Cambridge NATIONALS

Accredited

Specification

Level 1/2 Cambridge National Award in ICT (60 glh)
Level 1/2 Cambridge National Certificate in ICT (120 glh)
Level 1/2 Cambridge National Diploma in ICT (240 glh)

September 2012

OCR

The OCR Cambridge Nationals are vocationally related qualifications that take an engaging, practical and inspiring approach to learning and assessment.

They're industry relevant, geared to key sector requirements and very popular with schools and colleges because they suit such a broad range of learning styles and abilities.

The new generation of Cambridge Nationals has been developed to ensure that they build upon the legacy and reputation of the existing qualifications, which are taught in over 3,000 centres.

Created to bring together the Wolf Report recommendations and industry needs

The Cambridge Nationals in ICT have been founded upon the recommendations of the Wolf Report and created in partnership with teachers, students, education specialists and industry-leading employers. This collaborative approach has resulted in a qualification that offers students a solid foundation for their future studies and careers.

Cambridge Nationals and Cambridge Technicals – how they differ

Cambridge Nationals in ICT are targeted at 14-16 year olds in a school environment. They're available as an Award, Certificate and Diploma, with the Certificate being the same size as a GCSE. They use both internal and external assessment and are recognised by the recently published DfE Performance Tables for 2014.

Cambridge Technicals are targeted at students aged 16+ in either a school or FE environment. They allow for greater flexibility with the choice of units that make up the qualification and are wholly internally assessed. In addition, the Level 3 qualifications have UCAS points, supporting progression to HE.

A few good reasons to work with OCR

- You can enjoy the **freedom and excitement** of teaching ICT qualifications that have been developed to help you inspire students of all abilities
- We've built specifications **with you in mind**, using a clear and easy-to-understand format, making them straightforward to deliver
- Our **clear and sensible assessment** approach means that assessment material and requirements are clearly presented and sensibly structured for you and your students
- **Pathways for choice** – we have the broadest range of vocational qualifications, and Cambridge Nationals provide an ideal foundation for students to progress to more advanced studies and ICT-related careers
- **Working in partnership to support you** – together with teachers, we've developed a range of practical help and support to save you time. We provide everything you need to teach our specifications with confidence and to ensure that your students get as much as possible from the programme of learning
- Cambridge Nationals are **supported with new innovative support products** and training – to help you get started, prepare to teach and share best practice

Sign up to teach – let us know you will be teaching this specification to ensure you receive the support you need. Simply complete the online form at **cambridgenationals.org.uk/signup**

OCR Cambridge Nationals in ICT

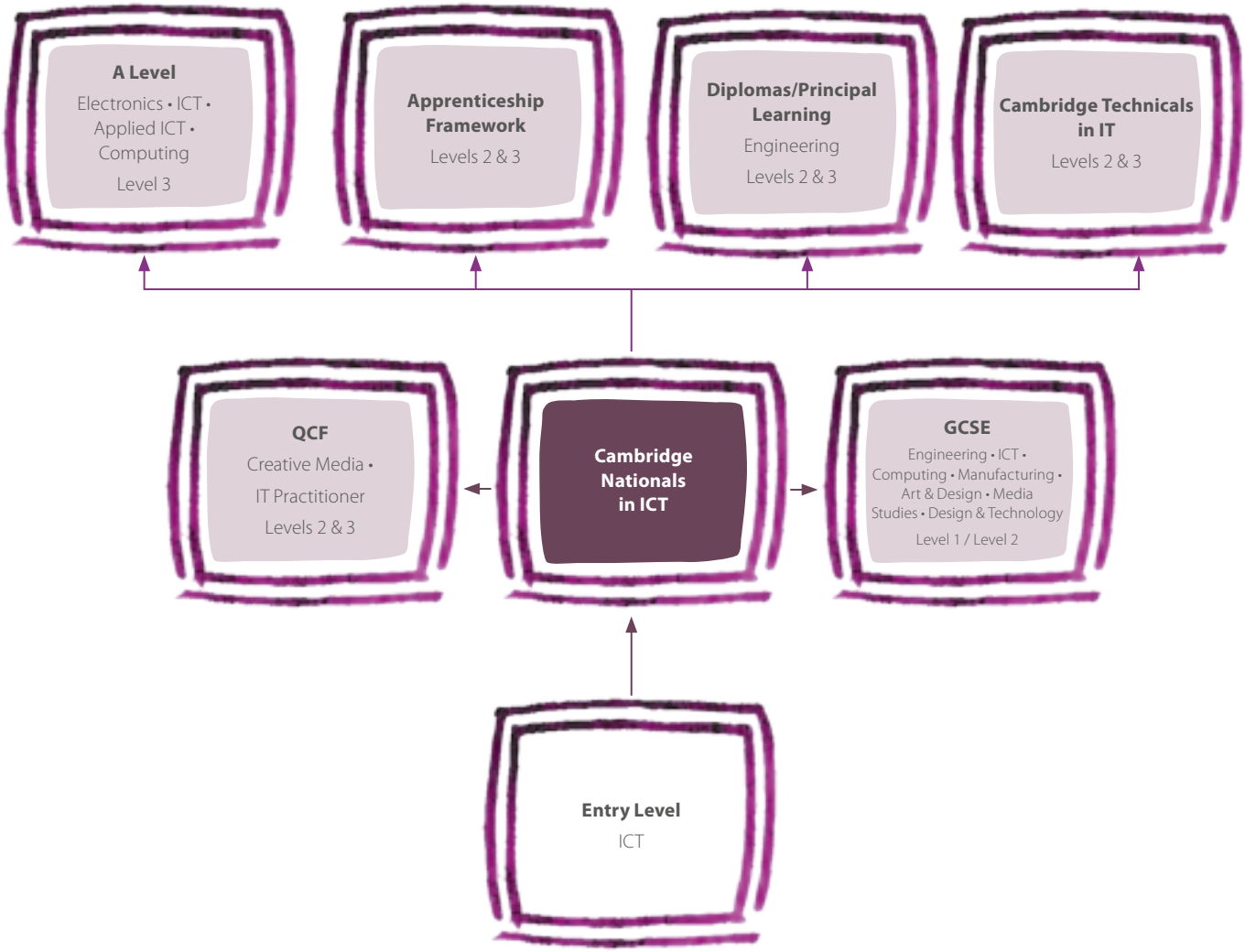
ICT skills are essential for success in employment and higher education, and are among the fundamental transferable skills required by employers. Cambridge Nationals deliver these skills across the whole range of learning styles and abilities, effectively engaging and inspiring all students to achieve great things.

Units	Assessment Method	GLH	Award 60 GLH	Certificate 120 GLH	Diploma 240 GLH
Mandatory					
R001: Understanding computer systems	Written paper – 1 hour – 60 marks	30	M	M	M
R002: Using ICT to create business solutions	Centre assessed task, OCR moderated	30	M	M	M
Business strand					
R003: Handling data using spreadsheets	Centre assessed task, OCR moderated	30	N/A	O	S
R004: Handling data using databases	Centre assessed task, OCR moderated	30	N/A	O	S
Creative Strand					
R005: Creating an interactive product using multimedia components	Centre assessed task, OCR moderated	30	N/A	O	O
R006: Creating digital images	Centre assessed task, OCR moderated	30	N/A	O	O
R007: Creating dynamic products using sound and vision	Centre assessed task, OCR moderated	30	N/A	O	O
Technical strand					
R008: Introduction to computer programming	Centre assessed task, OCR moderated	30	N/A	O	O
R009: Exploring computer hardware and networks	Centre assessed task, OCR moderated	30	N/A	O	O
R010: Developing control systems	Centre assessed task, OCR moderated	30	N/A	O	O
Student-initiated project					
R011: Understanding technology - a project approach	Centre assessed task, OCR moderated	30	N/A	O	O

Key: M = mandatory unit O = optional unit S = software – must choose one of the S units

Next steps for your students – Future progression to other qualifications

Cambridge Nationals in ICT lead to a wide range of general and vocational qualifications for your students.



Continuing Professional Development (CPD) and learning resources

Our support is carefully designed to help you at every stage, from preparation through to the delivery of our specifications.

Continuing Professional Development (CPD)

As with all our qualifications, there will be a range of events and activities to support you. The reputation of our Professional Development is second to none and we will continue to build up our reputation in providing exemplary support.

To keep up to date visit www.ocreventbooker.org.uk

Learning resources are an important part of any qualification and the Cambridge Nationals are no exception. We have developed a suite of support and learning resources that provide what teachers tell us they want.

We've worked in partnership with teachers and education specialists to develop ideas and ensure that there is a range of tasks that suit differing levels and abilities of students.

By working in this collaborative way, we have ensured that our range of resources support classroom activities, from lesson planning and teaching to monitoring student progression and success. This includes our 'teaching links', offering additional resource information, and teaching tools such as games and activities directly linked to some units.

Other resources include:

Administration guides and tools that include a 'rules of combination' online tool and a progress tracker

Sample assessment materials for the mandatory units

Teaching packs, including introductory unit presentations

Text book (working in partnership with Hodder)

These resources are free and available from www.ocr.org.uk

Preparing for first teaching

Adopting a new specification can appear daunting. There's quite a lot of information to weigh up: the demands of the course, the quality of support, and the needs and expectations of teachers and candidates. Here's some advice to help you make the best decision.

7 Steps to First Teaching

MAKE THE MOST OF THE OCR WEBSITE

The unit specifications will be available online. While the overall programme of study may be familiar, it's important to check each unit specification to make sure that you're happy with the learning outcomes, knowledge, understanding and skills.

TAKE A TOUR OF THE SAMPLE ASSESSMENTS

They give a clear idea about the type of tasks to be undertaken. OCR will provide model assignments for centre assessed units (R002 – R010). They can be used directly or adapted to suit your needs.

MAKE GOOD MARKING DECISIONS

The specification contains information on performance indicators, which indicate the level of attainment associated with grades, marking criteria glossary of terms and guidance on assessment for you to use in addition to the marking criteria to support your marking decisions.

GET SOCIAL

Visit our social media site (**www.social.ocr.org.uk**). By registering you will have FREE access to a dedicated platform where teachers can engage with each other – and OCR – to share best practice, offer guidance and access a range of support materials produced by other teachers such as lesson plans, presentations, videos and links to other helpful sites.

ENJOY SUPPORT AND GUIDANCE

It's wise to review our Report to Centres for generic guidance and explore the summary of key issues from previous assessment series. These will be available on the OCR website once the qualifications have been through their first cycle of assessment.

GET GREAT TRAINING

Check OCR's website to see if there is a convenient course available. OCR's Professional Development courses are an excellent way to get practical advice on the best ways to deliver Cambridge Nationals.

EXPLORE EXTERNAL WEBSITES

It's often worthwhile carrying out an internet search to see if there is any free or paid-for resource material available. But please always check that whatever material you incorporate into your teaching meets the qualification's assessment requirements.

Level 1/2 Cambridge National Award in ICT (60 GLH) J800
Level 1/2 Cambridge National Certificate in ICT (120 GLH) J810
Level 1/2 Cambridge National Diploma in ICT (240 GLH) J820

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Contents

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1 Introduction to Cambridge Nationals in ICT

1.1 Qualification aims

These qualifications will assess the application of ICT skills through their practical use. They will provide learners with essential knowledge, transferable skills and tools to improve their learning in other subjects with the aims of enhancing their employability when they leave education, contributing to their personal development and future economic well-being.

The Cambridge Nationals in ICT will equip learners with sound ICT skills for everyday use and provide opportunities to develop in context those desirable, transferable skills such as planning, research and analysis, working with others or communicating technical concepts effectively. They will also challenge all learners, including high attaining learners, by introducing them to demanding material and skills; encouraging independence and creativity; providing tasks that engage with the most taxing aspects of the National Curriculum (including data handling, modelling and programming).

The hands on approach that will be required for both teaching and learning will chime appropriately with the way young people use new technology and will underpin a highly valid approach to the assessment of their skills as is borne out by what teachers tell us. The qualification design, including the range of units available, will allow learners the freedom to explore more deeply the things that interest them as well as providing good opportunity to enhance their learning in a range of curriculum areas.

This specification contains OCR's Cambridge National Award/Certificate/Diploma in ICT for first teaching from September 2012.

1.2 Qualification summary

The Cambridge Nationals in ICT consist of three qualifications:

The OCR Level 1/2 Cambridge National Award in ICT consists of two mandatory units.

The OCR Level 1/2 Cambridge National Certificate in ICT consists of two mandatory units and two optional units.

The OCR Level 1/2 Cambridge National Diploma in ICT consists of two mandatory units and six optional units.

1.3 Guided learning hours (GLH)

OCR Level 1/2 Cambridge National Award in ICT requires 60 GLH in total.

OCR Level 1/2 Cambridge National Certificate in ICT requires 120 GLH in total.

OCR Level 1/2 Cambridge National Diploma in ICT requires 240 GLH in total.

1.4 Prior learning/attainment

Learners who are taking courses leading to any of these qualifications should normally have a corresponding Key Stage 3 Programme of Study within the National Curriculum.

