6, C.P7, B.M2, C.M3, BC.D2, BC.D3)

Further information for teachers and assessors

Resource requirements

For this unit, learners must have access to a range of programming languages, IDEs (integrated development environment) and diagramming tools to allow them to use a variety of tools and techniques (given in the unit content) to design and develop computer programs.

Learners will need access to examples of programs and code bases written in a range of languages for a number of different purposes. While access to the code base of many proprietary applications is restricted, there are many open-source alternatives that can be used.

Essential information for assessment decisions

Learning aim A

Evidence for this assignment will be in the form of a written response that investigates computational thinking skills and the principles and purpose of different programming languages. The report will make use of specific examples of code implementation (and the chosen paradigm) to explore how the example code has been implemented to meet specific needs.

The code base used by learners in their investigation must be of sufficient complexity to allow analysis of the implementation of a range of programming constructs, including standard and language-specific techniques, logical structures and mathematical principles.

For distinction standard, learners will provide an evaluation of how computational thinking skills are used to find solutions to problems and how this can impact software design and the applications developed. They will provide a clear and balanced evaluation of the use of different programming languages (in identified programs) to solve different, specific problems. Learners will provide a detailed analysis of the programming principles used in the identified programmes. They will evaluate the success of their implementation in terms of the quality of code produced, and in a wider context where applicable. Quality will be considered in terms of the degree to which user requirements are met, the robustness of the code, its maintainability, efficiency, portability and ease of use.

Learners will provide an evaluation of the identified programming languages. They will consider the principles they have analysed and explain why specific programming languages are used and what advantages they may offer to the programmer and the end user.

Learners must articulate their arguments and views fluently and concisely, providing an evaluation that makes reasoned and valid judgements. The evidence will demonstrate high-quality written/ oral communication through the 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 analyse how computational thinking skills can impact software design, highlighting features of decomposition, pattern recognition and pattern generalisation and abstraction. Learners will show a clear understanding of how different programming languages are implemented to solve problems. They will provide a balanced and reasoned analysis of the strengths and weaknesses of the identified code in solving the problems and the quality of the implementations. They will analyse the strengths and weaknesses of the identified languages and how they affect the requirements of the user and the development of a program to meet defined needs. The evidence will be technically accurate and demonstrate good-quality written or oral communication.

For pass standard, learners will explain how computational thinking skills are used to find solutions to problems. They will explain the range of programming languages available, as given in the unit content. Learners will explain how each differs in terms of constructs, techniques, use and requirements. They must choose one example program that has been created to solve a particular problem/meet a specific need, and provide descriptions of how programming constructs and the principles of software design have been applied to develop a solution to meet the required needs of users. Learners will also consider how computational thinking skills may have been applied when exploring the principles of software design. They will explain how different software design methods can be used to produce effective applications. This can be achieved by using supporting examples. The evidence may have some inaccuracies and may include limited use of examples to illustrate the explanations.

Learning aims B and C

Learners must develop a program to solve a specific problem. The problem must be of significant complexity to allow learners to demonstrate the application of a range of appropriate problem solving and programming skills.

For distinction standard, learners will draw on and show synthesis of knowledge across the learning aims to produce a detailed evaluation of the planning, development and refinement of the solutions in line with client requirements. They must explain methodologies applied throughout the process and justify their use in ensuring the requirements of the client are met.

Learners must provide a thorough evaluation of the effectiveness of the final program, including a systematic evaluation of the techniques, principles and constructs applied in their program. They will provide well-considered, justifiable suggestions for future improvements to the program.

Evaluation of behaviours will consider learners' use of 'soft skills' in relation to the vocational context of the project, such as managing and liaising with other members of the team or clients and time management. Learners will evaluate their own behaviours throughout the project and the impact they have on the outcomes. Learners must refer to tangible evidence to support their evaluation such as meeting notes, correspondence and time plans.

For merit standard, learners will apply their knowledge through the selection and application of appropriate methodologies to plan, develop and test an effective, optimised computer program. Learners will use feedback from others to identify how their design could be improved and produce a solution design.

Learners must provide a clear, accurate and well-reasoned justification for the decisions made throughout the development of the program, linking decisions to their effectiveness in meeting user requirements. In doing this, learners will optimise the effectiveness and efficiency of their solution in line with the user requirements. They will take feedback from others into account and explain how they decided to accept or reject recommendations.

Learners must optimise their computer program by making use of testing and feedback throughout development to improve and refine their code to fully meet client requirements, for example improving data validation procedures, the efficiency of the code or the usability of the program.

For pass standard, learners will apply their understanding of the software development life cycle to design and develop a computer program to meet identified requirements. Learners must apply an understanding of client requirements and provide planning documentation that demonstrate the possible solutions to the identified problems. They will seek feedback on their design and use this feedback to improve the quality of their design solution for the problem.

Learners must produce evidence that the finished program has been tested using a number of different appropriate testing methods to ensure they are functional. They must produce solutions that meet the requirements of the client; however some small issues may persist.

Learners must provide a review of whether their work meets client requirements, considering both positive and negative aspects of the outcomes, although their review may be unbalanced and/or superficial. They will use relevant feedback, such as client feedback, to make suggestions regarding possible alternative solutions that could be implemented.

Links to other units

The assessment for this unit should draw on knowledge, understanding and skills developed from:

- Unit 1: Information Technology Systems
- Unit 2: Creating Systems to Manage Information
- Unit 3: Using Social Media in Business.

This unit would relate to teaching of:

- Unit 5: Data Modelling
- Unit 7: Mobile Apps Development
- Unit 8: Computer Games Development.

Employer involvement

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

- guest speakers
- technical workshops involving staff from local organisations/businesses
- contribution of design/ideas to unit assignment/scenario/case study/project materials, including own organisation/business materials as exemplars where appropriate
- feedback from staff from local organisations/businesses on plans/designs/items developed
- opportunities for observation of organisational/business application during work experience
- support from local organisation/business staff as mentors.

Unit 5: Data Modelling

Level: **3**
Unit type: **Internal**
Guided learning hours: **60**

Unit in brief

Learners study how data modelling can be used to solve problems. They will design and implement a data model to meet client requirements.

Unit introduction

In all aspects of life, individuals are constantly faced with situations where they must weigh up the available information in order to produce alternatives and make decisions. In the working environment, effective decision making can ensure the successful development of organisations. Poor decision making can have significant negative consequences and can even lead to the demise of an organisation.

In this unit, you will investigate the fundamentals of the decision-making process. You will find out how using data modelling provides the computational ability to compare consequences, and determine a preferred course of action. You will develop the skills and techniques necessary to create complex spreadsheets in order to produce accurate information that informs decision making. You will examine a scenario and then design, develop and test a spreadsheet; you will review your spreadsheet and make refinements based on user feedback, providing an evaluation of the effectiveness of the alternatives produced.

The skills developed in this unit are useful for progression to computing or business-related higher education courses and for use in decision making in the workplace.

Learning aims

In this unit you will:

A Investigate data modelling and how it can be used in the decision-making process

B Design a data model to meet client requirements

C Develop a data model to meet client requirements.

Summary of unit

Learning aim	Key content areas	Recommended assessment approach
A Investigate data modelling and how it can be used in the decision-making process	**A1** Stages in the decision-making process **A2** Spreadsheet features used to support data modelling **A3** Using data modelling to consider alternatives **A4** Evaluating models **A5** Documenting and justifying decisions	A presentation or report evaluating the role of data modelling in the decision-making process.
B Design a data model to meet client requirements	**B1** Functional specification **B2** Spreadsheet model design **B3** Reviewing and refining data model designs	A practical activity, involving the design and development of a data model to fulfil identified client requirements. A functional specification, design documentation, spreadsheet development and testing logs. A report that evaluates the effectiveness of the alternatives considered, and suggests ways in which the alternatives could be improved if the task were to be repeated.
C Develop a data model to meet client requirements	**C1** Developing a data model solution **C2** Testing the data model solution **C3** Reviewing and refining the data model solution **C4** Skills, knowledge and behaviours	

Content

Learning aim A: Investigate data modelling and how it can be used in the decision-making process

A1 Stages in the decision-making process

- Understanding the scenario.
- Identifying information and sources:
  o information required
  o information that is already available
  o additional information needed
  o sources of additional information
  o requirements for verifying the information sources.
- Factors affecting the quality of information:
  o currency of data
  o accuracy of data
  o external factors.
- Analysing the information.
- Identifying alternatives.
- Identifying consequences of implementing the alternatives.
- Making a decision.
- Justifying the decision.
- Communicating decision(s) to others (e.g. client, supervisor, project sponsor), as appropriate.

A2 Spreadsheet features used to support data modelling

- Entering and editing data.
- Formatting data.
- Using formulae and functions.
- Validation (and verification) of data.
- Analysing and interpreting data.
- Presenting data.

A3 Using data modelling to consider alternatives

- Identifying the inputs required for the model.
- The range of outputs that can be produced.
- Benefits and limitations of alternative solutions.
- Impact/consequences of alternative solutions.
- Identifying the alternative solution(s) that produce the best decision or compromise.

A4 Evaluating models

Factors to consider in the evaluation of the model:

- how well the model reflects the scenario being modelled
- the decisions that can be made, using the model
- whether the model can be improved
- whether or not there are other factors that could be used to extend the model.

A5 Documenting and justifying decisions

Requirements for documenting and justifying the model:

- summarising the situation
- identifying information sources used
- indicating the factors considered
- indicating method used to reach a decision
- justifying the choice of information sources, factors considered and methods used.

Learning aim B: Design a data model to meet client requirements

B1 Functional specification

Designing a functional specification to meet requirements:

- nature of the problem
- functions the model must perform
- user interface
- constraints
- success criteria.

B2 Spreadsheet model design

A design which shows how the spreadsheet model will look and work.

- Producing worksheet structure diagrams that show:
  - layout and presentation
  - processing
  - data entry and validation
  - navigation
  - output.
- Producing a test plan to show:
  - test data
  - purpose of the test
  - expected result.

B3 Reviewing and refining data model designs

Working with clients and others to improve the quality, effectiveness and appropriateness of designs.

- Gathering feedback from client(s) and potential users on the extent to which the design meets requirements.
- Communicating with clients, e.g. email, verbal communication.
- Scheduling and documenting meetings.
- Agreeing and adjusting timescales.
- Refining ideas and solutions.
- Updating design specification documentation, based on review and feedback.