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1.5 Overview of the qualifications

Units	Assessment method	GLH	J800 Award 60 GLH	J810 Certificate 120 GLH	J820 Diploma 240 GLH
Mandatory					
R001: *Understanding computer systems*	Written paper OCR set and marked 1 hour – 60 marks (60 UMS) Learners answer all questions	30	M	M	M
R002: *Using ICT to create business solutions*	Centre assessed tasks OCR moderated Approx 10 hours – 60 marks (60 UMS)	30	M	M	M
Business information systems strand					
R003: *Handling data using spreadsheets*	Centre assessed tasks OCR moderated Approx 10 hours – 60 marks (60 UMS)	30	n/a	O	S
R004: *Handling data using databases*	Centre assessed tasks OCR moderated Approx 10 hours – 60 marks (60 UMS)	30	n/a	O	S
Creative strand					
R005: *Creating an interactive product using multimedia components*	Centre assessed tasks OCR moderated Approx 10 hours – 60 marks (60 UMS)	30	n/a	O	O
R006: *Creating digital images*	Centre assessed tasks OCR moderated Approx 10 hours – 60 marks (60 UMS)	30	n/a	O	O
R007: *Creating dynamic products using sound and vision*	Centre assessed tasks OCR moderated Approx 10 hours – 60 marks (60 UMS)	30	n/a	O	O
Technical strand					
R008: *Introduction to computer programming*	Centre assessed tasks OCR moderated Approx 10 hours – 60 marks (60 UMS)	30	n/a	O	O
R009: *Exploring computer hardware and networks*	Centre assessed tasks OCR moderated Approx 10 hours – 60 marks (60 UMS)	30	n/a	O	O
R010: *Developing control systems*	Centre assessed tasks OCR moderated Approx 10 hours – 60 marks (60 UMS)	30	n/a	O	O
Learner-initiated project					
R011: *Understanding technology – a project approach*	Centre assessed tasks OCR moderated Approx 15 hours – 60 marks (60 UMS)	30	n/a	O	O

Key: **M = mandatory unit**
O = optional unit
S = software – must choose one of the S units

A bank of model assignments is available free of charge from the OCR website for the centre assessed units R002 – R010.

2 Units

2.1 Guidance on unit content

Use of i.e./e.g. in unit content

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

Teachers will need to ensure that any modifications to tasks, from the bank of model assignments for the centre assessed units, do not expect the learner to do more than they have been taught, but they must enable them to access the full range of marks as described in the marking criteria.

For externally assessed units, where the content contains i.e. and e.g. under specific areas of content, the following rules will be adhered to when setting questions:

- a direct question may be asked where the unit content is shown with an i.e.
- where unit content is shown as an e.g. a direct question will not be asked about that example. Any questions relating to the area of content will offer learners the opportunity to provide their own examples as the unit has not specified which examples they should be familiar with.

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2.2 Unit R001: *Understanding computer systems*

Aims

This unit will provide learners with the underpinning knowledge and understanding required to use computer systems effectively. Learners will develop their knowledge and understanding of the systems they use both at home and at school and will explore how these same technologies are used by business organisations.

This unit complements unit R002. In unit R001 learners will study the computer system on which applications software sits and consider the implications of working with data to create content, while in unit R002 they will work with 'office' applications software to edit and format/create content to meet specified business purposes.

From personal computers to smartphones, computing devices are an essential feature of the modern world. Technology may be changing every day, but the knowledge and understanding of how to use computers effectively is the same regardless of the technology being used. Computers are powerful devices for the storage and manipulation of data, but how can they be used effectively and the important data they use be stored securely?

On completion of this unit, learners will have gained the knowledge and understanding to use computers more effectively in a variety of different contexts including home, school and the workplace. Their regard for their own personal data security and for the security of the data of others will be increased and, overall, learners will be more informed users of computers making them more effective participators in business and social life.

Learners studying optional units will be able to apply the knowledge and understanding they have gained in this unit to develop their skills.

Learning Outcome 1: Understand how ICT can be used to meet business needs

Learners must be taught:

- features and purposes of computing devices, i.e.:
  - desktop and portable devices, i.e. laptops, netbooks, tablets, smartphones
  - input devices, i.e. mice, keyboard, microphone, sensors, pads, specialist keyboards, touch pad, microphones, remote controls, scanners, digital cameras, webcams, touch screens, readers for barcodes, magnetic stripes and chip and pin, MIDI instruments
  - output devices, i.e. monitor/screens, printers, speakers, head/earphones, digital projectors, data projectors, plotters, actuators
  - software, i.e.:
    - operating systems (e.g. Windows, OS X, Android, iOS)
    - utility software (e.g. computer security)
    - applications software, i.e. word processors, desktop publishing software, spreadsheets, database management software, multimedia software, slideshow software, video-editing software, graphics manipulation software, communications software (e.g. social networking software, chat, instant messaging, file transfer and email clients), presentation software, gaming software, web browsers, apps for portable devices
  - storage and connectivity devices, i.e.:
    - optical disks (e.g. CD and DVD for data storage)
    - magnetic media (e.g. internal and external hard disk drives (HDD), tape)
    - Solid State Drives (SSD)
    - Memory cards, i.e. flash memory devices
    - network devices (e.g. routers, modems)
    - cloud storage

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- configurations, i.e.:
  - typical office configurations
  - customised systems for specified needs, i.e.:
    - physical impairment, i.e. sight, hearing, movement
    - remote working (e.g. travelling, hotel or home)
- how the following factors can affect the choice of system: cost, availability, user needs, data security
- how peripherals can be connected to a computer device, i.e.:
  - wired methods (e.g. USB, firewire)
  - wireless methods (e.g. wifi, Bluetooth, infra-red)
- how to connect a computing device to an existing wireless network, i.e.:
  - network name, i.e. Service Set Identifier (SSID)
  - the use of security keys
  - appropriate firewall settings for public and private networks
- how organisations can monitor employees, i.e. GPS location tracking, monitoring internet use, monitoring communications.

Learning Outcome 2: Know how to work with information and data to meet specified business needs

Learners must be taught:

- data capture methods, i.e.:
  - online and paper-based forms
  - automated data capture systems, i.e. control system sensors, barcode readers, Radio Frequency Identification Device (RFID), Near Field Communication (NFC)
- how the following factors can affect the choice of method:
  - nature of information to be collected (e.g. environmental conditions, location of information)
  - cost
  - availability
  - ease of use
  - data security
- how to design data capture forms to obtain specified information
- how to code information for use in a spreadsheet or database
- data validation methods
- file formats for storing data, i.e.:
  - proprietary formats, i.e. .doc, .xls, .ppt, .fla, .wma, .aac
  - open formats, i.e. .rtf, .pdf, .csv, .exe, .txt, .mp3, .wav
- data storage technologies, i.e.:
  - local and removable media
  - remote storage (e.g. offsite location, cloud storage)
- security measures to be used when storing data, i.e.
  - network/computer security, i.e.:
    - usernames/passwords
    - access rights/permissions
  - document security, i.e.:
    - passwords
    - other ways to restrict access to or editing of content
    - how and why data is encrypted
  - physical security to prevent loss of data/devices (e.g. locked doors)
- data transferring technologies, i.e.:
  - wired and wireless methods
  - mobile data transmission (e.g. 3g, 4g)
  - remote methods (e.g. email, internet/cloud, peer to peer file sharing)
  - security methods, i.e. data encryption
  - how the following factors can affect the choice of method: file size, transfer speed, future-proofing, data security, user needs

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- factors affecting data transfer speed (e.g. bandwidth, router technology)
- the factors affecting the appropriate optimisation of electronic files (e.g. download speeds, quality of product)
- how to use back-up and recovery systems, i.e.:
  - data storage media (e.g. removable devices, remote storage)
  - back-up frequency
  - archiving
  - automated versus manual systems
- how the following factors can affect the choice of method: cost, availability, ease of use, data security.

Learning Outcome 3: Know how ICT can be used to support business working practices

Learners must be taught:

- how businesses can communicate with employees and others working remotely, i.e. voice telephones, SMS, instant messaging, e-mail, chat rooms, forums, bulletin boards, Voice-over-IP (VoIP), video conferencing, webcams, blogs, social networking
  - appropriate use of remote communication tools, i.e. for email appropriate use of subject, cc/bcc, attachments and email etiquette
  - the benefits and drawbacks of these methods
- how diary management software can be used to organise work schedules, i.e.:
  - creating appointments/meetings
  - inviting participants
  - creating tasks
  - creating to-do lists
  - setting reminders
- how documents can be created and edited collaboratively, i.e.:
  - documents in shared access locations, i.e.:
    - network shared areas (e.g. read/write access)
    - cloud-based services (e.g. providing open or restricted access to services enabling the creating/editing of documents online)
  - inserting comments into an existing draft
  - editing drafts, tracking changes made
  - reviewing facilities: accepting or rejecting changes made.

Learning Outcome 4: Understand how legal, ethical, safety and security issues affect how computers should be used

Learners must be taught:

- how legislation affects business computer users, i.e.:
  - health and safety
  - data protection
  - copyright
  - computer misuse
- how moral and ethical issues affect business computer users, i.e.:
  - the use and abuse of personal and private data
  - cyberbullying
  - monitoring of individuals by organisations through the use of:
    - worker monitoring/logging,
    - cookies,
    - key logging,
    - worker call monitoring/recording,
    - electronic consumer surveillance,
    - mobile phone triangulation
- the implications and consequences for organisations of data loss, corruption and theft, i.e.:
  - legal implications (e.g. action from the Information Commissioner)
  - impact on customers (e.g. reduced confidence in business, increased risk of personal identity theft)

- impact on employees (e.g. disciplinary action for not following company procedures)
- impact on organisation (e.g. increased costs in resolving problems caused, loss of income if customers lose confidence)

- the main threats to data security and how to deal with them, i.e.:
  - threats to data security, i.e.:
    - computer viruses
    - trojans
    - worms
    - phishing
    - spyware
    - adware
    - hacking
    - Denial of Service (DoS) attacks
    - physical threats (e.g. loss/theft of devices)
  - actions to minimise risks, i.e.:
    - act online in ways which reduce the risk of identity theft and protect personal security
    - use of protection software, i.e. firewall, anti-virus, anti-spam, data encryption to store and transfer data
- using automatic and manual updating facilities for operating systems and security software.

Assessment guidance

During the external assessment, learners will be expected to demonstrate their understanding through questions that require the skills of analysis and evaluation in particular contexts.

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2.3 Unit R002: *Using ICT to create business solutions*

Aims

This unit will enable learners to develop ICT skills that would equip them to operate effectively in a business environment. This unit complements unit R001. In unit R001 learners will study the computer system on which applications software sits and consider the implications of working with data to create content, while in this unit they will work with 'office' applications software to edit and format/create content to meet specified business purposes.

Learners will use a wide range of applications that are commonly used in the workplace, schools, and in further and higher education. They will learn how to select the most appropriate software to complete tasks to meet specified business requirements in a variety of contexts.

They will learn how to use software tools to handle data and communicate information for a range of business purposes, and how to apply formatting to enhance those documents to suit their purpose and intended audience. This type of skill is very valuable as it can be transferred from one software application to another. So if the learner is able to secure these skills through this unit they will be prepared to use a range of software applications effectively. They will learn to work with a variety of file types and to integrate/import files of different types into other documents. They will develop techniques to search for, select and store information in a variety of contexts. They will learn how to select the tools and techniques to communicate information and solve problems.

On completion of this unit learners will have extended their capability in the use of applications software.

Learning Outcome 1: Be able to use techniques to search for, store and share information

Learners must be taught how to:

- use search engine techniques to find specific information on the internet, i.e. using
  - phrase
  - key words
  - advanced search pages
  - quotes
  - wildcards
- use and organise bookmarks/favourites
- select, capture and store graphics and text in compliance with copyright
  - download
  - 'copy and paste'
- use non-internet based sources to find information, i.e. local area network, wireless area network, CD-ROMs
- evaluate validity of information, i.e.:
  - reliability of source
  - age
  - bias of information
- reference all information copied/sourced, i.e.:
  - author/source
  - year created (if available)
  - title of webpage/web document
  - date last updated (if available)
  - URL

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- store electronic information[1], i.e.:
  - meaningful file and folder names
  - folder structure
  - backups
  - password protection
  - compressing/zipping files
- use email to communicate with others in business contexts, i.e.:
  - subject line when composing messages
  - body message text when sending, forwarding and replying to messages, appropriateness of body text
  - including multiple recipients, i.e.:
    - Carbon Copy (cc)
    - Blind Carbon Copy (bcc)
    - Groups
  - attachments
  - email signatures
  - auto response messages
  - folders to store messages.

Learning Outcome 2: Be able to select and use software to handle data

Learners must be taught how to use software to handle data, i.e.:
Creating business **spreadsheets**:

- Import/open csv files and save in an appropriate file type
- enter title, column headings and row labels
- enter[2]/import data, i.e.:
  - text
  - numeric
  - title
  - column/field headings
  - row labels
  - formulae involving arithmetic operators[2], i.e. +, –, *, /
  - simple functions[2], i.e.:
    - SUM
    - AVERAGE
    - MIN
    - MAX
    - IF
  - cell references, i.e. relative, absolute

Editing and manipulating data in **spreadsheets**:

- insert and delete rows/columns
- change/amend data in cells
- amend formulae
- change data to model outcomes
- search data
- sort data[2]
- create graphs[2], i.e.:
  - pie chart
  - column/bar graph
  - line graph
  - scatter graph

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Printing data from **spreadsheets**:

- spreadsheet view
- formulae view
- selected data

Creating flat file (single table) **databases**:

- import csv files and save in an appropriate file type

Editing **databases**:

- enter new records
- edit records
- delete records
- sort table
- query data in a single table using[3]:
  - simple criteria, i.e. =
  - complex criteria, i.e. <, >, <>, >=.<=, NOT, AND, OR, BETWEEN
  - sort data

Printing **databases**:

- selected data (queries)
- reports
  - tabular
  - columnar
  - stepped
  - list
  - label
  - grouped
  - grouped with summaries.

Learners must be taught how the purpose and audience for the business activity influences the choice of software.

Teaching should be delivered in the context of data handling software, i.e. spreadsheets and databases.

Learning Outcome 3: Be able to select and use software to communicate information for a business purpose

Learners must be taught how to:

- import txt and rtf files and save in an appropriate file type to retain formatting
- use tools and facilities appropriate to the software, i.e.
  - enter text, tables, images using the keyboard, mouse or other input device
  - modify existing documents
  - design and create new documents
  - create screen layouts by using existing templates and by creating and positioning text and graphic frames
  - graphics, i.e. copy, paste, resize
  - select appropriate text and graphics
  - edit using insert, delete, cut, copy and paste functions
  - import tables, graphic images, and graphs/charts created in other software
  - integrate files of different types
  - mail merge, i.e.
    - enter merge fields/codes
    - merge selected data
  - use spelling, grammar and design checkers

- proof read documents to detect errors not corrected by automated checkers available within the software used, i.e. spelling, grammar, design checkers.

Learners must be taught how the purpose and audience influences the choice of document type, and how the document type influences the choice of software.

Teaching should be delivered in the context of a range of software, i.e. Word Processing, Desktop Publishing, Presentation, Web page, Graphics, for a range of documents that are typically used in business.

Learning Outcome 4: Be able to use software tools to format information

Learners must be taught how to:

- use headings, subheading and body text
- use widows and orphans
- use white space
- use case, i.e. capitals and lower case and how to use it consistently
- use spacing before and after punctuation, bullets and numbered lists
- use line, paragraph and page breaks and how to use it consistently
- auto date format, i.e. English UK
- use formatting techniques to create impact and enhance the appearance of documents, i.e.:
  - orientation, i.e. landscape and portrait
  - margins
  - inserting page and line breaks
  - columns
  - graphics, i.e. positioning, scaling maintaining aspect ratio, cropping
  - text, i.e. font[2], style, size, direction, colour[2], emphasis
  - paragraph, i.e. alignment, indents, line spacing, tabs
  - bulleted and numbered lists
  - text wrapping around objects
  - cells, i.e.:
    - text, i.e. font, style, size, alignment,
    - number, i.e. decimal places, percentage, currency, date/time
  - borders and shading[2]
  - backgrounds, i.e. images, colours[2]
  - transition and animation effects
  - scaling/fit to page
  - set print options appropriate to the software[2]
  - inserting headers and footers[2]
- inserting automatic fields, i.e. date and document information.

Links between units and synoptic assessment

[1] If learners have already completed unit R006 they will have covered the content marked with [1].

[2] If learners have already completed unit R003 they will have covered the content marked with [2].

[3] If learners have already completed unit R004 they will have covered the content marked with [3].

There is no requirement to teach the units in a particular order but teachers should take note of this coverage and schedule the programme of learning accordingly.

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2.4 Unit R003: *Handling data using spreadsheets*

Aims

This unit builds on Units R001 and R002 and learners will be able to apply the skills, knowledge and understanding developed in those units and vice versa. This unit will help the learner to process and present data into meaningful information that can be used to support the decision-making process in real life scenarios.

The learning is important because spreadsheets are used extensively in businesses for a variety of purposes such as budgeting, cost modelling, reporting, trend analysis and forecasting. Spreadsheets are very effective at performing automatic calculations e.g. for displaying information to highlight relationships, for predicting outcomes by changing data, for numerical analyses and to create informative graphs and charts. In a school environment teachers use spreadsheets to monitor and analyse learners' performance. Learners will create a spreadsheet to provide a solution to a given scenario which will provide the facility for the user to create and manipulate data and to produce graphs and/or charts to support decision making.

On completion of this unit learners will be able to interpret requirements for a spreadsheet, take unstructured data, plan how to use it in a spreadsheet, create and populate a spreadsheet, use relevant functions and tools to manipulate the data and produce outputs to present the data graphically to support decision making.

Learning Outcome 1: Be able to create and populate spreadsheets to meet user requirements

Learners must be taught how to:

- provide structure[1], i.e. worksheet name(s), column/row headings/sub-headings
- set size of rows, columns, print area
- use presentation features, i.e. borders, shading, fonts, colours, wrap text, merge cells, hide/show columns
- use validation rules[1], i.e. list, time, text length
- use input messages and error messages to advise and/or redirect the user in the event of invalid data entry
- enter given data
- set data types[1], i.e. alphanumeric, text, numeric (integer, currency, percentages, number of decimal places and fractions), date/time, limited choice (drop-down list, radio buttons, tick lists), object, logical/Boolean (Yes/No, Male/Female) types
- use conditional formatting
- use page layout features, i.e. headers, footers, gridlines, scaling, paper size, orientation
- provide help for user of spreadsheet (e.g. notes, comments)
- interpret user requirements from the user brief.

Learning Outcome 2: Be able to select and use spreadsheet functions to meet user requirements

Learners must be taught how to:

- select and enter formulae using correct and appropriate arithmetic operators[2], i.e. +, –, /, *
- select and enter functions[2], i.e. SUM, AVERAGE, LOOK UPS, IF, AND, OR, TODAY, DATE, MIN, MAX, COUNT
- use absolute and relative cell references
- use brackets to force order of operation
- reference data on other worksheets with formulae, i.e. cell linking
- create, assign, print and annotate macros
- test spreadsheet functionality.

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Learning Outcome 3: Be able to use spreadsheet models to present information to support decision making

Learners must be taught how to:

- arrange data by sorting
- reduce data by filtering
- use 'what if analysis' (e.g. trial and error, change variable data, goal seek) to predict results and create different scenarios and outcomes
- recognise that data type influences the graphical method used[3]
- use graphical methods to present information, i.e. bar chart, pie chart, line graph, scattergram and the use of scales, a title, axis title and key legend.[3]

Links between units and synoptic assessment

[1] Unit R001 LO2 supports the development of these skills by developing an understanding of them in business contexts.

[2] Unit R002 LO2 supports the development of this Learning Outcome.

[3] Unit R002 LO2 supports this by developing an understanding of appropriate chart types.

If learners have already completed core units R001 and R002 they will already understand why and how spreadsheets are used to store and retrieve data in a business context and they will have covered the Data Protection Act (DPA). It is therefore recommended that they do these units first. However, if this is not possible teachers should cover the content from the mandatory units which specifically relates to spreadsheets and the DPA as well as the taught content for unit R003 listed above.

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2.5 Unit R004: *Handling data using databases*

Aims

This unit builds on Units R001 and R002 and learners will be able to apply the skills, knowledge and understanding developed in those units and vice versa. This unit will enable learners to gain the necessary additional skills and knowledge to be able to modify an existing database by adding fields and then to further enhance a database by creating new table structures to produce a relational database structure. They will also learn how to test and interrogate a database. They will understand that a database has to be developed to meet the needs of an individual user or organisation.

Database software is one of the most important IT applications programs used by organisations in the 21st Century. Databases are used to store and organise data so that it is easy to find the data again when an organisation or individual wants to do something with the data. For example, a website that sells goods is likely to have a database behind it to store details of all the products the business sells and the account details of its customers. A computer game has a database to store all the options selected and to store the results of each game played, so users can compare their progress. A school keeps a database of contact details and exam results of its current pupils.

On completion of this unit learners will be able to modify an existing database and produce a relational database. They will also be able to create queries to interrogate a database and find specific records and produce reports based on the results of these queries and create a user interface for the database.

Learning Outcome 1: Be able to modify databases to meet user requirements

Learners must be taught how to:

- modify existing databases to add field(s), table(s) to meet user needs
- modify single-table databases into multi-table databases and understand the need/rationale for doing this
- create table structures with key fields (primary keys); field names[1]
- use data types, i.e. number, text, date/time, currency, auto-incremented , yes/no; field length[1]
- use validation rule, i.e. input masks, presence check, range check, list check; customised error messages[1].

Learning Outcome 2: Be able to produce outputs from databases to meet user requirements

Learners must be taught how to:

- create queries and understand the need/rationale for them[2], i.e.:
  - simple queries on a single table using single criteria
  - complex queries on linked tables using single and multiple criteria
  - reusable queries, i.e. parameter queries using parameter text
- save queries using appropriate query names[2]
- output results of queries in reports on screen and formatted to print (e.g. address labels, letters, invoices[3])
- customise standard reports (e.g. add labels, adjust field widths, re-position fields, add header/footer[3]).
- customise reports to reflect house styles (e.g. consistent layouts and formatting[3]).

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Learning Outcome 3: Be able to create user interfaces for databases to meet user requirements

Learners must be taught how to:

- enable security such as password protection of databases[4]
- create data input forms and add objects, i.e. fields, text labels, pictures, list boxes, combo boxes, option buttons, command buttons[5]
- create menus using forms, use of wizards, i.e. switchboard manager, use of command buttons for navigation, main menu form to load at start up[5]
- customise interfaces to reflect house styles (e.g. consistent layout and formatting[5]).

Learning Outcome 4: Be able to analyse a databases suitability for a business purpose

Learners must be taught how to:

- test validation rules, data entry forms, queries and reports
- solve problems such as responding to error messages, resolving incorrect results from queries
- create a test plan with headings, i.e. test number, test purpose, test data, expected outcome, actual outcome, modification
- use different test methods i.e. use of test data, i.e. normal, extreme, erroneous test plans, end user testing, i.e. end user/peer testing of user interface to provide feedback.

Links between units and synoptic assessment

[1] Unit R001 LO2 supports the development of these skills by developing understanding through their use in business contexts.

[2] Unit R002 LO2 supports this by developing these skills in the context of existing spreadsheets and databases.

[3] Unit R002 LO3 and LO4 support this by developing understanding of how to communicate using business documents, of which these are examples.

[4] Unit R001 LO4 supports this by developing understanding of the need for security measures and the consequences of data loss.

[5] Unit R001 LO2 supports this by developing understanding of how data can be captured using forms.

If learners have already completed core units R001 and R002 they will already understand why and how databases are used to store and retrieve data in a business context and they will have covered the Data Protection Act (DPA). It is therefore recommended that they do these units first. However, if this is not possible teachers should cover the content from the mandatory units which specifically relate to databases and the DPA as well as the taught content for unit R004 listed above.

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2.6 Unit R005: *Creating an interactive product using multimedia components*

Aims

This unit builds on Units R001 and R002 and learners will be able to apply the skills, knowledge and understanding developed in those units and vice versa.

This unit will enable learners to demonstrate their creative flair by combining multimedia components to create a vibrant, energetic or stimulating www, webpage, or interactive product.

Interactive products are used widely in everyday life; from visiting a website, ordering online products, using mobile phone applications, viewing a presentation, e-learning products or playing computer games.

On completion of this unit learners will be able to show how the interactive product meets both the user needs and extends their capability within the use of applications software such as website development.

Learning Outcome 1: Be able to design interactive products

Learners must be taught how to:

- select and use the software features appropriate to the interactive products to aid in the design process, i.e. website, tablet/mobile phone apps, gaming platforms, presentation software
- identify success criteria, i.e. meeting the client brief, component quality, composition and the extent to which the product is interactive
- select and use different forms of navigation site planning techniques, i.e. mood boards, spider diagrams, mind mapping, site plans, house-style, hand-drawn templates
- source and store multimedia components for inclusion in products and how to make ready where applicable, i.e. source components images, video, sound, animation, scripting, sprites. Storage will necessitate the use of different file types[1], i.e. swf, html, sis, app, exe, xaml, xml, ppt
- understand the implications of legislation on their sources, i.e. Copyright Law; Intellectual Property; photo permissions and releases; acknowledgement and referencing of sources[2]
- select the applications software dependent on purpose and audience, i.e. web authoring software, game making software, 'App' development software or presentation authoring software.

Learning Outcome 2: Be able to create interactive products containing multimedia components

Learners must be taught how to:

- combine components using techniques (e.g. alternative pathway, user interaction and effects)
- use templates, i.e. master slides, environments, cascading style sheets
- create a navigation system, i.e. navigation bar, buttons, hyperlinks, mouse /keyboard controls, menus and drop down lists, graphical user interface
- set up interaction, i.e. roll over, drag and drop, input form, behaviours (e.g. pop up messages, shake, fades, and sounds) triggers, collision, scripting, hot spots
- use effects, i.e. transitions, html clock, fade in, fade out, custom animation.

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Learning Outcome 3: Be able to carry out usability testing

Learners must be taught how to:

- test the product during production and where appropriate review tools and techniques used in line with the success criteria
- test the product post completion against the success criteria using a variety of feedback methods including client feedback.

Links between units and synoptic assessment

[1] Unit R001 LO2 supports this by developing an understanding of appropriate file types.