Learning aim C: Develop a data model to meet client requirements

C1 Developing a data model solution

- Processing features and requirements:
  - formulae, e.g. add, subtract, divide, multiply
  - functions e.g. SUM, AVERAGE, COUNT, COUNTIF, LOOKUP, INDEX, GOAL SEEK
  - logical functions e.g. IF, NOT, AND, OR, WHATIF
  - nested IF functions
  - data manipulation, e.g. sorting, grouping, filtering, pivoting data
  - importing and exporting data
  - autofill
  - replication
  - relative and absolute cell referencing
  - using macros and buttons to initiate procedures.

- Data entry and validation requirements and methods:
  o use of data entry forms
  o restricting data input to acceptable values
  o protecting cells by hiding, locking and password protecting
  o ease of use techniques, e.g. list boxes and drop-down menus
  o automated data transfer between sheets or applications
  o adding user prompts and messages.
- Layout and presentation considerations:
  o font size and style
  o merging cells
  o colours, borders, shading
  o conditional formatting
  o headers and footers
  o graphics.
- Output requirements:
  o worksheet layout
  o graphics
  o colours, borders and shading
  o charts and graphs.

C2 Testing the data model solution

Using formative and summative testing to test data models, including functionality and acceptance.

- Testing to establish whether:
  o the solution meets all of the requirements of the functional specification
  o the underlying logic of the model is correct
  o all the functions and formulae work correctly.
- Other factors to consider:
  o selection and use of appropriate test data, e.g. valid, invalid, erroneous, extreme
  o selecting suitable users for solution testing
  o gathering feedback from users, e.g. effectiveness, presentation, performance and purpose
  o designing and completing test documentation.

C3 Reviewing and refining the data model solution

Making improvements and/or refinements to the model in order to meet client requirements.

- Refining the model to take account of issues raised during testing.
- Refining the model to take account of the feedback and client requirements.
- Factors that could be used to extend the model.

C4 Skills, knowledge and behaviours

- Planning and recording, including setting relevant targets with timescales, how and when feedback from others will be gathered.
- Reviewing and responding to outcomes, including the use of feedback from others, e.g. professionals who can provide feedback on the quality of the data model and its suitability against the design requirements.
- Demonstrate own behaviours and their impact on outcomes to include professionalism, etiquette, support of others, timely and appropriate leadership, accountability and individual responsibility.
- Evaluating outcomes to help inform high-quality, justified recommendations and decisions.
- Evaluating targets to obtain insights into own performance.

- Media and communication skills, including:
  - o the ability to convey intended meaning, e.g. written (email, design documentation, recording documentation, reports, visual aids for presentation use); verbal communication requirements (one to one and group informal and formal situations)
  - o use of tone and language for verbal and written communications, to convey intended meaning and make a positive and constructive impact on audience, e.g. positive and engaging tone, technical/vocational language suitable for intended audience, avoidance of jargon
  - o responding constructively to the contributions of others, e.g. supportive, managing contributions so all have the opportunity to contribute, responding to objections, managing expectations, resolving conflict.

Assessment criteria

Pass	Merit	Distinction
Learning aim A: Investigate data modelling and how it can be used in the decision-making process		
A.P1 Explain the stages involved in the decision-making process for data modelling. **A.P2** Explain how the features of spreadsheet software are used to support the decision-making process.	**A.M1** Analyse how the features of spreadsheet software contribute to the decision-making process.	**A.D1** Evaluate how the features of spreadsheet software contribute to the decision-making process.
Learning aim B: Design a data model to meet client requirements		
B.P3 Produce designs for a data model which meet client requirements. **B.P4** Review the designs with others, to identify and inform improvements.	**B.M2** Justify decisions made, showing how the design will fulfil its purpose and client requirements.	**BC.D2** Evaluate the design and optimised data model against client requirements. **BC.D3** Demonstrate individual responsibility, creativity, and effective self-management in the design, development and review of a data model.
Learning aim C: Develop a data model to meet client requirements		
C.P5 Develop a data model to meet client requirements. **C.P6** Test the data model for correctness, functionality and acceptance. **C.P7** Review the extent to which the data model meets client requirements.	**C.M3** Optimise the data model to meet client requirements.	

Essential information for assignments

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

There is a 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, C.P7, B.M2, C.M3, BC.D2, BC.D3)

Further information for teachers and assessors

Resource requirements

For this unit, learners must have access to hardware and software resources that will allow them to use the features and functions of spreadsheet software, as given in the unit content, to design and develop data models.

Essential information for assessment decisions

Learning aim A

For distinction standard, learners will produce a comprehensive, detailed explanation of the stages involved in the decision-making process, considering how a systematic approach using valid information leads to informed decisions that can be justified. Learners will evaluate the use of advanced features and functions of a spreadsheet in data modelling, and clearly show how this contributes to the decision-making process.

Learners' 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 produce a detailed explanation of the stages involved in the decision-making process and show clear understanding of how a systematic approach using valid information leads to informed decisions. Learners will analyse how advanced features and functions of spreadsheet software in data modelling can contribute to the decision-making process.

The evidence will be technically accurate and demonstrate good-quality written/oral communication.

For pass standard, learners will produce an explanation of the stages involved in the decision-making process, and show understanding of how a systematic approach using valid information leads to informed decisions. Learners will show understanding of advanced features and functions of spreadsheet software in data modelling. The evidence may have some inaccuracies and make limited use of examples.

Learning aims B and C

For distinction standard, learners will provide evidence of designing and developing a data model for a specified scenario that meets client requirements. Learners will draw on and show synthesis of knowledge across the learning aims to evaluate how the decisions and processes applied throughout the design, development and testing stages, impact on the effectiveness of the final solution.

Learners must produce detailed designs for a data model, which will include a range of alternative solutions. Learners will evaluate the alternatives and their impact and consequences, selecting, and justifying the selection of the alternative(s) that produce the best decision or compromise. Learners will develop their final design using a range of appropriate, advanced spreadsheet features and functions. They will carry out comprehensive testing and seek user feedback which will be used to refine and improve their data model. They will evaluate the final design and produce well-considered, justifiable suggestions for future improvements to the data model.

Learners will produce an evaluation that is a systematic and accurate review of their own skills and performance and the impact that this had on the effectiveness of the solutions. Learners will take individual responsibility for their own work, for example identifying potential issues and resolving them, reviewing their work and making improvements, keeping their work safe and secure and showing responsible use of quoted materials. Creativity will be shown, for example, by evidence of taking innovative approaches to problem solving, and the originality of their solution.

For merit standard, learners will provide evidence of designing and developing a data model for a specified scenario that meets client requirements. They will justify how the decisions made and processes applied throughout the design, development and testing stages impact on the effectiveness of the final solution.

Learners will produce detailed designs for a data model that will include a range of alternative solutions. Learners will analyse the alternatives and their impact, selecting the alternative(s) that produce the best solution. Learners must develop their final design using a range of advanced spreadsheet features and functions. They will carry out testing and seek user feedback, which will be used to refine and improve their data model. Learners will analyse the final design and provide reasoned justification of how it fulfils its purpose and meets client requirements.

For pass standard, learners will provide evidence of designing and developing a data model for a specified scenario that meets client requirements, although some small issues may persist. They will explain how the decisions made and processes applied throughout the design, development and testing stages impact on the effectiveness of the final solution.

Learners will produce designs for a data model that will include a range of alternative solutions. Learners will consider the alternatives and their impact, selecting the alternative(s) that produce the best solution. Learners must develop their final design using a range of spreadsheet functions, carry out testing and seek user feedback. The results of testing and user feedback can be used to refine and improve their data model. Learners must review the extent to which the final design meets client requirements, although the review may be unbalanced.

Links to other units

This unit links to *Unit 1: Information Technology Systems*.

Employer involvement

This unit would benefit from employer involvement in the form of:
- guest speakers
- technical workshops involving staff from local organisations/businesses
- contribution of design/ideas to unit assignment/scenario/case study/project materials, including own organisation/business materials as exemplars where appropriate
- feedback from staff from local organisations/businesses on plans/designs/items developed
- opportunities for observation of organisational/business application during work experience
- support from local organisation/business staff as mentors.

Unit 6: Website Development

Level: **3**
Unit type: **Internal**
Guided learning hours: **60**

Unit in brief

Learners investigate website development principles. They will design and develop a website using scripting languages.

Unit introduction

Increasingly, organisations rely on websites to serve customers and, in some cases, to generate revenue. With millions of web pages being created daily, the need for websites to be engaging, innovative and desirable is important. As a website developer, you must use sophisticated techniques to capture user interest and to ensure that customers are served. The scripting involved in the development of websites has become crucial: website developers need to understand and acquire the necessary skills to find solutions to a variety of scenarios and problems.

In this unit, you will review existing websites – commenting on their overall design and effectiveness. You will use scripting languages such as Hypertext Markup Language (HTML), Cascading Style Sheets (CSS) and JavaScript® and a simple text editor, or rapid application development tools. Finally, you will reflect on the website design and functionality using a testing and review process.

Many software developers, database experts and systems managers need web-client development skills as an integral part of their overall portfolio of expertise. This unit will prepare you for employment as a website developer or as a website development apprenticeship. The unit will benefit you if you want to go on to higher education to develop your studies.

Learning aims

In this unit you will:

A Understand the principles of website development

B Design a website to meet client requirements

C Develop a website to meet client requirements.

Summary of unit

Learning aim	Key content areas	Recommended assessment approach
A Understand the principles of website development	**A1** Purpose and principles of website products **A2** Factors affecting website performance	A report describing the different types and purposes of websites. This will include an explanation of the factors that affect website performance and mathematical principles used in website development.
B Design a website to meet client requirements	**B1** Website design **B2** Common tools and techniques used to produce websites	Learners' devised design documentation arising from the identification of client requirements. A digital version of the website product, including an observation record sheet and supporting documentation, such as scripts and annotated screenshots, to justify design decisions. A report evaluating the design and the website against the client requirements.
C Develop a website to meet client requirements	**C1** Client-side scripting languages **C2** Website development **C3** Website review **C4** Website optimisation **C5** Skills, knowledge and behaviours	

Content

Learning aim A: Understand the principles of website development

A1 Purpose and principles of website products

- Purpose of websites, including the features of:
  - content-based (Web 2.0 technologies)
  - product and/or service-based
  - target audience, e.g. social networker, seekers, gamers, buyers, age profile, gender
  - requirements, e.g. user-friendly, consistent, navigational, customisable, flexible.
- Principles of website design, e.g. usability, white space, site layout, accessibility, spacing, navigation, typography, alignment, clarity, consistency/intuitiveness, accuracy, content, media, simplicity.
- Media and objects, e.g. position, colour, contrast, size, appropriateness.
- Creativity and innovation, e.g. unconventional layouts, white space, 'outside of the box' thinking, golden ratio.
- Search engine optimisation, e.g. indexing (meta tags), use of keywords, importance of updates, limiting crawling.