[2] Unit R001 LO4 supports this by developing an understanding of the implications of copyright legislation and the consequences of non-compliance with its provisions.

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2.7 Unit R006: *Creating digital images*

Aims

This unit builds on Units R001 and R002 and learners will be able to apply the skills, knowledge and understanding developed in those units and vice versa. This unit will enable learners to acquire the underpinning knowledge and skills to enable them to create, edit, enhance and save different types of digital images.

We live, learn, work and play in a very visual world. Whether we like it or not digital images influence our actions and thoughts – persuading us to buy one product instead of another, instructing us to go this way rather than that, explaining a complicated scientific concept and portraying an emotion or expressing a feeling using powerful digital art. With or without words successful digital images will convey their message effectively so that the viewer receives and understands it – and can then act upon it.

The most famous type of digital image is a logo or brand concept. Large companies will spend hundreds of thousands of pounds on their brand image (such as the London 2012 logo; BBC One re-branding) and may re-brand products many times over their life. Pepsi has had 11 re-brandings: The graphic design industry is big business.

On completion of this unit learners will be able to create a digital image that communicates the intended message effectively, meeting the client's needs, and they will have extended their capability within the use of digital editing software packages.

Learning Outcome 1: Be able to specify a digital image solution for a client's needs

Learners must be taught how to:

- analyse a client brief to determine success criteria: suitability; relevance; measurability
- select and use research methods, i.e. image/thought showers/spider diagrams; interviews/focus groups; questionnaires/surveys; competitor/market research/stakeholder perceptions
- select and use creative design plans, i.e. storyboards; roughs/sketches; design concepts/layouts
- select and use component sources, i.e. image capture (e.g. camera, scanner); hand-drawn design; client-provided images; stock images; internet; effect of sourced components on final image quality, i.e. file size, resolution, scalability, noise
- identify the implications of legislation on sources,
  i.e. Copyright Law; Intellectual Property Rights; photo permissions and releases; acknowledgement and referencing of sources[1].

Learning Outcome 2: Be able to create digital images

Learners must be taught how to:

- select and use software for different purposes[2], i.e. software for vector-based images; software for bitmap/raster-based images
- set image/canvas size and image resolution for different outputs/output sizes for print and for screen[3] (as appropriate to the software)
- use standard software tools to create and edit digital images, i.e. cut, copy, crop, paste; select parts of images; move, align and order components; group/ungroup components; rotate and flip; create lines, curves and shapes, i.e. basic and freehand; change stroke and fill, i.e. colour, thickness, style; draw/paint, i.e. pencil, brush, bucket; insert and edit text, i.e. colour, font, size
- select and use specialised software tools to enhance digital images, i.e.:
  - filters, i.e. sharpen, blur, noise; colour balance, levels and curves; masks and layers
  - retouching tools, i.e. clone, red eye; trace; edit and combine paths
  - opacity/transparency; transform, scale, rotate and distort
  - text effects, i.e. attach to path; guides/guidelines

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- combine components to create complex composite digital images, i.e. multiple-step processes; multi-layering; combine output from different software applications
- feedback/evaluate, i.e. recognising merits and faults of technical features; constructive feedback.

Learning Outcome 3: Be able to store, retrieve and present digital images

Learners must be taught how to:

- use storage systems, i.e. standard naming conventions; version control; archiving
- use file formats for working files[4], i.e. native file formats (e.g. AI, CDR, PSD, PSP); standard bitmap-based formats (e.g. TIFF, JPEG, GIF, PNG); vector-based formats (e.g. SVG, EPS, WMF, AI, DPP)
- use file formats for final output, i.e. save and/or export; resolution; colour mode; size (e.g. physical and digital); orientation; optimisation[5]/compression; dependent upon method of display or printing
- recognise the effect of different file formats on image quality and size
- use presentation methods[6], i.e. exhibition; printed portfolio; digital portfolio; mock-up/visual representation; print/web sizes; print media; colour options.

Links between units and synoptic assessment

If learners have already completed units R001 and R002 they will already understand why and how storage systems are used. Teachers should take note that coverage of storage systems is in units R001, R002 and R006 and manage the teaching of this area of learning accordingly.

[1] Unit R002 LO1 develops research skills in using the internet.

[2] Unit R001 LO4 supports this by developing an understanding of the implications of legislation including copyright laws and the consequence of non-compliance with their provisions.

[3] Unit R002 LO3 supports this by considering how the purpose and audience influences the choice of product and content.

[4] Unit R001 LO2 supports this by developing an understanding of optimisation and the factors to be taken into account whilst optimising objects.

[5] Unit R001 LO2 develops an understanding of optimisation and filetypes that addresses these three bullets.

[6] Unit R002 LO3 supports this by considering how the purpose and audience influences the choice of document type, and how the document type influences the choice of software.

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2.8 Unit R007: *Creating dynamic products using sound and vision*

Aims

This unit builds on Units R001 and R002 and learners will be able to apply the skills, knowledge and understanding developed in those units and vice versa.

21st century technology such as gaming technologies, mobile phone apps, media marketing technologies and web-based technologies make great use of dynamic specialist technologies to differentiate their products for the end user. This unit will enable learners to develop the knowledge, understanding and skills that would be expected in creative media industries such as advertising, music and online marketing. Learners will have the opportunity to learn about dynamic products such as music recordings and/or mixes; video/media news clips and animation for webpages before going on to create their own dynamic product.

Movies, animations and sounds bring messages and communications to life. The ability to create, edit and enhance these types of media is an essential business and personal skill that can be used for many purposes. On completion of this unit learners will be able to prepare, create, export and evaluate a timeline-based dynamic product.

Learning Outcome 1: Be able to prepare for the production of dynamic products

Learners must be taught how to:

- analyse a client brief to determine success criteria, i.e. length, file type, main features, theme, message
- produce a time-line storyboard and script for a product suitable to audience and purpose provided by a client
- select appropriate software[1]
- source and select appropriate assets and store efficiently
- identify the implications of legislation on sources, i.e. Copyright Law; Intellectual Property Rights; photo permissions and releases (e.g. model, property/location); acknowledgement and referencing of sources[2,3].

Learning Outcome 2: Be able to create dynamic products

Learners must be taught how to:

- import sourced assets
- use features of the software to edit the assets, i.e.:
  - sound, i.e. cut, copy and paste, envelope tool, generate silence
  - animation, i.e. frame-by-frame, layers, tweening, resizing, rotate, drawing tools
  - movie, i.e. splitting, layers, mute, sound, titles, audio
- use the features of the software to enhance the assets, i.e.:
  - sound, i.e. level, fade, amplify, bass, filter, noise removal, reverse, fade, pitch, invert
  - animation, i.e. motion path, rotation, flip, magnifying, gradient, mask, 3D, transparency, interactions, tints
  - movie, i.e. transitions, pan, zoom, dissolve, brightness, colour, fade, filter, spin, blur, mirror, edge detection
- combine assets within the selected software to produce an audio, animation or movie suitable to audience and purpose[4]
- save file in original format
- export the product file type suitable for purpose[5], i.e.:
  - sound, i.e. WAV, WMA and MP3
  - animation, i.e. Animated GIF, SWF and Silverlight
  - movie, i.e. AVI, MP4 and WMV
- recognise the advantages and disadvantages of exporting as different file types, file sizes, compression techniques, optimisation[6] techniques, codecs, resolution and compatibility.

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Learning Outcome 3: Be able to test functionality of dynamic products

Learners must be taught how to:

- create test plans, i.e.:
  - tests required and how to carry them out
  - retests
- test the product during production and where appropriate review tools and techniques used in line with the success criteria
- test the product post completion against the success criteria.

Links between units and synoptic assessment

[1] Unit R002 LO3 supports this by considering how the purpose and audience influences the choice of product and content.

[2] Unit R002 LO1 supports this by developing an understanding of how to select, capture and store graphics and text in compliance with copyright.

[3] Unit R001 LO4 supports this by developing an understanding of the implications of legislation including copyright laws and the consequence of non-compliance with their provisions.

[4] Unit R002 LO3 develops an understanding of the importance of purpose and audience when editing content.

[5] Unit R001 LO1 develops an understanding of appropriate filetypes.

[6] Unit R001 LO2 develops an understanding of optimisation.

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2.9 Unit R008: *Introduction to computer programming*

Aims

This unit builds on Unit R002 by developing knowledge and understanding of how operators are used within computer applications.

Computer programs are an essential element of modern living. Without suitable programs most modern devices or systems would not function. For example, they are used in games, phone applications, domestic appliances, life-support systems, CAD/CAM, transport, security systems.

This unit will enable learners to gain additional skills and to develop their knowledge and understanding of the use of programming and scripting to enable computer systems to solve problems.

On completion of this unit learners will be able to appreciate the range of programming and scripting languages that are used and their applications and will be able to develop, test and evaluate working programs in one language of their choice. Learners will have acquired the skills necessary to help develop their programming further into interactive websites, mobile phone and tablet apps and a range of computer applications and they will communicate technical concepts effectively using terminology appropriately.

Learning Outcome 1: Be able to devise algorithms to solve problems

Learners must be taught about[1]:

- the nature and uses of various high-level language types, i.e.:
  - Object-oriented (e.g. VB, VBA, Scratch, App inventor, iPhone Apps)
  - Procedural (e.g. Basic)
  - Scripting languages (e.g. VB Script, Action Script, JavaScript, Game Maker)

Learners must be taught how to:

- analyse problems in terms of language choice, input, processes, and outputs required
- break down solutions into simple steps
- present solutions using algorithms, i.e. flow diagrams and structured English
- identify measurable success criteria.

Learning Outcome 2: Be able to develop computer programs

Learners must be taught how to:

- write code for a program, i.e.:
  - declaring and using different types of variables and constants
  - using assignment operators to store data in variables and constants
  - using relational operators to compare the values in variables
  - using mathematical operators to perform calculations using variables
  - using the programming constructs of sequence, selection and iteration to produce working routines.
- annotating code to explain how it works.

Learning Outcome 3: Be able to test and evaluate computer programs

Learners must be taught how to:

- recognise different types of errors, i.e. syntax, logic and run-time
- develop a test plan for a program
- use this plan to test a program
- evaluate test results against the expected outcomes and success criteria.

Links between units and synoptic assessment

[1] This LO is linked to Unit R002 LO2 where an understanding of variables and formulas is developed in the context of a spreadsheet.

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2.10 Unit R009: *Exploring computer hardware and networks*

Aims

This unit builds on Units R001 and R002 and learners will need to apply the skills, knowledge and understanding developed in those units. Learners will gain an appreciation of computer hardware and the range of platforms currently available, including gaming and mobile devices. They will understand the characteristics and features of computer networks and how to design a network. They will be able to identify and provide solutions to a range of common hardware and network issues.

On completion of this unit learners will have acquired skills and knowledge that would be beneficial to working with IT systems within different employment sectors or within the home environment and they will communicate technical concepts effectively using terminology appropriately.

Learning Outcome 1: Be able to select computer system devices and platforms

Learners must be taught how to:

- select core computer components to meet the requirements of computer systems, i.e. the features of:
  - CPU
  - RAM
  - ROM
  - input devices[1]
  - output devices[1]
  - storage[1]
- select and use specialist input devices in flexible ways (e.g. voice activated systems, multi-touch gestures, fingerprint recognition utility[1])
- make use of assistive technology (e.g. eye-tracking and 'sip and puff' input devices) to provide access for disabled users[1]
- select and use different computer platforms (e.g. games consoles, mobile phones, Kindle, tablet and embedded systems) according to their properties[1].

Learning Outcome 2: Be able to devise network solutions

Learners must be taught:

- network topologies in a modern context (e.g. extended star in a typical wired LAN), hierarchical (e.g. complex LAN), cell topology in a wireless LAN or mobile telephony network, cloud topology, grid topology[2]
- the advantages and disadvantages of different topologies (e.g. redundant links as in a cloud or grid, or central points of failure such as in a hierarchical topology)
- the components and features of LANs and WANs
- the role of computers in network communication, i.e.:
  - server
  - client
  - peer-to-peer host
- the need for a network ID and host ID[3]
- the role of an IP address and its purpose in network communication
- the need for a physical address and to be able to recognise a MAC address
- the role of the network ID in determining how the router forwards packets
- commonly encountered standards and types of cables (e.g. cat 5, 6 and 7 UTP, fibre optic, 802.11g and n, 3G, 4G)
- network bandwidth and throughput
- security considerations associated with networks[4]

Learners must be taught how to:

- plan a network to meet requirements by selecting hardware components, network devices, network type, considering bandwidth, security and cost implications.

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Learning Outcome 3: Be able to identify and solve hardware and network problems

Learners must be taught how to:

- recognise hardware and network problems (e.g. an unsuccessful PING between two hosts, fault indicator LED on a printer etc.)
- check network configuration information using IPCONFIG.
- capture packets in real time to analyse network communication events and protocols, verify network communication using TRACERT
- identify and solve simple hardware and network problems (e.g. faulty network cables, a printer has run out of paper, IP address conflict, incorrect WEP key[5]).

Links between units and synoptic assessment

[1] This section is supported by Unit R001 LO1 where an understanding of the elements of computer systems is developed.

[2] Unit R001 LO2 develops an understanding of how networks are used in business organisations.

[3] Unit R001 LO1 supports this by developing an understanding of how to connect a device to an existing network.