A2 Factors affecting website performance

- Where scripts run (on the web server – server-side scripts, or the local client machine – client-side scripts).
- Browser compliance, e.g. which elements are supported by different browsers.
- Server-side factors, e.g. bandwidth availability, number of hits, file types.
- Client-side factors, e.g. upload and download speeds, browser, cache memory, processor speed, interactivity.

Learning aim B: Design a website to meet client requirements

B1 Website design

Understanding the steps involved in developing a design for a client website.

- Problem definition statement requirements: intended audience, full summary of the problem to be solved, constraints, benefits, nature of interactivity, complexity of the website.
- Purpose requirements as defined in a client brief for their interactive website.
- Application of website design principles by professionally created websites.
- Initial design ideas/prototypes (illustrating design principles) and the requirements for an interactive website, including:
  - diagrammatic illustrations, e.g. storyboard, mood board, wireframe, site maps
  - realistic representations
  - search engine optimisation
  - alternative design ideas/prototypes, including compatibility with mobile/tablet devices.
- Client-side scripting design tools and techniques, e.g. pseudocode, flow charts (including use of British Computer Society (BCS) standard flow chart symbols) used to develop original code.
- Effective use of ready-made and/or original assets, e.g. a digital animation, digital graphic, digital audio and video, or any other combined assets.
- Obtaining and using feedback from others to help refine alternative design ideas/prototypes and make decisions.
- Testing plan requirements and its completion with test data, to test functionality.
- Identifying technical and design constraints and working around them.

- Legal and ethical considerations applicable to the equivalent legislation in England, Wales and Northern Ireland:
  - Copyright, Designs and Patents Act 1988 and its requirements in terms of protecting software products and digital media, such as images, music and films.
  - Data protection legislation and the requirements it places on organisations to keep data about living individuals secure.

B2 Common tools and techniques used to produce websites

Use of tools and techniques and their suitability for different client requirements.

- HTML, HTML5 and subsequent updates.
- Tables.
- Forms, text field, text area, buttons, radio buttons, check boxes.
- Navigation, menus, hyperlinks (internal and external), anchors.
- Interactive components, e.g. hot spots, pop-ups, buttons, menus, rollover images.
- Colour schemes, styles and templates.
- CSS, e.g. background colour, background images, text formatting, borders, padding, heading styles, element position.
- Embedded multimedia/digital asset content, e.g. digital animation, digital graphics, digital audio, digital video.
- Accessibility features, e.g. alternative tags, zoom features, text-to-speech.
- The World Wide Web Consortium (W3C®) standards for accessibility and HTML compliance.
- Platform compatibility, e.g. browser, operating system, mobile devices.
- Exporting and compressing of digital assets into suitable file types.

Learning aim C: Develop a website to meet client requirements

C1 Client-side scripting languages

- Embedding of original client-side scripts into web pages to provide more interactivity and improve the usability of the website.
- Types of web-scripting languages, e.g. JavaScript®, VBScript®.
- Uses of scripting languages, e.g. alerts, confirming choices, browser detection, creating rollovers, checking/validating input, handling forms.
- Constructs, e.g. syntax, loops, decision making, functions, parameter passing, handling events, methods.

C2 Website development

Creation of interactive websites, including:

- use of CSS, e.g. HTML tags, CSS frameworks, box model, access CSS from HTML, doc types
- use of original client-side scripting
- compatibility with mobile and tablet devices
- effective use of tools and techniques
- the uploading of files to a web server or host computer/device.

C3 Website review

Reviewing interactive websites:

- quality in comparison with other similar websites
- suitability for intended purpose and audience
- suitability against the client's requirements, including optimisation
- legal and ethical constraints
- strengths and improvements.

C4 Website optimisation

Optimising an interactive website, including:

- performance and user testing
- obtaining and evaluating feedback from others
- checking interactivity
- checking compatibility
- refinements and making improvements to meet client needs to optimise the website.

C5 Skills, knowledge and behaviours

- Planning and recording, including the setting of relevant targets with timescales, how and when feedback from others will be gathered.
- Reviewing and responding to outcomes, including the use of feedback from others, e.g. IT professionals and users who can provide feedback on the quality of the website and their suitability against the original requirements.
- Demonstrate own behaviours and their impact on outcomes to include professionalism, etiquette, supporting others, timely and appropriate leadership, accountability and individual responsibility.
- Evaluating outcomes to help inform high-quality, justified recommendations and decisions.

Assessment criteria

Pass		Merit	Distinction
Learning aim A: Understand the principles of website development			**A.D1** Evaluate how the principles of website design are used to produce creative, high-performance websites that meet client requirements
A.P1 Compare the principles of website design used in two websites, including their suitability for the intended audience and intended purpose.		**A.M1** Analyse how the principles of website design are used to produce creative, high-performance websites that meet client requirements.	
Learning aim B: Design a website to meet client requirements			
B.P2 Produce designs for a website that meet client requirements. **B.P3** Review the website design proposals with others to identify and inform improvements.		**B.M2** Justify the design decisions, explaining how they will meet the user's needs and be fit for purpose.	**BC.D2** Evaluate the design and optimised website against client requirements. **BC.D3** Demonstrate individual responsibility, creativity and effective self-management in the design, development and review of a website.
Learning aim C: Develop a website to meet client requirements			
C.P4 Produce a website for an intended audience and purpose. **C.P5** Test the website for functionality, compatibility and usability. **C.P6** Review the extent to which the website meets client requirements.		**C.M3** Optimise a website to meet client requirements.	

Essential information for assignments

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

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

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

Learning aims: B and C (B.P2, B.P3, C.P4, C.P5, C.P6, B.M2, C.M3, BC.D2, BC.D3)

Further information for teachers and assessors

Resource requirements

For this unit, learners must have access to software resources that will allow them to use tools and techniques (given in the unit content) to design and develop websites. For example, text editors (such as Notepad®++), rapid authoring software (such as Dreamweaver®, KompoZer), File Transfer Protocol (FTP) service (such as FileZilla®) to upload websites to a web server.

Essential information for assessment decisions

Learning aim A

For distinction standard, learners will give a detailed and balanced evaluative report that explains how the two sites meet user requirements. This must be explored further by identifying the requirements of the websites, for example it has a secure login, and why these are important for the user. Learners will discuss what overall impact the site will have on the organisation, including positive and negative outcomes. The report 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 show a clear understanding of how the two sites employ different principles of website design to develop websites that are creative and high performing. Learners will give a detailed analysis of how user needs and principles of website design impact on the design and development of a website. The report must provide a balanced discussion, supported by reasoned examples. It will be technically accurate and demonstrate good-quality written/oral communication.

For pass standard, learners will give a detailed comparison of two websites, for example Asda and Tesco – two similar commerce sites, with an explanation of who the site is aimed at and its purpose. Learners will explain the use of design principles in each website to compare their application. The evidence may have some inaccuracies and the comparison may be unbalanced.

Learning aims B and C

For distinction standard, learners will draw on and show synthesis of knowledge across the learning aims to evaluate how the decisions and methodologies applied throughout the design, development, maintenance, optimisation and testing stages of their website impacted on the overall outcomes. They will consider whether the website meets client requirements, including achieving its stated purpose and appealing to the target audience. Learners will justify their designs and provide a discussion on why alternative designs were not used.

Learners will give a detailed and balanced evaluation of how effectively their completed website meets the client requirements, including appealing to the target audience and meeting its stated purpose, in comparison to alternative solutions. Their evaluation will be supported by evidence from all stages of the project to reach conclusions and suggest developments. The evaluation must contain a systematic and accurate review of their own skills, performance and behaviours and the impact that this had on the development of the final website. Learners will take individual responsibility for their own work, for example identifying potential issues and resolving them, reviewing their work and making improvements, keeping their work safe and secure, and showing responsible use of quoted materials. Creativity will be shown, for example, by taking innovative approaches to problem solving and through the originality of their solution.

For merit standard, learners will apply their knowledge through selection and application of appropriate methodologies to design, develop, maintain and test an effective, optimised website to meet client requirements. Learners will produce comprehensive designs, including alternative solutions. When developing their website, learners will produce an optimal solution to meet client requirements as closely as possible. Learners will also gather and analyse feedback on their website in order to make improvements. Learners will record the changes that are made and produce subsequent versions of the website as appropriate.

Learners will give a clear analysis of the success of their solution, giving accurate and reasoned suggestions as to how the solution could be improved, they will discuss alternative solutions that could be implemented if the task were to be repeated. They will consider how decisions they made during the project affected the outcomes and justify why these decisions were made. They will give an evaluation of how their skills and behaviours affected the outcomes of the website.

For pass standard, learners will apply understanding through the planning and development of the website to meet client requirements. Learners will produce detailed designs for their website, including user requirements, visual designs and technical documentation. Learners will carry out and document a number of tests and reviews of the website (including use of test users and appropriate test plans, schedules and test data) to ensure that the solution works and meets the identified criteria. They will give evidence that different types of testing have been carried out and that important problems and errors identified have been responded to. Learners' websites will be functional and meet the identified requirements but there may be some performance issues and/or the implemented solution may not be as efficient or effective as it could be.

Learners will review how the decisions they made during planning and development affected the website. Learners will explain the extent to which the website meets the initial project brief. They will consider both positive and negative aspects of the website, although their review may be unbalanced and/or superficial. They will make reference to the possible alternative solutions that could be implemented.

Links to other units

This unit links to:

- Unit 1: Information Technology Systems
- Unit 3: Using Social Media in Business
- Unit 4: Programming
- Unit 7: Mobile Apps Development.

Employer involvement

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

- guest speakers
- technical workshops involving staff from local organisations/businesses
- contribution of design/ideas to unit assignment/scenario/case study/project materials, including own organisation/business materials as exemplars where appropriate
- feedback from staff from local organisations/businesses on plans/designs/items developed
- opportunities for observation of organisational/business application during work experience
- support from local organisation/business staff as mentors.

Unit 7: Mobile Apps Development

Level: **3**

Unit type: **Internal**

Guided learning hours: **60**

Unit in brief

Learners investigate mobile apps and design and develop an application intended for use on mobile devices.

Unit introduction

Millions of people carry a mobile device that rivals the capability of many desktop computers. These devices offer a broad range of functionality by bringing together many different technologies. To develop high-quality mobile apps you must have an understanding of how they are designed to run specifically on mobile devices and how you can exploit the technologies currently available to ensure an effective final product.

In this unit you will investigate mobile apps, how they are used, why they are created, the differences between devices and the implications of creating and using software on mobile devices. You will study the design considerations inherent in mobile apps and general software design. You will design, develop, test and review a mobile app to fulfil a specific set of client requirements.

With over a million apps on both Apple App Store™ and Google Play Store™, and the growing popularity of Microsoft Windows® mobile devices, the mobile app development industry is highly competitive and continually expanding. Many organisations use mobile apps to support their operations in one way or another. Mobile app development is an important skill for software developers who wish to retain their competitive edge. This unit will help you to progress to an app development role and gives you a basis for further study of the design and development of mobile apps and services.

Learning aims

In this unit you will:

A Investigate mobile apps and mobile devices

B Design a mobile app that utilises device functions

C Develop a mobile app that utilises device functions.

Summary of unit

Learning aim		Key content areas	Recommended assessment approach
A	Investigate mobile apps and mobile devices	**A1** Types of mobile apps **A2** Context of mobile apps **A3** Mobile device integration **A4** Mobile app programming	A report evaluating bespoke mobile apps running on different mobile devices. An analysis of mobile device functions and the context in which mobile apps are used.
B	Design a mobile app that utilises device functions	**B1** Requirements for an app **B2** Designing a mobile app	Analysis, design and development of a mobile app. An analysis of context. Product design documents.
C	Develop a mobile app that utilises device functions	**C1** Content preparation for mobile apps **C2** Developing a mobile app **C3** Testing a mobile app **C4** Lessons learned from developing a mobile app **C5** Reviewing own skills, knowledge and behaviours	A log of the development process, annotated code, screenshots of running app or demonstration of app running on a mobile device. Testing documentation, including a test log, log of errors and any resolutions made.

Content

Learning aim A: Investigate mobile apps and mobile devices

A1 Types of mobile apps

Understand the characteristics and implications of different types of mobile applications, including:

- native apps – those that are programmed for, and installed on, a specific mobile platform
- web apps – remote apps not required to be installed on the device, e.g. mobile web pages
- hybrid apps – cross-platform-compatible scripting that can be installed on a device.

A2 Context of mobile apps

Understand how the features, purpose and context of mobile apps impact on their design, development and use, including:

- locale, e.g. maps
- utility, e.g. file manager
- productivity, e.g. office
- immersive full screen, e.g. games
- entertainment, e.g. music players
- widgets, e.g. news ticker, quick device settings.

A3 Mobile device integration

Understand the characteristics and implications of integrating mobile app services on different mobile devices.

- Using device functions, e.g. accelerometer, global positioning system (GPS).
- User interface, e.g. small screen, touch screen.
- Operating system, e.g. Android, iOS.
- Device permissions, e.g. read phone status, network access, read contacts.

A4 Mobile app programming

Understand development options and environments for developing apps.

- Programming languages, e.g. Java®, Objective-C®.
- Programming environments, e.g. Android Studio, Xcode®.

Learning aim B: Design a mobile app that utilises device functions

B1 Analyse requirements for an app

The mobile computing requirements of an identified situation:

- device capabilities required, e.g. accelerometer, GPS
- input required, e.g. touch screen, voice, timed event
- output required, e.g. video, audio, vibration
- the user's needs, e.g. location-based services, accessibility considerations.

B2 Designing a mobile app

Producing appropriate design documentation for a mobile app to meet identified requirements.

- User requirements.
- A proposed solution:
  - description of program tasks
  - target platform(s)
  - screen layouts and navigation
  - algorithms, e.g. pseudo code, activity diagrams
  - control structures
  - data validation
  - integration of device capabilities, i.e. how, when and where device capabilities will be utilised.

- Alternative solutions.
- Details of resources and assets to be used:
  o predefined code
  o video, graphical, audio.
- Test and review schedule.
- Constraints, e.g. time, phone permissions, phone capabilities, limitation of platform.
- Legal and ethical considerations applicable to the equivalent legislation in England, Wales and Northern Ireland, e.g. privacy, security, use of content created by others.

Learning aim C: Develop a mobile app that utilises device functions

C1 Content preparation for mobile apps

- Selection and application of appropriate processing and editing techniques to prepare resources for each specific device and purpose.
- Optimisation, e.g. file size, image size, selecting/removing sections of prewritten code.
- Alternative formats for screen orientation e.g. landscape, portrait.
- File formats, i.e. compatibility.
- Compression.
- Encryption.

C2 Developing a mobile app

Producing a mobile app to meet identified requirements through the use of appropriate programming language(s), tools and/or development environments, e.g. Android Studio, Xcode.

- Programming constructs:
  o constants
  o operators; arithmetic, logical
  o reserved words, e.g. public, final
  o input and output commands
  o local variables
  o global variables
  o assignment
  o sequence
  o selection
  o iteration.
- Functions and procedures.
- Data types, e.g. char, integer, real, Boolean.
- Objects and classes.
- Event handling, e.g. forms, screen components, actions.
- Utilise device capabilities, e.g. language APIs, Android Sensor, iOS Core Motion Framework.
- Interrogate device status, e.g. location, battery life.
- Orientation of device, e.g. autodetection, force orientation mode.
- Code annotation.
- Create executable for target device.
- Quality control:
  o efficiency and performance, e.g. system resources used, accessing storage media
  o maintainability, i.e. the ease of modification and improving the app
  o portability, i.e. range of device compatibility
  o usability, i.e. ease of use, how easily the user can interact with the app.

C3 Testing a mobile app

Select and use appropriate testing methodologies to ensure the mobile app meets the identified requirements.

- Test plans and test data.
- How and what to test:
  - functionality, e.g. all utilities work as intended
  - acceptance, e.g. fitness for purpose
  - performance, e.g. stress loading
  - usability, e.g. users can complete tasks easily
  - compatibility, e.g. different model/brand of phone.
- Selecting appropriate test users.
- User feedback, i.e. response from end users regarding the app
- Analysis of user feedback:
  - collation of results
  - identification of trends, e.g. '60% of users suggested…'.
- Improving and refining the app:
  - making use of the outcomes of testing and review
  - change logs
  - versioning
  - optimising the app, e.g. exporting assets to different file formats, improving the efficiency of code, developing the user interface based on review and feedback.

C4 Lessons learned from developing a mobile app

Evaluate the effectiveness of the app that has been developed with reference to:

- the extent to which the solution met the identified requirements
- issues arising during testing and refinement
- how the final app could be improved to better meet the needs of the user and fulfil the identified client requirements
- alternative solutions that could be implemented if the task were to be repeated.

C5 Reviewing own skills, knowledge and behaviours

- Planning and recording opportunities for skills, knowledge and behaviours development, including the setting of relevant targets with timescales, and how and when feedback from others will be gathered.
- Reviewing and responding to the outcomes of own skills knowledge and behaviours development, including the use of feedback from others.
- Own behaviours and their impact on outcomes, including professionalism, etiquette, being supportive of others, timely and appropriate leadership, accountability.
- Evaluating targets set for skills, knowledge and behaviour development to obtain insights into own performance.

Assessment criteria

Pass	Merit	Distinction
Learning aim A: Investigate mobile apps and mobile devices		
A.P1 Explain how the purpose of a mobile app and the needs, preferences and characteristics of the user affect its design and the provided features. **A.P2** Explain the impact of current technologies on the design and implementation of mobile apps.	**A.M1** Analyse how the implementation and design of mobile apps is affected by the intended user, current technologies and the purpose of the app.	**A.D1** Evaluate how the effectiveness of mobile app implementation and design are affected by the intended user, current technologies and the purpose of the app.
Learning aim B: Design a mobile app that utilises device functions		
B.P3 Produce designs for a mobile app to meet identified requirements. **B.P4** Review the mobile app designs with others to identify and inform refinements.	**B.M2** Justify how decisions made during the design process ensure the design for the app will meet identified requirements.	**BC.D2** Evaluate the design and optimised mobile app against client requirements. **BC.D3** Demonstrate individual responsibility, creativity and effective self-management in the design, development and review of a mobile app.
Learning aim C: Develop a mobile app that utilises device functions		
C.P5 Produce a mobile app that meets the design criteria. **C.P6** Test a mobile app for functionality, usability, stability and performance. **C.P7** Review the extent to which the mobile app meets the identified requirements	**C.M3** Optimise a mobile app that meets the design criteria.	

Essential information for assignments

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

There is a 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, C.P7, B.M2, C.M3, BC.D2, BC.D3)

Further information for teachers and assessors

Resource requirements

For this unit, learners must have access to:

- an integrated development environment with support for mobile development such as Android Studio, Eclipse®, Xcode® or similar
- mobile devices, such as Android phones or tablets, Apple® phones or tablets, or similar are also required in order to enable learners to meet assessment criteria.

Essential information for assessment decisions

Learning aim A

Learners must have access to more than one mobile device configuration to allow for a full investigation and evaluation of the chosen apps, for example different versions of mobile device operating system, mobile phones or tablets.

Learners will investigate at least two different apps that have implementations on at least two different mobile platforms, for example, iOS and Android. The chosen examples must provide learners with enough scope to examine a range of current technologies and design features, and the ways in which they are implemented on different systems.

For distinction standard, learners will provide a clear and balanced evaluation of how the capabilities and constraints of different devices and platforms impact on the success of mobile phone apps implementation. Learners will provide clear examples of how they used the principles of mobile design, the requirements of the user and current technology, and how successful and/or appropriate these were to the identified situation. Learners must make comparisons between different apps and different implementations of the same app, making justified suggestions for improvements. 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 show a clear understanding of how the context in which the app is designed to operate impacts on its design, development and use. The analysis must provide a balanced discussion as to how user needs, the tasks that are to be performed and the current technologies (including target platform and device capabilities) impact on features available in the apps and the way in which features are implemented. The report will be technically accurate and demonstrate good-quality written/oral communication.