[4] Unit R001 LO4 develops an understanding of the threats to data security, including those affecting computer networks.

[5] Unit R001 LO1 supports this by developing an understanding of how to connect a device to an existing network.

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2.11 Unit R010: *Developing control systems*

Aims

This unit builds on Unit R001 and learners will need to apply the knowledge and understanding developed in that unit. This unit will enable learners to increase their knowledge and understanding of control systems and to develop valuable transferable logical skills.

Control systems form part of everyday life. For example, they are used in games consoles, street lamps, domestic appliances, transport systems, alarm systems, manufacturing systems and theme park rides. Exposure to real life examples of control systems will really aid learners' understanding of control systems, and educational trips are encouraged.

On completion of this unit learners will be able to explore the different components which can be used to build control systems and the rules which are written to ensure they work properly, and be able to communicate technical concepts effectively using terminology appropriately. Learners will build working control systems using either real components or simulation software to show they understand the concepts.

Learning Outcome 1: Be able to design control systems

Learners must be taught:

- what a computer control system is
- the range of sensors, i.e. light, temperature, sound, position, pressure and actuators, i.e. motors, buzzers, LEDs, used within control systems[1]
- the role of feedback within control systems
- the use of variables within control systems
- the use of open and closed loop control systems
- the uses of control systems within society, i.e. security systems, environmental control, safety systems, CAM, robotics, the properties of each, input / output and benefits and impacts of their use[1].

Learners must be taught how to:

- use block diagrams to represent control systems, i.e.:
  - components of block system diagrams
  - input, process (including feedback and variables) and output
- use block diagrams to define control systems
- design sets of instructions for control systems, i.e.:
  - repeat loops and subroutines
- identify success criteria for control system designs, i.e. the functions that will be needed to meet the requirements.

Learning Outcome 2: Be able to implement control systems

Learners must be taught how to:

- implement control systems from designs which use a range of sensors and actuators
- be precise in framing instructions.

Learning Outcome 3: Be able to test control systems

Learners must be taught how to:

- devise test plans to ensure functionality of control systems
- test control systems using a test plan to evaluate the performance of the system
- use the results of testing to refine control systems.

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Links between units and synoptic assessment

[1] Unit R001 LO1 develops an understanding of input devices and Unit R001 LO2 develops an understanding of data capture methods and the factors affecting the choice of appropriate method.

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2.12 Unit R011: *Understanding technology – a project approach*

Aims

This unit builds on Units R001 and R002 and learners will be able to apply the skills, knowledge and understanding developed in those units and vice versa.

This unit will allow learners to develop their planning, research, presentation and analytical skills by undertaking a learner initiated-individual project with an ICT-related theme.

Developments in the ICT sector move at a fast pace giving a fascinating array of emerging technologies which could be studied as well as technologies which are already in daily use. Therefore the project is an opportunity to:

- study a completely new area of ICT which is learner motivated and which supports their personal aspirations
- explore the 21st century emerging technologies, from tablet computing, smartphone or web-based communications to the home entertainment centres such as gaming consoles, TVs and 3D technologies
- extend the learning already achieved as a result of studying one of the optional units from the creativity or technical strands.

The output of the project could be a design, a report or a presentation, but, whatever form the project output takes, the learner also has to produce a project record for assessment.

On completion of this unit learners will have acquired the transferable skills to work through the cycle of planning, research, presentation and analysis to answer a question, test a hypothesis or to design a product or new concept.

Learning Outcome 1: Be able to initiate projects

Learners must be taught:

- the different forms the project output could take (e.g. an ICT solution, the answer to a question or a response to a hypothesis)
- how to choose a project topic
- how to set objectives, identify success criteria
- how to use planning tools and techniques to create plans, i.e.:
  - use timelines for planning a project and the need to amend and review plans
  - divide a project into manageable stages.

Learning Outcome 2: Know how to conduct research for projects

Learners must be taught how to[1]:

- find information in different ways and from a variety of sources both primary and secondary (e.g. research, questionnaires, interviews, books, websites, magazines)
- select sources that are relevant to their project
- check for bias and accuracy of information
- select information that is relevant
- check the reliability of information selected
- acknowledge other people's ideas and written work (e.g. using quote marks in written work)
- record sources of information using formal referencing systems within ICT.

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Learning Outcome 3: Be able to carry out projects

Learners must be taught how to:

- produce a project output based on the agreed topic
- record and monitor project progress, i.e. project plan, record of investigation, design stages (if applicable), diary of progress[2]
- obtain and act on feedback whilst completing a project
- keep records in order to look back and check progress, learn from work already completed and incorporate learning into the next stage of the project.

Learners must be taught:

- the importance of producing the project record whilst carrying out various stages of the project.

Learning Outcome 4: Know how to review projects

Learners must be taught how to:

- differentiate between the actual project outcome and the anticipated outcome
- differentiate between the actual process of completing the project and the planned process
- describe clearly what went well and what could be improved
- review the actual project timescale compared to the planned timescale
- measure the project against its objectives
- describe the learning achieved as a result of completing the project.

Links between units and synoptic assessment

[1] This section is supported by Unit R002 LO1 where learners develop the ability to use ICT based sources to carry out research.

[2] This builds on Unit R001 LO3 which develops an understanding of how ICT can be used to support working practices.

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3 Assessment of Cambridge Nationals in ICT

3.1 Overview of the assessment in the Cambridge Nationals in ICT

Entry code	Qualification title	GLH	Reference
J800	OCR Level 1/2 Cambridge National Award in ICT	60	600/4774/4
Made up of: • Units R001 and R002.			
J810	OCR Level 1/2 Cambridge National Certificate in ICT	120	600/4776/8
Made up of: • Units R001 and R002 • Any other two units.			
J820	OCR Level 1/2 Cambridge National Diploma in ICT	240	600/4778/1
Made up of: • Units R001 and R002 • Any other six units.			

Individual unit details below:

Unit R001: *Understanding computer systems*

30 GLH
1 hour written paper
60 marks (60 UMS)
OCR set and marked

This question paper:
- is based on a pre-release case study
- consists of two sections, each comprising short answer and extended response questions.

Unit R002: *Using ICT to create business solutions*

30 GLH
Centre assessed tasks (OCR set)
60 marks (60 UMS)
Centre assessed and OCR moderated

The assessment for this unit:
- is an OCR set task
- assesses the quality of written communication.

Unit R003: *Handling data using spreadsheets*

30 GLH
Centre assessed tasks
60 marks (60 UMS)
Centre assessed and OCR moderated

The centre assessed tasks:
- assess the quality of written communication.

Unit R004: *Handling data using databases*

30 GLH
Centre assessed tasks
60 marks (60 UMS)
Centre assessed and OCR moderated

The centre assessed tasks:
- assess the quality of written communication.

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Unit R005: ***Creating an interactive product using multimedia components***

30 GLH
Centre assessed tasks
60 marks (60 UMS)
Centre assessed and OCR moderated

The centre assessed tasks:
- assess the quality of written communication.

Unit R006: ***Creating digital images***

30 GLH
Centre assessed tasks
60 marks (60 UMS)
Centre assessed and OCR moderated

The centre assessed tasks:
- assess the quality of written communication.

Unit R007: ***Creating dynamic products using sound and vision***

30 GLH
Centre assessed tasks
60 marks (60 UMS)
Centre assessed and OCR moderated

The centre assessed tasks:
- assess the quality of written communication.

Unit R008: ***Introduction to computer programming***

30 GLH
Centre assessed tasks
60 marks (60 UMS)
Centre assessed and OCR moderated

The centre assessed tasks:
- assess the quality of written communication.

Unit R009: ***Exploring computer hardware and networks***

30 GLH
Centre assessed tasks
60 marks (60 UMS)
Centre assessed and OCR moderated

The centre assessed tasks:
- assess the quality of written communication.

Unit R010: ***Developing control systems***

30 GLH
Centre assessed tasks
60 marks (60 UMS)
Centre assessed and OCR moderated

The centre assessed tasks:
- assess the quality of written communication.

Unit R011: ***Understanding technology – a project approach***

30 GLH
Centre assessed tasks
60 marks (60 UMS)
Centre assessed and OCR moderated

The centre assessed tasks:
- assess the quality of written communication.

Unit R001 is a timetabled exam. The question paper is based on a pre-release case study. It consists of two sections, each comprising short answer and extended response questions.

Units R002–R011 are centre-assessed and OCR-moderated tasks. These units assess the quality

of written communication (QWC).To claim the Level 1/2 Cambridge National Award (60 GLH) qualification learners must complete both Unit R001 and Unit R002.

The written assessment for Unit R001 is available in English and Welsh.

For centre assessed unit(s) R002–R011, centres may request a bilingual moderator. Further information regarding this is available in the Admin Guide.

3.2 Links between units and synoptic assessment

The DfE has recently announced that only those qualifications that provide evidence of synoptic assessment that demonstrates pupils' broad understanding of what they have studied in their courses will be counted in the school attainment tables.

This qualification is designed with that requirement in mind. It has been written in a way that allows learners to sequentially build up their knowledge, understanding and skills between the mandatory units (R001 and R002) and their chosen optional units over the course of their programme of learning, which will support them in the assessment of their mandatory and optional units.

While we will not prescribe in which order the units are assessed, it is important to be aware of the links between units and the requirement for synoptic assessment so that the teaching, learning and assessment can be planned accordingly then when being assessed learners can apply their learning in ways which show they are able to make connections across the qualification.

Synoptic assessment is included in units R003–R011.

This specification will support synoptic assessment by:

- showing teaching and learning links between the units across the specification
- giving guidance, with the marking criteria for the optional units, about where learners could apply the knowledge and understanding from the core units to improve their performance.

This qualification supports synoptic learning and assessment by employing the following principles:

- to enable learners to follow specialist pathways within their optional units allowing for holistic delivery and the application of prior or concurrent learning
- to develop learners' appreciation of how different situations or user needs may contribute to different uses and applications of technology
- to enable learners to demonstrate an ability to use and apply a range of different methods and/or techniques
- to provide assessment that encourages learners to put forward different ideas and/or explanations to support decisions they have made
- to develop learners' ability to suggest or apply different approaches to contexts, situations
- to develop and assess learners' use of transferable skills
- to enable learners to demonstrate analytical and interpretation skills (of situations and/or results) and the ability to formulate valid well-argued responses
- to enable learners to evaluate and justify their decisions, choices and recommendations.

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3.3 Grading and awarding grades

All results are awarded on the following scale:

- Distinction* at Level 2 (*2)
- Distinction at Level 2 (D2)
- Merit at Level 2 (M2)
- Pass at Level 2 (P2)
- Distinction at Level 1 (D1)
- Merit at Level 1 (M1)
- Pass at Level 1 (P1).

The shortened format of the grade will be displayed on Interchange and some administrative documents provided by OCR. However, the full format of the grade will appear on certificates issued to learners.

The boundaries for Distinction at Level 2, Pass at Level 2 and Pass at Level 1 are set judgementally. Other grade boundaries are set arithmetically.

The Merit (Level 2) is set at half the distance between the Pass (Level 2) grade and the Distinction (Level 2) grade. Where the gap does not divide equally, the Merit (Level 2) boundary is set at the lower mark (e.g. 45.5 would be rounded down to 45).

The Distinction* (Level 2) grade is normally located as far above Distinction (Level 2) as Merit (Level 2) is below Distinction (Level 2).

To set the Distinction (Level 1) and Merit (Level 1) boundaries, the gap between the Pass (Level 1) grade and the Pass (Level 2) grade is divided by 3, and the boundaries set equidistantly. Where this division leaves a remainder of 1, this extra mark will be added to the Distinction (Level 1)-Pass (Level 2) interval (i.e. the Distinction (Level 1) boundary will be lowered by 1 mark). Where this division leaves a remainder of 2, the extra marks will be added to the Distinction (Level 1)-Pass (Level 2) interval, and the Merit (Level 1)-Distinction (Level 1) interval, i.e. the Distinction (Level 1) boundary will be lowered by 1 mark, and the Merit (Level 1) boundary will be lowered by 1 mark.

For example, if Pass (Level 2) is set judgementally at 59, and Pass (Level 1) is set judgementally at 30, then Distinction (Level 1) is set at 49, and Merit (Level 1) is set at 39.

Grades are indicated on qualification certificates. However, results for learners who fail to achieve the minimum grade (Pass at Level 1) will be recorded as *unclassified* (U or u) and this is **not** certificated.

These qualifications are unitised schemes. Learners can take units across several different series. They can also re-sit units or choose from optional units available. Please refer to section 7.3 *Unit and qualification re-sits*. When working out learners' overall grades OCR needs to be able to compare performance on the same unit in different series when different grade boundaries have been set, and between different units. OCR uses a Uniform Mark Scale to enable this to be done.

A learner's uniform mark for each unit is calculated from the learner's raw mark on that unit. The raw mark boundary marks are converted to the equivalent uniform mark boundary. Marks between grade boundaries are converted on a pro rata basis.

When unit results are issued, the learner's unit grade and uniform mark are given. The uniform mark is shown out of the maximum uniform mark for the unit, e.g. 40/60.