For pass standard, learners will explain how a mobile app's design and features are affected by the task(s) that it must perform and the needs and preferences of the user. The descriptions will be supported by relevant examples of how these needs and preferences are met in at least two different mobile phone apps. Learners will explain how the technologies currently available on mobile platforms affect the ways in which an app is designed and implemented. The learner will support their explanations with examples from the identified apps. Learners will explain how apps that have implementations on two or more devices make use of technologies currently available on the target platform and how the implementations differ from each other in terms of design, use and application. The evidence may have some inaccuracies and the explanations may be unbalanced.

Learning aims B and C

Learners must have access to more than one mobile device configuration to allow for design for multiple devices and implementation of a developed app onto a mobile device. For example, different versions of mobile device operating systems, mobile phones or tablets.

Learners must develop a mobile app that is of sufficient complexity to demonstrate appropriate use of a range of technologies/functions offered by modern mobile devices.

For distinction standard, learners will draw on and show synthesis of knowledge across the learning aims to evaluate how the decisions and methodologies applied throughout the design, development, maintenance, optimisation and testing of the mobile app impacted on its effectiveness. Learners will justify their designs and provide a discussion on why alternative designs were not used.

Learners will provide a detailed evaluation of their completed app's effectiveness in comparison to alternative solutions. Their evaluation must be supported by evidence from all stages of the project to reach conclusions and suggest future developments. It will contain a systematic and accurate review of their own skills, performance and behaviours, and the impact that this had on the effectiveness of the final app.

Learners will take individual responsibility for their own work, for example identifying potential issues and resolving them, reviewing their work and making improvements, keeping their work safe and secure and showing responsible use of quoted materials. They will show creativity, for example by taking innovative approaches to problem solving and through the originality of their solution.

For merit standard, learners will apply their knowledge through the selection and application of appropriate methodologies to design, develop, maintain and test an effective, optimised mobile app to meet identified requirements. Learners will produce comprehensive designs to cover multiple devices, alternative solutions and use of device functions. Learners must make use of feedback from others to help improve and refine the designs to create a solution. They will justify decisions made when developing the design. When developing their app, learners will produce optimal code in order to implement the required device functions in the most efficient way.

Learners will gather and analyse feedback on their app in order to make improvements. They will record the changes that are made and produce subsequent versions of the app as appropriate.

Learners must optimise their apps by making use of testing and feedback throughout development to improve and refine the final solution, for example resampling and exporting assets to different file types to reduce demands on system resources, making use of additional phone features, enhancing the user interface.

Learners must provide a clear and balanced analysis of the success of their solution, giving accurate and reasoned suggestions as to how it could be improved. They will discuss alternative solutions that may be implemented if the task were to be repeated. They must consider how decisions they made during the project affected the outcomes and justify why they made these decisions.

For pass standard, learners will apply understanding through the planning and development of a mobile app to meet identified requirements. Learners will produce detailed designs for their mobile app, including user requirements, visual designs and technical documentation. Learners must show evidence that they have sought feedback on their suggested solutions and made use of this feedback to create a final design.

Learners must carry out and document a number of tests and reviews of the mobile app, including use of test users and appropriate test plans, schedules and test data, to ensure that the solution works and meets the identified criteria. They will provide evidence that different types of testing have been carried out and that important problems and errors identified have been addressed.

Learners must install the app on a target device and it must work, but there may be some performance issues and/or the implemented solution may not be as efficient or effective as it could be.

Learner swill review how the decisions they made during planning and development affected the final app, explaining to what extent it meets the initial project brief. They must consider both positive and negative aspects of the app, although their review may be unbalanced and/or superficial. Learners will make reference to the possible alternative solutions that could be implemented.

Links to other units

This unit links to:

- Unit 1: Information Technology Systems
- Unit 3: Using Social Media in Business
- Unit 4: Programming
- Unit 6: Website Development
- Unit 8: Computer Games Development.

Employer involvement

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

- guest speakers
- technical workshops involving staff from local organisations/businesses
- contribution of design/ideas to unit assignment/scenario/case study/project materials, including own organisation/business materials as exemplars where appropriate
- feedback from staff from local organisations/businesses on plans/designs/items developed
- opportunities for observation of organisational/business application during work experience
- support from local organisation/business staff as mentors.

Unit 8: Computer Games Development

Level: **3**

Unit type: **Internal**

Guided learning hours: **60**

Unit in brief

Learners investigate the computer games industry and its impact on technological and social trends. They will design and develop a computer game to meet requirements.

Unit introduction

The computer games industry has been growing year on year and has become a multi-billion pound industry. With the prevalence of computing devices, games consoles and mobile devices, this growth shows no sign of slowing. Many computer games are vast productions involving a range of people such as programmers, graphical artists, animators, level designers, actors and directors. As a games developer, you will analyse the needs of a client and understand the potential and limitations of different gaming solutions.

In this unit, you will investigate the technologies used in the computer gaming industry and the implications they have for users, developers and organisations. You will analyse how user needs and preferences impact on game design and how target technologies affect the design and development of a computer game. Finally, you will design, create and review a computer game to meet requirements and reflect on the skills and understanding applied during the design and development process.

You will apply analytical skills that would be used by any software developer to investigate the available technologies and current trends in order to design and develop appropriate software solutions. The skills you gain through this unit will benefit you as you progress to employment in the computer gaming industry, for example in computer games developer and software developer roles.

Learning aims

In this unit you will:

A Investigate technologies used in computer gaming

B Design a computer game to meet client requirements

C Develop a computer game to meet client requirements.

Summary of unit

Learning aim	Key content areas	Recommended assessment approach
A Investigate technologies used in computer gaming	**A1** Social trends in computer gaming **A2** Technologies used in computer gaming	A report investigating and evaluating social and technological trends in gaming and how they would influence the development of new computer games.
B Design a computer game to meet client requirements	**B1** Computer games design processes and techniques **B2** Design documentation **B3** Reviewing and refining designs	A design specification showing the design and development of a computer game to meet identified client requirements. Project brief, design documentation, development and testing logs, meeting notes and a report that evaluates the effectiveness and appropriateness of the computer game. The evidence should also suggest ways in which solutions could be improved and/or alternative solutions that could be used if the task were to be repeated.
C Develop a computer game to meet client requirements	**C1** Principles of computer games development **C2** Developing computer games **C3** Testing computer games **C4** Reviewing computer games **C5** Quality characteristics **C6** Skills, knowledge and behaviours	

Content

Learning aim A: Investigate technologies used in computer gaming

A1 Social trends in computer gaming

Social trends relevant to computer games, including:

- popular genres
- players, e.g. age range, gender, casual gamers, immersive gamers, themes
- game production, e.g. mainstream publisher, indie, free-to-play
- multiplayer
- artificial intelligence, e.g. search algorithms, mathematical optimisation, logic
- emerging technologies
- security of integrated services and multiplayer environments, e.g. Steam, Google Play™.

A2 Technologies used in computer gaming

Technologies are continually evolving; it is vital to remain up to date with what is current at the time.

- Benefits and limitations of different platform options for the development of computer games:
  - personal computers, e.g. Windows®, Mac®
  - consoles, e.g. PlayStation®, Xbox™, Nintendo®
  - mobile devices, e.g. smartphones, tablets, notebooks
  - web based, e.g. Flash®, HTML5.
- Hardware options and their effect on the development of computer games, including:
  - central processing unit (CPU)
  - graphics processing unit (GPU)
  - memory, e.g. random-access memory (RAM), read-only memory (ROM)
  - output, e.g. display, sound
  - input, e.g. keyboard/mouse, touch, gamepad, joystick, kinetic, voice
  - storage, e.g. hard disk drive, cloud
  - connections, e.g. internet, local area network, mobile network
  - new technologies.
- Software options and their effect on the development of computer games, including:
  - operating system, e.g. Windows, Mac OS, Linux®
  - programming language, e.g. C++, Java®
  - device drivers, e.g. input/output devices
  - graphic options, e.g. DirectX®, OpenGL
  - audio options, e.g. music, ambiance, file format.
- Uses of game engines, their capabilities and how they aid computer game developers, including:
  - rendering engines
  - physics engines
  - collision detection
  - scripting
  - animation.

Learning aim B: Design a computer game to meet client requirements

B1 Computer games design processes and techniques

- Mathematical techniques and processes.
- Graphic processing and editing techniques.
- Platform and delivery.
- Visual styles.
- Assets.
- Game play features, to include:
  - interaction model, e.g. avatar, omnipresence
  - participation, e.g. single player, multiplayer
  - narrative, e.g. story, dialogue
  - game setting, e.g. physical, temporal, environmental, emotional, ethical
  - goals, e.g. what the player needs to achieve in the game
  - challenges, e.g. what the player must overcome
  - rewards, e.g. what the player will receive for completing goals or challenges
  - player actions, e.g. run, jump
  - rules, e.g. valid moves, how high the player can jump
  - feedback, e.g. how the player knows their progress
  - difficulty, e.g. degree of challenge
  - game mechanics, e.g. inventory, scoring, win condition
  - game structure, e.g. storyboard, flowchart, activity diagram
  - quality, e.g. compatibility, performance, gaming experience.

B2 Design documentation

- Requirements of the brief, including audience, purpose and client requirements.
- Legal and ethical considerations applicable to the equivalent legislation in England, Wales and Northern Ireland, e.g. copyright, royalties, digital rights management.
- Game design, to include:
  - type of gameplay
  - data dictionary
  - algorithm design, e.g. pseudo code
  - storyboards, flow charts, activity diagrams
  - visual styles, e.g. world (terrain, architecture, objects), characters, non-playing characters, feedback interface, perspectives (2D, 3D, first-person, third-person, scrolling, aerial and context-sensitive)
  - full motion video
  - assets, e.g. graphical, audio and video
  - gameplay features.
- Choice of programming languages, application program interface (APIs) and computer game development kits.
- Intended platform/media for delivery.
- Timeline, e.g. outlining which different assets are included and when different assets will be combined.
- Production schedule, e.g. timeline of development.
- Hardware, software and other resources required.
- Test plans to check playability, performance and other quality characteristics.
- Constraints, e.g. platform limitations.

B3 Reviewing and refining designs

- Working with clients and others to improve the quality, effectiveness and appropriateness of designs, including:
  - gathering feedback from client(s) and potential users
  - communicating with clients, e.g. email, verbal communication
  - scheduling and documenting meetings
  - agreeing and adjusting timescales
  - refining ideas and solutions.
- Updating design schematic documentation based on review and feedback.