The uniform mark boundaries for each of the assessments are shown below:

Unit GLH	Max Unit Uniform Mark	Unit Grade							
		distinction* at L2	distinction at L2	merit at L2	pass at L2	distinction at L1	merit at L1	pass at L1	u
30	60	54	48	42	36	30	24	18	0

The learner's uniform mark for Unit R001 will be combined with the uniform mark for the centre assessed units to give a total uniform mark for the qualification. The learner's overall grade will be determined by the total uniform mark. The following table shows the minimum total mark for each overall grade:

Qualification	Max Uniform Mark	Qualification Grade							
		distinction* at L2	distinction at L2	merit at L2	pass at L2	distinction at L1	merit at L1	pass at L1	u
Award	120	108	96	84	75	60	48	36	0
Certificate	240	216	192	168	144	120	96	72	0
Diploma	480	432	384	336	288	240	192	144	0

3.4 Performance descriptors

The performance descriptors indicate the level of attainment associated with Distinction at Level 2, Pass at Level 2 and Pass at Level 1. They are for use at awarding meetings. They give a general indication of the levels of attainment likely to be shown by a representative learner performing at these boundaries.

Performance descriptor – Distinction at Level 2

Learners will be able to work with confident independence to create material which reflects thoughtful planning, skilled development and perceptive evaluation.

They will be able to apply knowledge, understanding and skills in a variety of contexts – exploring, identifying, selecting and using a range of ICT tools, hardware and file types efficiently to produce effective ICT-based solutions. They will be able to use confidently a range of features from a broad range of applications that add value in the workplace and in higher education.

They will be able to produce work that is complete and coherent, demonstrating originality and depth of understanding.

They will be able to:

- recall a wide range of information regarding the effective use of ICT
- perceptively analyse ICT problems
- create solutions which demonstrate detailed consideration of audience and fitness for purpose
- understand and use a wide range of ICT terminology correctly
- use techniques efficiently to search for, select and store appropriate information effectively, in a wide variety of contexts
- model situations, interpret and present information with sensitivity to needs and with a flair for effective communication
- perceptively evaluate the impact of ICT
- demonstrate, in depth, research, analytical and evaluative skills
- work independently and manage time efficiently.

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Performance descriptor – Pass at Level 2

Learners will be able to work with independence to create material which reflects effective planning, development and evaluation.

They will be able to apply knowledge, understanding and skills – identifying, selecting and using a range of ICT tools, hardware and file types to produce ICT-based solutions. They will be able to use appropriate features from a range of applications commonly used in the workplace and in higher education.

They will be able to produce work that is complete and coherent, demonstrating independence and understanding.

They will be able to:

- recall information regarding the effective use of ICT
- analyse ICT problems
- create solutions which demonstrate consideration of audience and fitness for purpose
- understand and use ICT terminology correctly
- use techniques to search for select and store appropriate information in a variety of contexts
- model situations, interpret and present information with an understanding of needs and effective communication
- evaluate the impact of ICT
- demonstrate research, analytical and evaluative skills
- work independently and manage time.

Performance descriptor – Pass at Level 1

Learners will be able to show evidence of independent work to create material which has been planned, developed and evaluated.

They will be able to apply knowledge, understanding and skills in a limited range of contexts. They will have understanding of how to identify, select and use ICT tools, hardware and file types to produce ICT-based solutions. They will be able to use a limited range of features from a range of applications commonly used in the workplace and in higher education.

They will be able to produce work which demonstrates some evidence of independence and understanding.

They will be able to:

- recall some information regarding the effective use of ICT
- demonstrate an understanding of ICT problems
- create solutions which demonstrate awareness of audience and fitness for purpose
- understand and use ICT terminology correctly
- use techniques to search for, select and store information
- model situations and present information with an understanding of needs
- understand the impact of ICT
- demonstrate some research and evaluative skills
- state some advantages or disadvantages.

3.5 Quality of written communication

Quality of written communication is assessed in all centre assessed units and is integrated in the marking criteria.

Learners are expected to:

- ensure that text is legible and that spelling, punctuation and grammar are accurate so that meaning is clear
- present information in a form that suits its purpose
- use a suitable structure and style of writing
- use specialist terminology, where applicable.

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The centre assessed units (R002–R011)

4

This section provides guidance on the completion of the centre assessed units.

4.1 The centre assessed units

Each of the centre assessed units (R002–R011) is designed to provide learners with the opportunity to build a portfolio of evidence to meet the learning outcomes for that unit.

We recommend that teaching and development of subject content and associated skills be referenced to real vocational situations, through the utilisation of appropriate industrial contact, vocationally experienced delivery personnel, and real life case studies.

Units R002–R011 are centre assessed and externally moderated by OCR. Centres can choose whether they would like moderation via the OCR Repository, postal or visiting moderation.

Appendix B of this specification contains assessment guidance for the centre assessed units, which should be referred to in conjunction with the unit content and marking criteria grids to inform delivery of the units. The assessment guidance aims to provide clarification regarding the scope of the learning required in specific areas of the units where this is felt to be beneficial.

4.2 Tasks for the centre assessed units

4.2.1 Units R002–R011

A bank of model assignments is provided by OCR for units R002–R010. Centres must select from the model assignments provided to use when assessing their learners. The assignments will be available free of charge from the OCR website. Learners are able to work on the tasks anytime until the date the centre collects the work for internal assessment. OCR will review the model assignments annually which may result in an assignment being withdrawn and replaced. It is up to the centre to check the OCR website to see which model assignments are available to be used. We will give approximately 12 months notice if a model assignment is to be withdrawn and replaced so that we do not disadvantage any learners who have already started working on an assignment that is to be replaced.

Centres can make modifications to the model assignments that OCR provides so that the assignment can be put within a local context that learners might relate to more easily, or to allow for differences in the materials, equipment and facilities at different centres. Guidance on what can be modified is given in each assignment in the section Teacher Information under *Scope of permitted model assignment modification*. If modifications are made to the model assignment, whether to just the scenario or to both the scenario and tasks, it is up to the centre to ensure that all learning outcomes can be met and that learners can assess the full range of marks.

For R002:

The assessment will be structured so that learners are required to provide evidence of using appropriate ICT techniques to meet specified purposes. It is unlikely that evidence of the techniques used will, on their own, provide sufficient evidence to judge the extent to which they have been used appropriately. Annotations may help to provide this additional context and guidance on producing evidence is given in the OCR assignment for the unit.

Learners must be provided with access to an appropriate range of software that fully meets the requirements of this unit when they are taking their assessment. Learners must have access to a range of software as they must make their own decisions as to the choice of software and the techniques to be used when carrying out activities to generate assessment evidence. For example learners should have access to both word processing and desk top publishing software and must be free to choose for themselves the most appropriate software to use in order to format/create documents which meet a specified purpose. Learners must also make their own decisions when formatting/creating content. For example learners must start with blank documents and then choose

an appropriate layout as well as the techniques they will use to import, create and edit content – using wizards will not be appropriate. Similarly, this will apply to their use of spreadsheets and databases.

For R011:

Centres must take note that the nature of unit R011 means that the learner agrees a project title with the teacher in order to produce evidence that meets the marking criteria. Responsibility lies with the centre to verify the choice of project topic and title. A verification of topic and title form is available on the OCR website.

The duration of the assessment is included in the guided learning hours for the unit. Tasks should indicate how long learners should expect to spend on each task.

The OCR model assignments are provided for summative assessment and not as practice materials.

Teachers must ensure learners are clear about the tasks they are to undertake and the criteria which they are expected to meet.

4.2.2 Methods of assessment

It is the assessor's responsibility to choose the best method of assessing a learner in relation to their individual circumstances. The methods chosen must be:

- valid
- reliable
- safe and manageable and
- suitable to the needs of the learner.

Valid

Validity can also be compromised if a learner does not understand what is required of them. For example, one valid method of assessing a learner's knowledge and understanding is to question them. If the questions posed are difficult for the learner to understand (not in terms of the content but the way they are phrased, for example) the validity of the assessment method is questionable.

As well as assessment methods being valid, the evidence presented must also be valid. For example, it would not be appropriate to present an organisation's equal opportunities policy as evidence towards a learner's understanding of how the equal opportunities policy operates within the organisation. It would be more appropriate for the learner to incorporate the policy within a report describing different approaches to equal opportunities.

Reliable

A reliable method of assessment will produce consistent results for different assessors on each assessment occasion. Internal moderators must make sure that all assessors' decisions are consistent.

Safe and manageable

Assessors and internal moderators must make sure that the assessment methods are safe and manageable and do not put unnecessary demands on the learner.

Suitable to the needs of the learner

OCR is committed to ensuring that achievement of these awards is free from unnecessary barriers. Centres must follow this commitment through when designing tasks and/or considering assessment.

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4.3 Completing the tasks (for units R002–R011)

Teachers/assessors are expected to supervise and guide learners when undertaking work that is centre assessed. It should be remembered, however, that the final pieces of work must be produced solely by the individual learner.

When supervising tasks, teachers/assessors are expected to:

- exercise continuing supervision of work in order to monitor progress and to prevent plagiarism
- exercise continuing supervision of practical work to ensure essential compliance with Health and Safety requirements
- ensure that the work is completed in accordance with the specification requirements and can be assessed in accordance with the specified marking criteria and procedures.

Centre assessed work should be completed in the course of normal curriculum time, and supervised and marked by the teacher/assessor. Some of the work, by its very nature, may be undertaken outside the centre, for example, research work, testing etc. As with all centre assessed work, the teacher must be satisfied that the work submitted for assessment is the learner's own.

Learners are free to revise and redraft work without teacher/assessor involvement before submitting the work for assessment. The advice provided prior to final submission should only enable the learner to take the initiative in making amendments, rather than detailing what amendments should be made. This means that teachers/assessors must not provide templates, model answers or detail specifically what amendments should be made.

Adding, amending or removing any work after it has been submitted for final assessment will constitute malpractice.

4.3.1 Presentation of the final piece of work

Learners must observe the following procedures when producing their final piece of work for the centre assessed tasks:

- work can be word processed or hand written
- tables, graphs and spreadsheets may be produced using appropriate ICT. These should be inserted into the report at the appropriate place
- any copied material must be suitably acknowledged
- quotations must be clearly marked and a reference provided wherever possible
- a completed cover sheet must be attached to work submitted for moderation. The cover sheet must include the following information as well as the marks given for each of the assessment criteria:
  - centre number
  - centre name
  - candidate number
  - candidate name
  - unit code and title
  - assignment title.

Work submitted in digital format (CD or online) for moderation or marking must be in a suitable file structure as detailed in Appendix C at the end of this specification. Work submitted on paper must be secured by treasury tags or other suitable method.

4.4 Marking and moderating centre assessed units

All centre assessed units are internally marked by centre staff using OCR marking criteria and guidance and externally moderated by the OCR-appointed moderator.

The centre is responsible for appointing someone to act as the assessor. This could be the teacher who has delivered the programme or another person from the centre.

The marking criteria must be used to mark the learners' work. These specify the levels of skills, knowledge and understanding that the learner is required to demonstrate.

The following assessment methods are considered suitable for teachers/assessors to adopt for these qualifications alongside the assessment of the evidence submitted by the learner:

- **observation** of a learner doing something
- **questioning** of the learner or witness.

Observation

The teacher/assessor and learner should plan observations together but it is the teacher/assessor's responsibility to record the observation properly.

Questioning

Questioning the learner is normally an ongoing part of the assessment process, and may in some circumstances provide evidence to support achievement of learning outcomes.

Questioning is often used to:

- test a learner's understanding of work which has been completed outside of the classroom
- check if a learner understands the work they have undertaken
- collect information on the type and purpose of the processes a learner has gone through.

If questioning is to be used as evidence towards achievement of specific learning outcomes, it is important that teachers/assessors record enough information about what they asked and how the learner replied, to allow the assessment decision to be moderated.

Questioning witnesses is normally an ongoing part of validating written witness statements. However, questioning witnesses can be used for other purposes. Teachers/assessors should be able to speak to witnesses and record, in whatever way is suitable, the verbal statements of these witnesses. A record of a verbal statement is a form of witness statement and could provide valuable evidence. Further guidance on the use of witness statements can be found in Appendix A.

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4.4.1 Use of a 'best fit' approach to marking criteria

The assessment tasks should be marked by teachers/assessors according to the OCR marking criteria using a 'best fit' approach. For each of the marking criteria, teachers/assessors select the band descriptor provided in the marking grid that most closely describes the quality of the work being marked.

Marking should be positive, rewarding achievement rather than penalising failure or omissions.

The award of marks **must be** directly related to the marking criteria.

- Each band descriptor covers all the relevant content for the learning outcomes.
- The descriptors should be read and applied as a whole.
- Make a best fit match between the answer and the band descriptors.
- An answer does not have to meet all of the requirements of a band descriptor before being placed in that band. It will be placed in a particular band when it meets more of the requirements of that band than it meets the requirements of other bands.

When deciding the mark within a band, the following criteria should be applied:

- the extent to which the statements within the band have been achieved.

For example:

- an answer that convincingly meets nearly all of the requirements of a band descriptor should be placed at or near the top of that band. Where the learner's work convincingly meets the statement, the highest mark should be awarded
- an answer that meets many of the requirements of the band descriptor should be placed in the middle of the band. Where the learner's work adequately meets the statement, the most appropriate mark in the middle range should be awarded
- if an answer is on the border-line between two bands but it is decided that it fits better the descriptors for the lower of these two bands, then it should be placed near the top of that band. Where the learner's work just meets the statement, the lowest mark should be awarded.