Learning aim C: Develop a computer game to meet client requirements

C1 Principles of computer games development

- Design schematics.
- Computational processes applied to computer games development, e.g. use of rendering engines.
- Principles of mathematics applied to computer games development, e.g. vector, physics.
- Prototyping and game engine selection.
- Tools and techniques used to develop computer games.
- Quality characteristics used to test and assess suitability of computer games.
- Technical constraints.

C2 Developing computer games

- Visual style:
  - omnipresent, e.g. area of vision
  - avatar, e.g. line of sight.
- Input methods:
  - keyboard and mouse
  - gamepad
  - customisation of control, e.g. user configuration.
- Asset integration, to include:
  - graphical, e.g. raster, vector
  - animation and video, e.g. cut scene, story, arc
  - audio, e.g. syncing sound clips with visual displays
  - texture mapping, e.g. applying texture to a mesh
- Advanced features, to include:
  - artificial intelligence, e.g. search algorithms, learning algorithms
  - 3D rendering, e.g. 3D environment, first-person view
  - save game state, e.g. options to save, auto-save points
  - multiple players, e.g. multiple player controls, via network
  - player progression, e.g. achievements, leader boards.

C3 Testing computer games

- Test computer games including playability, compatibility, stability and acceptance.
- Obtain feedback from others, e.g. effectiveness, presentation, performance, accessibility, portability, robustness, purpose.
- Make improvements and/or refinements to computer games in response to testing and feedback from others.

C4 Reviewing computer games

- Quality of the computer game.
- Suitability for audience and purpose.
- Suitability against the original requirements.
- Legal and ethical constraints.
- Technology constraints.
- Strengths and improvements.
- Platforms and compatibility.

C5 Quality characteristics

- Sources of quality characteristics which can be measured suitably against computer games, including playability, performance and presentation.

C6 Skills, knowledge and behaviours

- Planning and recording, including the setting of relevant targets with timescales, how and when feedback from others will be gathered.
- Reviewing and responding to outcomes including the use of feedback from others, e.g. IT professionals and users who can provide feedback on the quality of the computer games and their suitability against the original requirements.
- Demonstrate behaviour and its impact on outcomes to include professionalism, etiquette, supportive of others, timely and appropriate leadership, accountability and individual responsibility.
- Evaluating outcomes to help inform high-quality justified recommendations and decisions.
- Evaluating targets to obtain insights into own performance.
- Media and communication skills, including:
  - the ability to convey intended meaning, e.g. written (email, design documentation, recording documentation, reports, visual aids for presentation use), verbal communication requirements (one-to-one and group, informal and formal, situations)
  - use of tone and language for verbal and written communications to convey intended meaning and make a positive and constructive impact on audience, e.g. positive and engaging tone, technical/vocational language suitable for intended audience, avoidance of jargon
  - responding constructively to the contributions of others, e.g. supportive, managing contributions so all have the opportunity to contribute, responding to objections, managing expectation, resolving conflict.

Assessment criteria

Pass	Merit	Distinction
Learning aim A: Investigate technologies used in computer gaming		**A.D1** Evaluate the impact of current and emerging technologies on the design and development of computer games to meet the requirements of the users and the computer games industry.
A.P1 Explain social and technological trends of computer games. **A.P2** Explain how current and emerging technologies impact computer games' design and development.	**A.M1** Discuss how current and emerging technologies impact on how games are designed and developed to meet the requirements of the users and the larger computer games industry.	
Learning aim B: Design a computer game to meet client requirements		**BC.D2** Evaluate the design and optimised computer game against client requirements. **BC.D3** Demonstrate individual responsibility, creativity and effective self-management in the design, development and review of a computer game.
B.P3 Produce designs for a computer game that meet client requirements. **B.P4** Review the designs with others to identify and inform refinements.	**B.M2** Justify decisions made, showing how the design will fulfil its purpose and client requirements.	
Learning aim C: Develop a computer game to meet client requirements		
C.P5 Produce a computer game to meet client requirements. **C.P6** Test a computer game for functionality, usability, stability and performance. **C.P7** Review the extent to which the computer game meets client requirements.	**C.M3** Optimise a computer game to meet client requirements.	

Essential information for assignments

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

There is a 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, C.P7, B.M2, C.M3, BC.D2, BC.D3)

Further information for teachers and assessors

Resource requirements

For this unit, learners must have access to computer software resources that will allow them to use the tools and techniques (given in the unit content) to design and develop computer games, for example game engines such as Unity®, Unreal Development Kit™, or similar.

Essential information for assessment decisions

Learning aim A

Centres may wish to focus on particular areas such as specific consoles, devices, or genres of computer games. Learners must however be given the opportunity to explore alternative areas during their investigation and design.

The evidence must include discussion of social and technological trends in computer gaming and how these trends influence the design and development of computer games.

For distinction standard, learners will provide a clear and balanced evaluation of current and emerging technologies, and a comparison of how they impact on the development of a computer game to meet the requirements of the users and the game industry. Learners will provide clear examples of current and emerging technologies and the requirements of the users and the games industry. Learners must make comparisons between different technologies and how they impact on the games industry and the requirements and expectations of users. The report will demonstrate high-quality written/oral communication through the 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 show a clear understanding of how available and emerging technologies affect the development of a computer game. The report must provide a balanced discussion as to how user needs and current and emerging technologies impact on the design and development of a computer game. The report will be technically accurate and demonstrate good quality written/oral communication.

For pass standard, learners will provide descriptions of how current and emerging technologies in gaming impact on the users and the games industry. The descriptions must be supported by examples of current and emerging technologies. Learners will explain the technologies available in gaming and how they affect the design and implementation of a game. Learners must support their explanations with examples from existing computer games and how they make use of the technologies available during development. The evidence may have some inaccuracies and the review of the impact may be unbalanced.

Learning aims B and C

Learners must provide evidence of planning and developing a computer game. The computer game must be of sufficient complexity to show use of a range of appropriate software development tools and techniques.

For distinction standard, learners will draw on and show synthesis of knowledge across the learning aims in evaluating how the decisions and processes applied throughout the planning, development and testing stages impacted on the effectiveness of the computer game. Learners will make suitable and reasoned justifications of decisions made in comparison to alternative solutions.

Learners must provide a thorough evaluation of the effectiveness of the content produced against the design and client requirements. In order to reach valid conclusions as to how the chosen processes and techniques provided more appropriate content in comparison to alternatives, the evaluation will be supported by evidence from all stages of the planning, development and review processes. Learners will provide well-considered, justifiable suggestions for improvements to the computer game.

The evaluation must contain a systematic and accurate review of their own skills and performance and the impact that this had on the effectiveness of the solutions. Evaluation of behaviours will consider learners' use of 'soft skills' in relation to the vocational context of a project, such as managing and liaising with other members of the team or clients and time management. Learners will evaluate their own behaviours throughout the project and the impact they have on the outcomes. Learners will take individual responsibility for their own work, for example identifying potential issues and resolving them, reviewing their work and making improvements, keeping their work safe and secure and showing responsible use of quoted materials. Creativity will be shown, for example, through taking innovative approaches to problem solving and through the originality of their solution. Learners will refer to tangible evidence to support their evaluation such as meeting notes, correspondence and time plans.

For merit standard, learners will apply their knowledge through selection and application of appropriate methodologies to plan, design, develop, test and optimise a computer game that effectively meet client requirements. Learners will produce comprehensive designs, including alternative solutions. When developing their game, learners must produce an optimal solution in order to meet client requirements as closely as possible. Learners will also gather and analyse feedback on their game in order to make improvements.

The sourcing, development and testing stages must be well documented with clear justification of decisions and selections made throughout. Learners will record the changes that are made and produce subsequent versions of the game as appropriate. Learners will make clear reference to the client requirements and target platform. They will consider legal and ethical issues as appropriate.

Learners must provide a clear, accurate and robust justification of how the design decisions will ensure the product is appropriate for the use for which it was intended and fully meets client requirements.

Learners will source a wide range of digital content in preparation for processing and editing with appropriate, dedicated editing software. The evidence will demonstrate accurate and appropriate use of visual and audio effects to fully meet the client requirements.

Learners must optimise their computer game by making use of testing and feedback throughout development to improve and refine the game to fully meet client requirements.

Learners will provide a clear and balanced analysis of the success of their outcomes against the design and client requirements, and the quality of the computer game. Learners will refer to how the computer game suits the intended audience, purpose and platform of delivery. Learners must also provide an analysis of how any associated legal and ethical issues were considered and met. They will make accurate and reasoned suggestions as to how the computer game could be improved and will discuss alternative planning, sourcing and processing methods that could be used if the task were to be repeated.

For pass standard, learners will apply understanding through the planning and development of virtualised solutions to meet client requirements. Learners will provide an explanation of the computer game requirements, and related computing requirements, of an identified client and identify the success/acceptance criteria that will ensure the client's requirements are met.

Learners will produce detailed designs for their computer game, including user requirements, visual designs and technical documentation. Learners must consider the appropriateness of different possible techniques and formats and the impact these would have on user experience. Learners must carry out and document a number of tests and reviews of the computer game, including use of test users and appropriate test plans, schedules and test data, to ensure that the solution works and meets the identified criteria. Learners must review their designs with others to identify improvements and refinements. They will provide evidence that different types of testing have been carried out. Learners' games will be functional but there may be some performance issues and/or the implemented solution may not be as efficient or effective as it could be. Learners must show some awareness of the legal and ethical considerations related to producing computer games.

Learners must provide appropriate documentation for the planning, design, development, production and quality assurance of their computer game, explaining the decisions they made during the project to ensure they met the project brief. Learners will produce a solution that meets the requirements of the client, however, some small issues of optimisation may persist.

Learners must provide a review of whether their work meets the client requirements, considering both positive and negative aspects of the outcomes, although their review may be unbalanced and/or superficial. Learners will use relevant feedback, such as client feedback, to make suggestions for the possible alternative solutions that could be implemented.

Links to other units

This unit links to:

- Unit 1: Information Technology Systems
- Unit 4: Programming.

Employer involvement

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

- guest speakers
- technical workshops involving staff from local organisations/businesses
- contribution of design/ideas to unit assignment/scenario/case study/project materials, including own organisation/business materials as exemplars where appropriate
- feedback from staff from local organisations/businesses on plans/designs/items developed
- opportunities for observation of organisational/business application during work experience
- support from local organisation/business staff as mentors.

4 Planning your programme

How do I choose the right BTEC National qualification for my learners?

BTEC Nationals come in a range of sizes, each with a specific purpose. You will need to assess learners very carefully to ensure that they start on the right size of qualification to fit into their 16–19 study programme, and that they take the right pathways or optional units that 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 National Certificate or Extended Certificate. Learners who then decide to continue with a fuller vocational programme can transfer to a BTEC National Diploma or Extended Diploma, for example for their second year.

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

As a centre, you may want to teach learners who are taking different qualifications together. You may also wish to transfer learners between programmes to meet changes in their progression needs. You should check the qualification structures and unit combinations carefully as there is no exact match among the different sizes. You may find that learners need to complete more than the minimum number of units when transferring.

When learners are recruited, you need to give them accurate information on the title and focus of the qualification for which they are studying.

Is there a learner entry requirement?

As a centre it is your responsibility to ensure that learners who are recruited have a reasonable expectation of success on the programme. There are no formal entry requirements but we expect learners to have qualifications at or equivalent to Level 2.

Learners are most likely to succeed if they have:

- five GCSEs at good grades and/or
- BTEC qualification(s) at Level 2
- achievement in English and mathematics through GCSE or Functional Skills.

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

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*.

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 work spaces are available to deliver BTEC Nationals. For some units, specific resources are required. This is indicated in the units.

How can myBTEC help with planning for these qualifications?

myBTEC is an online toolkit that supports the delivery, assessment and quality assurance of BTECs in centres. It supports teachers with activities, such as choosing a valid combination of units, creating assignment briefs and creating assessment plans. For further information see *Section 10*.

Which modes of delivery can be used for these qualifications?

You are free to deliver BTEC Nationals 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 Nationals are vocational qualifications and, as an approved centre, you are encouraged to work with employers on the design, delivery and assessment of the course to ensure that learners have a programme of study that is engaging and relevant and that equips them 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, authorised assignment briefs, additional papers for external assessments 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*.

How will my learners become more employable through these qualifications?

All BTEC Nationals are mapped to relevant occupational standards (see *Appendix 1*).

Employability skills, such as team working and entrepreneurialism, and practical hands-on skills have been built into the design of the learning aims and content. This gives you the opportunity to use relevant contexts, scenarios and materials to enable learners to develop a portfolio of evidence that demonstrates the breadth of their skills and knowledge in a way that equips them for employment.

5 Assessment structure and external assessment

Introduction

BTEC Nationals are assessed using a combination of *internal assessments*, which are set and marked by teachers, and *external assessments* which are set and marked by Pearson:

- mandatory units have a combination of internal and external assessments
- all optional units are internally assessed.

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

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. Some units are defined as synoptic units (see *Section 2*). Normally, a synoptic assessment is one that a learner would take later in a programme and in which they will be expected to apply learning from a range of units. Synoptic units may be internally or externally assessed. Where a unit is externally assessed you should refer to the sample assessment materials (SAMs) to identify where there is an expectation that learners draw on their wider learning. For internally-assessed units, you must plan the assignments so that learners can demonstrate learning from across their programme. A unit may be synoptic in one qualification and not another because of the relationship it has to the rest of the qualification.

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

In administering internal and external assessment, the centre needs to be aware of the specific procedures and policies that apply, for example to registration, entries and results. An overview with signposting to relevant documents is given in *Section 7*.

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*, and the requirements for delivering assessment given in *Section 6*.

External assessment

A summary of the external assessment for this qualification is given in *Section 2*. You should check this information carefully, together with the unit specification and the sample assessment materials, so that you can timetable learning and assessment periods appropriately.

Learners must be prepared for external assessment by the time they undertake it. In preparing learners for assessment you will want to take account of required learning time, the relationship with other external assessments and opportunities for retaking. You should ensure that learners are not entered for unreasonable amounts of external assessment in one session. Learners may resit an external assessment to obtain a higher grade of near pass or above. If a learner has more than one attempt, then the best result will be used for qualification grading, up to the permitted maximum. It is unlikely that learners will need to or benefit from taking all assessments twice so you are advised to plan appropriately. Some assessments are synoptic and learners are likely to perform best if these assessments are taken towards the end of the programme.

Key features of external assessment in information technology

In information technology, after consultation with stakeholders, we have developed the following:

- *Unit 1 Information Technology Systems* is a scenario-based assessment. Learners show their understanding of the relationships between IT systems' hardware and software, the way systems work individually and together, the relationship between the user and the system, use of IT systems' issues and their impact on organisations and individuals. This is assessed by a Pearson set and marked examination.

- *Unit 2: Creating Information Systems to Manage Information* is a task-based assessment. Learners respond to a scenario to produce an effective database design solution, test and evaluate each stage of the development process and the effectiveness of the database solution.

Units

The externally-assessed units have a specific format which we explain in *Section 3*. The content of units will be sampled across external assessments over time through appropriate papers and tasks. The ways in which learners are assessed are shown through the assessment outcomes and grading descriptors. External assessments are marked and awarded using the grade descriptors. The grades available are Distinction (D), Merit (M), Pass (P) and Near Pass (N). The Near Pass (N) grade gives learners credit below a Pass, where they have demonstrated evidence of positive performance which is worth more than an unclassified result but not yet at the Pass standard.

Sample assessment materials

Each externally-assessed unit has a set of sample assessment materials (SAMs) that accompanies this specification. The SAMs are there to give you an example of what the external assessment will look like in terms of the feel and level of demand of the assessment. In the case of units containing synoptic assessment, the SAMs will also show where learners are expected to select and apply from across the programme.

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

A copy of each of these assessments can be downloaded from our website. An additional sample of each of the Pearson-set units will be available before the first sitting of the assessment to allow your learners further opportunities for practice.

6 Internal assessment

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

For BTEC Nationals 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 national standards.

Principles of internal assessment

Assessment through assignments

For internally-assessed 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, and formative assessment by, 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.

Assessment decisions through applying unit-based criteria

Assessment decisions for BTEC Nationals 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 an M criterion requires the learner to show 'analysis' and the related P criterion requires the learner to 'explain', then to satisfy the M criterion a learner will need to cover both 'explain' and 'analyse'. The unit assessment grid shows the relationships among the criteria so that assessors can apply all the criteria to the learner's evidence at the same time. In *Appendix 2* 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 simply 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 3 of the national framework.

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

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. Full information is given in the *Pearson Quality Assurance Handbook*.

- The Lead Internal Verifier (the Lead IV) has overall responsibility for the programme, its assessment and internal verification to meet our requirements, record keeping and liaison with the Standards Verifier. The Lead IV registers with Pearson annually. The Lead IV acts as an assessor, supports the rest of the assessment team, makes sure that they have the information they need about our assessment requirements and organises training, making use of our guidance and support materials.

- Internal Verifiers (IVs) oversee all assessment activity 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 to national standards. Before taking 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 in line with national standards. We support you through, for example, providing training materials and sample documentation. Our online myBTEC service can help support you in planning and record keeping. Further information on using myBTEC can be found in *Section 10* 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.

Setting effective assignments

Setting the number and structure of assignments

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 some units we provide authorised assignment briefs, for all the units we give you suggestions on how to create suitable assignments. You can find these materials along with this specification 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 tasks.
- 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.
- 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

BTEC Nationals 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 provide learners with the opportunity to apply a range of employability or transferable skills. Centres may choose to use different suitable forms for 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*. 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.

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:

- 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*.

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*
- examples of assessed work provided by Pearson
- your Lead IV and assessment team's collective experience, supported by the standardisation materials we provide.

Pass and Merit criteria relate to individual learning aims. The Distinction criteria as a whole relate to outstanding performance across the unit. Therefore, criteria may relate to more than one learning aim (for example A.D1) or to several learning aims (for example DE.D3). 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.

Dealing with late completion of assignments

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 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.

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.

Resubmission of improved evidence

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

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

- checking that a learner can be reasonably expected to perform better through a second submission, for example that the learner has not performed as expected
- making sure that giving a further opportunity 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 remains valid.

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

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.

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 only be achieved at a pass.

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

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 also work closely with us so that we can quality assure that national standards are being satisfied. This process gives stakeholders confidence in the assessment approach.

The Lead IV must have an assessment plan, produced as a spreadsheet or using myBTEC. When producing a plan, the assessment team may wish 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 external assessments and when quality assurance will take place
- the completion dates for different assignments
- who is acting as IV for each assignment and the date by which the assignment needs to be verified
- setting an approach to sampling assessor decisions though internal verification that covers all assignments, assessors and a range of learners
- 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:

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

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

7 Administrative arrangements

Introduction

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

Learner registration and entry

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

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

Access to assessment

Both internal and external assessments need to be administered carefully to ensure that all learners are treated fairly, and that results and certification are issued on time to allow learners to progress to 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 internal assessment

Records

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

Reasonable adjustments to assessment

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

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

Special consideration

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

Administrative arrangements for external assessment

Entries and resits

For information on the timing of assessment and entries, please refer to the annual examinations timetable on our website.

Access arrangements requests

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

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

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

Granting reasonable adjustments

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

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

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

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

Special consideration requests

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

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

Conducting external assessments

Centres must make arrangements for the secure delivery of external assessments. External assessments for BTEC qualifications include examinations, set tasks and performance.

Each external assessment has a defined degree of control under which it must take place. Some external assessments may have more than one part and each part may have a different degree of control. We define degrees of control as follows.

High control

This is the completion of assessment in formal invigilated examination conditions.

Medium control

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

Low control

These are activities completed without direct supervision. They may include research, preparation of materials and practice. The materials produced by learners under low control will not be directly assessed.

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

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.

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

Internally-assessed units

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

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

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

Externally-assessed units

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

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

Learner malpractice

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

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

Teacher/centre malpractice

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

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

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

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

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

Sanctions and appeals

Where malpractice is proven we may impose sanctions or penalties.

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

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

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

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

The centre will be notified if any of these apply.

Pearson has established procedures for centres that are considering appeals against penalties and sanctions arising from malpractice. Appeals against a decision made by Pearson will normally be accepted only from Heads of Centres (on behalf of learners and/or members of staff) and from individual members (in respect of a decision taken against them personally). Further information on appeals can be found in our *Enquiries and appeals 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, even if final results for external assessments have not been issued, then the centre can claim certification for the learner, provided that quality assurance has been successfully completed. For the relevant procedures please refer to our *Information Manual*. You can use the information provided on qualification grading to check overall qualification grades.