Teachers/assessors should use the full range of marks available to them and award full marks in any band for work that fully meets that descriptor. This is work that is 'the best one could expect from learners working at that level'.

4.4.2 Annotation of learners' work

Each piece of internally assessed work should show how the marks have been awarded in relation to the marking criteria.

The writing of comments on learners' work, and cover sheet, provides a means of communication between teachers during the internal standardisation and with the moderator if the work forms part of the moderation sample.

4.5 Authentication

Teachers/assessors must be confident that the work they mark is the learner's own. This does not mean that a learner must be supervised throughout the completion of all work, but the teacher must exercise sufficient supervision, or introduce sufficient checks, to be in a position to judge the authenticity of the learner's work.

Wherever possible, the teacher should discuss work-in-progress with learners. This will not only ensure that work is underway in a planned and timely manner, but will also provide opportunities for teachers/assessors to check authenticity of the work.

Learners must not plagiarise. Plagiarism is the submission of another's work as one's own and/or failure to acknowledge the source correctly. Plagiarism is considered to be malpractice and could lead to the learner being disqualified. Plagiarism sometimes occurs innocently when learners are unaware of the need to reference or acknowledge their sources. It is therefore important that centres ensure that learners understand that the work they submit must be their own and that they understand the meaning of plagiarism and what penalties may be applied. Learners may refer to research, quotations or evidence but they must list their sources. The rewards from acknowledging sources, and the credibility they will gain from doing so, should be emphasised to learners as well as the potential risks of failing to acknowledge such material.

Both learners and teachers must declare that the work is the learner's own.

- **Each learner** must sign a declaration before submitting their work to their teacher. A learner authentication statement that can be used is available to download from the OCR website. These statements should be retained within the centre until all enquiries about results, malpractice and appeals issues have been resolved. **A mark of zero must be recorded if a learner cannot confirm the authenticity of their work.**
- Centres must confirm to OCR that the evidence produced by learners is authentic. **Teachers** are required to declare that the work submitted for centre assessment is the learner's own work by completing a Centre Authentication Form for each unit. If a centre fails to provide evidence of authentication, **we will set the mark for the learner(s) concerned to Pending (Q) for that unit until authentication can be provided.** The Centre Authentication Form is available to download from the OCR website and includes a declaration which teachers must sign.

4.5.1 Internal standardisation

It is important that all teachers/assessors work to common standards. Centres must ensure that, within each unit, the internal standardisation of marks across teachers/assessors and teaching groups takes place using an appropriate procedure.

This can be done in a number of ways. In the first year, reference material and OCR training meetings will provide a basis for centres' own standardisation. In subsequent years, this, or centres' own archive material, may be used. Centres are advised to hold preliminary meetings of staff involved to compare standards through cross-marking a small sample of work. After most marking has been completed, a further meeting at which work is exchanged and discussed will enable final adjustments to be made.

4.5.2 Submitting marks

All work for centre assessment is marked by the teacher and internally standardised by the centre. Marks are then submitted to OCR; see Section 4.6 for submission dates of the marks to OCR.

There should be clear evidence that work has been attempted and some work produced. If a learner submits no work for a centre assessed unit, then the learner should be indicated as being absent from that unit. If a learner completes any work at all for a centre assessed unit, then the work should be assessed according to the marking criteria and the appropriate mark awarded, which may be zero.

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4.6 Moderation

The purpose of external moderation is to ensure that the standard of marking is the same for each centre and to ensure that internal standardisation has taken place.

Centres can select from:

- **Moderated via OCR Repository (see section 4.6.1)**
- **Moderated via postal moderation (see section 4.6.2)**
- **Moderated via visiting moderation (see section 4.6.3)**

The deadline dates for entries and submission of marks for each moderation method are detailed below. Centres must ensure when selecting a moderation method that the appropriate entry and marks submission deadlines can be adhered to.

Moderation method	January series		June series		November series (2013 onwards)	
	Entries	Marks	Entries	Marks	Entries	Marks
Moderated via OCR Repository	21st Oct	10th Jan	21st Feb	15th May	tbc	tbc
Moderated via postal moderation	21st Oct	10th Jan	21st Feb	15th May	tbc	tbc
Moderated via visiting moderation	21st Oct	10th Dec	21st Feb	31st Mar	Not available	

When making your entries, the entry option specifies how the work is going to be moderated.

For each unit, you must choose the same moderation method for **all** learners (i.e. all learners for that unit in that series must be entered using the same entry option). However, you can choose different moderation methods for different units and in different series.

Sample requests

Once you have submitted your marks, your exams officer will receive an email telling you which work will be sampled as part of the moderation. Samples will include work from across the range of attainment of the learners' work.

Each learner's work must have a cover sheet attached to it with a summary of the marks awarded for the task. If the work is to be submitted via OCR Repository this cover sheet must also be submitted electronically within each learner's files.

OCR will require centres to release work for awarding and archive purposes and the co-operation of the centre is most appreciated in these instances, as it is imperative to have work available at awarding meetings. If this is required then centres will be notified as early as possible.

Centres will receive the final outcome of moderation when the provisional results are issued. The following reports will be issued via Interchange:

- Moderation adjustments report – This lists any scaling that has been applied to internally assessed units
- Moderator report to centres – This is a brief report by the moderator on the internal assessment of learners' work.

4.6.1 Moderated via OCR Repository

The OCR Repository is a secure website for centres to upload candidate work and for assessors to access this work digitally. Centres can use the OCR Repository for uploading marked candidate work for moderation.

Centres can access the OCR Repository via OCR Interchange, find their candidate entries in their area of the Repository, and use the Repository to upload files (singly or in bulk) for access by their moderator.

The OCR Repository allows candidates to produce evidence and files that would normally be difficult for postal submissions, for example multimedia and other interactive unit submissions.

The OCR Repository is seen as a faster, greener and more convenient means of providing work for assessment. It is part of a wider programme bringing digital technology to the assessment process, the aim of which is to provide simpler and easier administration for centres.

All moderated units can be submitted electronically to the OCR Repository via Interchange: please check section 7.2.2 for unit entry codes for the OCR Repository.

There are three ways to load files to the OCR Repository:

1. Centres can load multiple files against multiple candidates by clicking on 'Upload candidate files' in the Candidates tab of the Candidate Overview screen.
2. Centres can load multiple files against a specific candidate by clicking on 'Upload files' in the Candidate Details screen.
3. Centres can load multiple administration files by clicking on 'Upload admin files' in the Administration tab of the Candidate Overview screen.

Instructions for how to upload files to OCR using the OCR Repository can be found on OCR Interchange.

4.6.2 Moderated via postal moderation

Your sample of work must be posted to the moderator within three days of receiving the request. You should use one of the labels provided by OCR to send the learner's work.

We would advise you to keep evidence of work submitted to the moderator, e.g. copies of written work or photographs of practical work. You should also obtain a certificate of posting for all work that is posted to the moderator.

Work may be submitted in digital format (on CD) for moderation but must be in a suitable file structure as detailed in Appendix C at the end of this specification.

4.6.3 Moderated via visiting moderation

Your sample of work must be retained in the centre ready for the moderation visit.

The work that is presented to the visiting moderator as their initial sample must be available in rank order, by unit, to allow moderation to take place. All work not selected for initial sampling **must** be available to the visiting moderator during their visit should they need to extend their sample.

At the end of the visit, the moderator may need to take samples of work away or request for work to be posted to them for further consideration.

All learners' work must be retained securely within the centre until results are issued and it is certain that no Enquiries about results or appeal procedure is required.

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Support for Cambridge Nationals in ICT

5

5.1 Free resources available from the OCR website

The following materials will be available on the OCR website:

- specification
- specimen assessment materials for units R001
- a bank of model assignments for the centre assessed units R002 – R010.

5.2 Other resources

OCR works in close collaboration with partners to ensure you have access to a wide range of high quality resources tailored to OCR specifications.

Endorsed publications

OCR endorses a range of publisher materials to provide quality resources for centres delivering its qualifications. You can be confident that materials branded with OCR's 'Official Publisher Partnership' or 'Approved publication' logos have undergone a thorough quality assurance process to achieve endorsement. All responsibility for the content of the publisher's materials rests with the publisher.

These endorsements do not mean that the materials are the only suitable resources available or necessary to achieve an OCR qualification.

5.3 Training

OCR will offer a range of support activities for all practitioners throughout the lifetime of the qualification to ensure they have the relevant knowledge and skills to deliver the qualification.

Please see Event Booker for further information.

5.4 OCR support services

5.4.1 Active Results

Active Results is available to all centres offering the Cambridge Nationals qualifications.

Active Results is a free results analysis service to help teachers review the performance of individual learners or whole schools.

Devised specifically for the UK market, data can be analysed using filters on several categories such as gender and other demographic information, as well as providing breakdowns of results by question and topic.

Active Results allows you to look in greater detail at your results:

- richer and more granular data will be made available to centres including question-level data available from e-marking for unit R001
- you can identify the strengths and weaknesses of individual learners and your centre's cohort as a whole
- our systems have been developed in close consultation with teachers so that the technology delivers what you need.

Further information on Active Results can be found on the OCR website.

5.4.2 OCR Interchange

OCR Interchange has been developed to help you to carry out day-to-day administration functions online, quickly and easily. The site allows you to register and enter learners online. In addition, you can gain immediate and free access to learner information at your convenience.
Sign up at https://interchange.ocr.org.uk.

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6.1 Equality Act information relating to Cambridge Nationals in ICT

The Cambridge Nationals in ICT require assessment of a broad range of competencies and, as such, prepare learners for a wide range of occupations and higher level courses.

The Cambridge Nationals in ICT qualifications were reviewed to identify whether any of the competencies required by the subject presented a potential barrier to any disabled learners. If this was the case, the situation was reviewed again to ensure that such competencies were included only where essential to the subject.

Reasonable adjustments are made for disabled learners in order to enable them to access the assessments and to demonstrate what they know and can do. For this reason, very few learners will have a complete barrier to the assessment. Information on reasonable adjustments is found in *Access Arrangements, Reasonable Adjustments* and *Special Consideration* produced by the Joint Council for Qualifications www.jcq.org.uk.

The access arrangements permissible for use in this specification are as follows:

Access arrangement	Yes/No	Type of assessment
Readers	Yes	All assessments
Scribers	Yes	All assessments
Practical assistants	Yes	All assessments
Word processors	Yes	All assessments
Transcripts	Yes	All assessments
BSL interpreters	Yes	All assessments
Oral language modifiers	Yes	All assessments
MQ papers	Yes	All assessments
Extra time	Yes	All assessments

6.2 Arrangements for learners with particular requirements

All learners with a demonstrable need may be eligible for access arrangements to enable them to show what they know and can do. The criteria for eligibility for access arrangements can be found in the JCQ document *Access Arrangements, Reasonable Adjustments* and *Special Consideration*. Learners who have been fully prepared for the assessment but who have been affected by adverse circumstances beyond their control at the time of the examination, may be eligible for special consideration. Centres should consult the JCQ document *Access Arrangements, Reasonable Adjustments* and *Special Consideration.*

7 Administration of Cambridge Nationals in ICT

Full details of the administrative arrangements can be found in the Cambridge Nationals Admin Guide. The Admin Guide is available from the OCR website.

7.1 Availability of assessment

There are three assessment series each year in January, June and November. All units will be assessed from January 2013. Assessment availability can be summarised as follows:

	Unit R001	Unit R002 – R011
January 2013	✓	✓
June 2013	✓	✓
November 2013	–	✓*
January 2014	✓	✓
June 2014	✓	✓
November 2014	–	✓*

Certification is available for the first time in January 2013 and each January, June and November thereafter.

* Visiting moderation is not available in the November series. Please see section 4.6 for details on the moderation methods available in each series.

7.2 Making entries

Centres must be registered with OCR in order to make any entries, including estimated entries. It is recommended that centres apply to OCR to become a registered centre well in advance of making their first entries. Details on how to register with OCR can be found on the OCR website.

Centres must have made an entry for a unit in order for OCR to supply the appropriate forms and allocate a visiting moderator for centre assessment.

It is essential that unit entry codes are quoted in all correspondence with OCR.

7.2.1 Making estimated unit entries

Estimated entries must be made prior to each assessment series. Estimated entries are used by OCR to allocate examiners and moderators to centres.

7.2.2 Making final unit entries

When making an entry centres must quote unit entry code and component codes. For the centre assessed units, centres must decide whether they want to submit learners' work for moderation via the OCR Repository or for postal or visiting. Learners submitting work must be entered for the appropriate unit entry code from the table opposite.

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For Unit R001, centres must ensure that the correct unit entry code is selected for the required language of the assessment materials.