Results issue

After the external assessment session, learner results will be issued to centres. The result will be in the form of a grade. You should be prepared to discuss performance with learners, making use of the information we provide and post-results services.

Post-assessment services

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

Changes to qualification requests

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

Additional documents to support centre administration

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

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

Continuing quality assurance and standards verification

On an annual basis, we produce the *Pearson Quality Assurance Handbook.* It contains detailed guidance on the quality processes required to underpin robust assessment 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; it must abide by these conditions throughout the period of delivery
- Pearson makes available to approved centres a range of materials and opportunities, through online standardisation, intended to exemplify the processes required for effective assessment, and examples of effective standards. Approved centres must use the materials and services to ensure that all staff delivering BTEC qualifications keep up to date with the guidance on assessment
- an approved centre must follow agreed protocols for standardisation of assessors and verifiers, for the planning, monitoring and recording of assessment processes, and for dealing with special circumstances, appeals and malpractice.

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

The methods we use to do this for BTEC Level 3 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 3 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.

The awarding and certification of these qualifications will comply with regulatory requirements.

Eligibility for an award

In order to be awarded a qualification, a learner must complete all units, achieve a Near Pass (N) or above in all external units and a pass or above in all mandatory units unless otherwise specified. Refer to the structure in *Section 2*.

To achieve any qualification grade, learners must:

- complete and **have an outcome** (D, M, P, N or U) for all units within a valid combination
- achieve the **required units at Pass or above** shown in *Section 2*, and for the Extended Diploma achieve a minimum 900 GLH at Pass or above (or N or above in external units)
- 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 (N or 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

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

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

BTEC Nationals are Level 3 qualifications and are awarded at the grade ranges shown in the table below.

Qualification	Available grade range
Certificate, Extended Certificate, Foundation Diploma	P to D*
Diploma	PP to D*D*
Extended Diploma	PPP to D*D*D*

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

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

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

Points available for internal units

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

	Unit size	
	60 GLH	**90 GLH**
U	0	0
Pass	6	9
Merit	10	15
Distinction	16	24

Points available for external units

Raw marks from the external units will be awarded **points** based on performance in the assessment. The table below shows the **minimum number of points** available for each grade in the external units.

	Unit size	
	90 GLH	**120 GLH**
U	0	0
Near Pass	6	8
Pass	9	12
Merit	15	20
Distinction	24	32

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

Claiming the qualification grade

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

Calculation of qualification grade

Applicable for registration from 1 September 2016.

Certificate		Extended Certificate		Foundation Diploma		Diploma		Extended Diploma	
180 GLH		360 GLH		510 GLH		720 GLH		1080 GLH	
Grade	Points threshold	Grade	Points threshold	Grade	Points threshold	Grade	Points threshold	Grade	Points threshold
U	0	U	0	U	0	U	0	U	0
Pass	18	P	36	P	51	PP	72	PPP	108
						MP	88	MPP	124
								MMP	140
Merit	26	M	52	M	73	MM	104	MMM	156
						DM	124	DMM	176
								DDM	196
Distinction	42	D	74	D	104	DD	144	DDD	216
						D*D	162	D*DD	234
								D*D*D	252
Distinction*	48	D*	90	D*	130	D*D*	180	D*D*D*	270

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

Examples of grade calculations based on table applicable to registrations from September 2016

Example 1: Achievement of a Foundation Diploma with a P grade

	GLH	Type (Int/Ext)	Grade	Unit points
Unit 1	120	Ext	Pass	12
Unit 2	90	Ext	Pass	9
Unit 3	90	Int	Pass	9
Unit 4	90	Int	Pass	9
Unit 5	60	Int	Unclassified	0
Unit 6	60	Int	Distinction	16
Totals	**510**		**P**	**55**

The learner has achieved N or higher in Units 1 and 2, and P or higher in Units 3 and 4.

The learner has sufficient points for a P grade

Example 2: Achievement of a Foundation Diploma with a D grade

	GLH	Type (Int/Ext)	Grade	Unit points
Unit 1	120	Ext	Distinction	32
Unit 2	90	Ext	Near Pass	6
Unit 3	90	Int	Merit	15
Unit 4	90	Int	Distinction	24
Unit 5	60	Int	Distinction	16
Unit 6	60	Int	Distinction	16
Totals	**510**		**D**	**109**

The learner has sufficient points for a D grade.

Example 3: An Unclassified result for a Foundation Diploma

	GLH	Type (Int/Ext)	Grade	Unit points
Unit 1	120	Ext	Merit	20
Unit 2	90	Ext	U	0
Unit 3	90	Int	Pass	9
Unit 4	90	Int	Distinction	24
Unit 5	60	Int	Distinction	16
Unit 6	60	Int	Pass	6
Totals	**510**		**U**	**75**

The learner has a U in Unit 2.

The learner has sufficient points for an M grade but has not met the minimum requirement for N or higher in Units 1 and 2, and P or higher in Units 3 and 4.

10 Resources and support

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

Support for setting up your course and preparing to teach

Specification

This **specification** (for teaching from September 2016) includes details on the administration of qualifications and information on all the units for the qualification.

Delivery Guide

This free guide gives 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. It explains the key features of BTEC Nationals (for example employer involvement and employability skills). It also covers guidance on assessment (internal and external) and quality assurance. The guide tells you where you can find further support and gives detailed unit-by-unit delivery guidance. It includes teaching tips and ideas, assessment preparation and suggestions for further resources.

Schemes of work

Free sample schemes of work are provided for each mandatory unit. These are available in Word™ format for ease of customisation.

Curriculum models

These show how the BTECs in the suite fit into a 16–19 study programme, depending on their size and purpose. The models also show where other parts of the programme, such as work experience, maths and English, tutorial time and wider study, fit alongside the programme.

Study skills activities

A range of case studies and activities is provided; they are designed to help learners develop the study skills they need to successfully complete their BTEC course. The case studies and activities are provided in Word™ format for easy customisation.

myBTEC

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

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

To find out more about myBTEC, visit the myBTEC page on the support services section of our website. We will add the new BTEC National specifications to myBTEC as soon as possible.

Support for teaching and learning

Pearson Learning Services provides a range of engaging resources to support BTEC Nationals, including:

- textbooks in e-book and print formats
- revision guides and revision workbooks in e-book and print formats
- teaching and assessment packs, including e-learning materials via the Active Learn Digital Service.

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

Support for assessment

Sample assessment materials for externally-assessed units

Sample assessments are available for the Pearson-set units. One copy of each of these assessments can be downloaded from the website/available in print. For each suite an additional sample for one of the Pearson-set units is also available, allowing your learners further opportunities for practice.

Further sample assessments will be made available through our website on an ongoing basis.

Sample assessment materials for internally-assessed units

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

We do provide a service in the form of Authorised Assignment Briefs, which are approved by Pearson Standards Verifiers. They are available via our website or free on myBTEC.

Sample marked learner work

To support you in understanding the expectation of the standard at each grade, examples of marked learner work at PM/MD grades are linked to the Authorised Assignment Briefs.

Training and support from Pearson

People to talk to

There are many people who are available to support you and provide advice and guidance on delivery of your BTEC Nationals. These include:

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

Training and professional development

Pearson provides a range of training and professional development events to support the introduction, delivery, assessment and administration of BTEC National 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 Nationals. They include an overview of the qualifications' structures, planning and preparation for internal and external 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 Links to industry standards

BTEC Nationals have been developed in consultation with industry and appropriate sector bodies to ensure that the qualification content and approach to assessment aligns closely to the needs of employers. Where they exist, and are appropriate, National Occupational Standards (NOS) and professional body standards have been used to establish unit content.

In the IT sector, the following approaches have been used:

- The Pearson BTEC National Level 3 Certificate, Extended Certificate and Foundation Diploma in Information Technology have been developed to reflect the underpinning knowledge of the Level 2 National Occupational Standards in IT Professional Standards (ITPS) 4.0 to include the range of competencies, knowledge and understanding elements that help learners meet the IT sector skills needs. Further information can be found at https://www.thetechpartnership.com/standards-and-quality/it-professional-standards/ and on our website.

Appendix 2 Glossary of terms used for internally-assessed units

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

Term	Definition
Analyse	Learners present the outcome of methodical and detailed examination either: • breaking down a theme, topic or situation in order to interpret and study the interrelationships between the parts and/or • of information or data to interpret and study key trends and interrelationships.
Assess	Learners present a careful consideration of varied factors or events that apply to a specific situation, or identify those which are the most important or relevant and arrive at a conclusion.
Compare	Learners can identify the main factors relating to two or more items/situations or aspects of a subject that is extended to explain the similarities, differences, advantages and disadvantages. This is used to show depth of knowledge through selection and isolation of characteristics.
Demonstrate	Learners' work, performance or practice shows the ability to carry out and apply knowledge, understanding and/or skills in a practical situation.
Design	Learners apply skills and knowledge to the process of deciding on the look and functioning of a product or process.
Develop	Learners acquire and apply skills through practical activities.
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.
Evaluate	Learners draw on varied information, themes or concepts to consider aspects such as: • strengths or weaknesses • advantages or disadvantages • alternative actions • relevance or significance. Learners' enquiries should lead to a supported judgement showing relationship to its context. This will often be in a conclusion.
Examine	Learners select and apply knowledge to less familiar contexts.
Explore	Learners apply their skills and/or knowledge in

Term	Definition
	contexts involving practical testing or trialling.

Term	Definition
Implement	Learners consider the relevant factors to put a plan into practice, requiring self-direction in the selection of factors such as planning, research, exploration, outcome and review.
Investigate	Learners' knowledge is based on personal research and development.
Justify	Learners are able to give reasons or evidence to: • support an opinion • prove something right or reasonable.
Optimise	Learners improve a process or product by incremental steps to achieve the best performance possible (given constraints).
Produce	Learners' knowledge, understanding and/or skills are applied to develop a particular type of evidence, for example a plan, product or report.
Review	Learners make a formal assessment. They appraise existing information or prior events, or 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 Nationals.

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.

Pearson
BTEC Level 3 National Diploma in
Information Technology

Certificate in Information Technology

Extended Certificate in Information Technology

Foundation Diploma in Information Technology

Diploma in Information Technology

Extended Diploma in Information Technology

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