Unit entry code	Component code	Assessment method	Unit titles
R001	01	Written paper	*Understanding computer systems*
R001 W	02	Written paper: Welsh language	
R002 A	01	Moderated via OCR Repository	*Using ICT to create business solutions*
R002 B	02	Moderated via postal moderation	
R002 C	03	Moderated via visiting moderation	
R003 A	01	Moderated via OCR Repository	*Handling data using spreadsheets*
R003 B	02	Moderated via postal moderation	
R003 C	03	Moderated via visiting moderation	
R004 A	01	Moderated via OCR Repository	*Handling data using databases*
R004 B	02	Moderated via postal moderation	
R004 C	03	Moderated via visiting moderation	
R005 A	01	Moderated via OCR Repository	*Creating an interactive product using multimedia components*
R005 B	02	Moderated via postal moderation	
R005 C	03	Moderated via visiting moderation	
R006 A	01	Moderated via OCR Repository	*Creating digital images*
R006 B	02	Moderated via postal moderation	
R006 C	03	Moderated via visiting moderation	
R007 A	01	Moderated via OCR Repository	*Creating dynamic products using sound and vision*
R007 B	02	Moderated via postal moderation	
R007 C	03	Moderated via visiting moderation	
R008 A	01	Moderated via OCR Repository	*Introduction to computer programming*
R008 B	02	Moderated via postal moderation	
R008 C	03	Moderated via visiting moderation	
R009 A	01	Moderated via OCR Repository	*Exploring computer hardware and networks*
R009 B	02	Moderated via postal moderation	
R009 C	03	Moderated via visiting moderation	
R010 A	01	Moderated via OCR Repository	*Developing control systems*
R010 B	02	Moderated via postal moderation	
R010 C	03	Moderated via visiting moderation	
R011 A	01	Moderated via OCR Repository	*Understanding technology – a project approach*
R011 B	02	Moderated via postal moderation	
R011 C	03	Moderated via visiting moderation	

The short title for these Cambridge National qualifications is CAMNAT and will display as such on Interchange and some administrative documents provided by OCR.

7.3 Certification rules

Learners must be entered for qualification certification separately from unit assessment(s). If a certification entry is **not** made, no overall grade can be awarded.

Learners may be entered for:

- OCR Level 1/2 Cambridge National Award – certification code J800
- OCR Level 1/2 Cambridge National Certificate – certification code J810
- OCR Level 1/2 Cambridge National Diploma – certification code J820.

Learners may be entered for certification of any combinations of the Award, Certificate and Diploma qualifications concurrently.

Unit results used to calculate the result for one qualification can be re-used toward certification of other qualifications of a different size. This means that, as learners progress through the course, they may certificate for a qualification of one size and then later certificate for a qualification of a different size, re-using the units used towards the first certification.

There are no terminal requirements for these qualifications therefore learners can complete units in any order.

7.4 Unit and qualification re-sits

Learners may re-sit each unit an unlimited number of times. The best unit result will be used to calculate the certification result.

Learners may enter for the qualification an unlimited number of times. Learners must retake at least one unit, or take a different optional unit, for a new result to be issued.

7.5 Enquiries about results

Under certain circumstances, a centre may wish to query the result issued to one or more learners. Enquiries about results for all units must be made immediately following the series in which the relevant unit was taken (by the Enquiries about results deadline).

Please refer to the JCQ Post-Results Services booklet and the Cambridge National Admin Guide for further guidance about action on the release of results. Copies of the latest versions of these documents can be obtained from the OCR website.

For internally assessed units the enquiries about results process cannot be carried out for one individual learner; the outcome of a review of moderation must apply to a centre's entire cohort.

7.6 Shelf-life of units

Individual unit results, prior to certification of the qualification, have a shelf-life limited only by that of the qualification.

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8 Other information about Cambridge Nationals in ICT

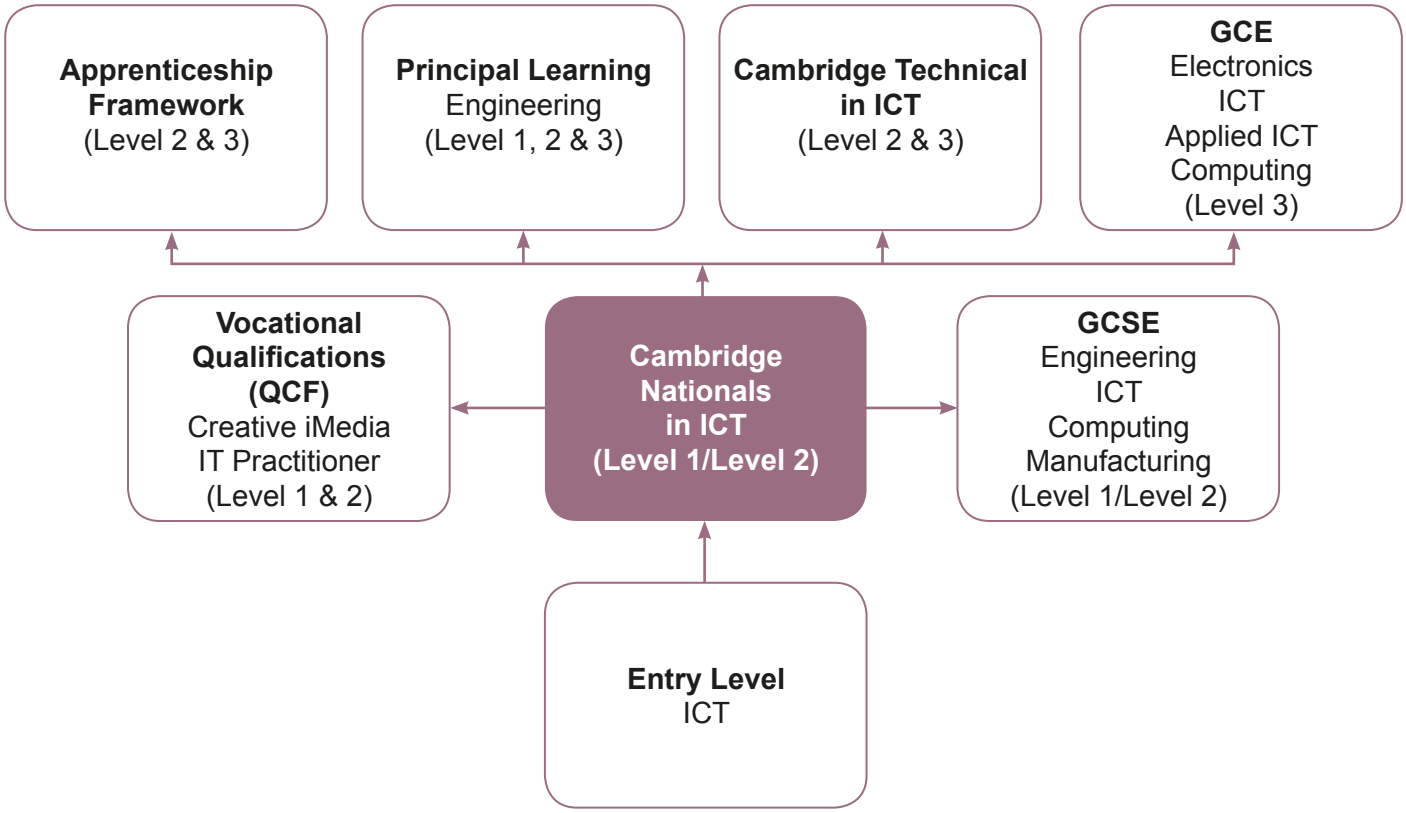
8.1 Overlap with other qualifications

There is some overlap between the content of these qualifications and that of GCSE in ICT.

There is also some potential overlap between units R008 – R010 with GCSE in Computing.

There is overlap of skills and content between the units of this specification and the Functional Skills Qualification in ICT at Level 1 and Level 2.

8.2 Progression from/to these qualifications



OCR offers a flexible and responsive range of general and vocational ICT qualifications that allow suitable progression routes for all types of learners.

Centres are able to use these qualifications to create pathways that provide learners with the underpinning skills and knowledge that will enable them to choose the most appropriate progression routes for their particular needs (further study, Further Education (FE) or employment).

Progression from OCR Level 1/Level 2 Cambridge National Award/Certificate/Diploma in ICT to **GCSE qualifications**:

- ICT
- Computing
- Business and Communication Systems
- Manufacturing
- Art and Design
- Media Studies
- Design and Technology.

For learners who want to progress to Level 3 qualifications they have the choice of various **GCE qualifications** which will further develop areas of their learning from Level 1/Level 2.

- ICT
- Computing
- Design and Technology.

Learners can progress from OCR Level 1/Level 2 Cambridge National Award/Certificate/Diploma in ICT to other **vocational qualifications**:

- IT User Skills, IT Professional and IT Practitioner suite of qualifications (Levels 1-4)
- Creative iMedia suite of qualifications (Levels 1-3).

8.3 Avoidance of bias

OCR has taken great care in preparing this specification and assessment materials to avoid bias of any kind. Special focus is given to the 9 strands of the Equality Act with the aim of ensuring both direct and indirect discrimination is avoided.

8.4 Criteria requirements

This specification complies in all respects with the Ofqual General Conditions of Recognition.

8.5 Language

This specification is available in English only. The assessment materials are available in English and Welsh.

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8.6 Spiritual, moral, ethical, social, legislative, economic and cultural issues

These qualifications provide potential for centres to develop learners' understanding of spiritual, moral, ethical, social, legislative, economic and cultural issues. This specification offers opportunities to contribute to an understanding of these issues in the following topics.

Issue	Examples of opportunities for developing an understanding of the issue during the course
Spiritual issues	○ developing knowledge and understanding of: how ICT systems have changed the way people go about their daily lives (including communication, shopping, gaming, entertainment, education and training, banking and financial services, social networking, and online/remote working etc)
Moral issues	○ learning about appropriate uses of software, malicious use of software and the damage it can cause, and the safe and responsible use of ICT.
Ethical issues	○ learning about the ethical implications of the electronic storage and transmission of personal information: ○ how ICT systems can affect the quality of life experienced by persons with disabilities and the responsibility to meet individuals access requirements
Social issues	○ social issues that can affect users of ICT, including the use and abuse of personal and private data, cyber bullying, etc
Legislative issues	○ the main aspects of legislation relating to the use of ICT: the computer misuse, data protection, copyright design and patents acts and other legislation as it applies to the use of ICT ○ The legal implications and consequences for business organisations of data loss
Economic issues	○ learning about making informed decisions about the choice, implementation, and use of ICT depending upon cost and the efficient management of money and resources
Cultural issues	○ helping learners appreciate that ICT contributes to the development of our culture and is becoming increasingly central to our highly technological future ○ how learners need to show cultural awareness of the audience when communicating with ICT

8.7 Sustainable development, health and safety considerations and European developments, consistent with international agreements

These qualifications provide potential to heighten learners' awareness of sustainable development, health and safety considerations and European developments consistent with international agreements.

The specification incorporates learning about relevant health and safety, European and environmental legislation, and could include learning about how each of these factors has affected the use of ICT for businesses and individuals.

Environmental issues

Learners could have the opportunity to learn about how the changes in working practices due to the use of ICT have impacted upon the environment e.g. fewer carbon emissions due to more online/ remote working and therefore less travel and environmental issues connected to the production, use and disposal of ICT systems.

Learners could also explore the effect on natural resources of the creation and use of ICT systems including the environmental impact of digital devices and their use, deployment and eventual recycling and disposal.

The understanding of environmental issues will only form part of the assessment requirements where they are relevant to the specific content of the specification and have been identified within the taught content. Learners may choose to produce work that has an environmental theme or to enhance their learning by carrying out further personal study.

8.8 Key Skills

These qualifications provide opportunities for the development of the Key Skills of *Communication, Application of Number, Information and Communication Technology, Working with Others, Improving Own Learning and Performance* and *Problem Solving* at Levels 1 and/or 2. However, the extent to which this evidence fulfils the Key Skills criteria at these levels will be totally dependent on the style of teaching and learning adopted for each unit. The following table indicates where opportunities may exist for at least some coverage of the various Key Skills criteria at Levels 1 and/or 2 for each unit.

Unit	C		AoN		ICT		WwO		IoLP		PS	
	1	2	1	2	1	2	1	2	1	2	1	2
Unit R001	✓	✓			✓	✓	✓	✓	✓	✓	✓	✓
Unit R002	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Unit R003	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Unit R004	✓	✓			✓	✓	✓	✓	✓	✓	✓	✓
Unit R005	✓	✓			✓	✓	✓	✓	✓	✓	✓	✓
Unit R006	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Unit R007	✓	✓			✓	✓	✓	✓	✓	✓	✓	✓
Unit R008	✓	✓	✓	✓	✓	✓			✓	✓	✓	✓
Unit R009	✓	✓			✓	✓	✓	✓	✓	✓	✓	✓
Unit R010	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Unit R011	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

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8.9 Functional Skills

These qualifications provide opportunities for the development of the Functional Skills of:

- *English: Speaking and Listening, Reading and Writing*
- *Mathematics: Representing, Analysing and Interpreting*
- *ICT: Use ICT systems, Find and select information and Develop, present and communicate information*

at Levels 1 and 2. However, the extent to which this evidence fulfils the criteria at these levels will be totally dependent on the style of teaching and learning adopted for each unit. The following table indicates where opportunities may exist for at least some coverage of the criteria at Levels 1 and/or 2 for each unit.

Unit	English						Maths						ICT					
	S&L		R		W		R		A		I		U		F&SI		D,P&C	
	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2
Unit R001	✓	✓	✓	✓	✓	✓							✓	✓	✓	✓	✓	✓
Unit R002	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Unit R003	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Unit R004	✓	✓	✓	✓	✓	✓							✓	✓	✓	✓	✓	✓
Unit R005	✓	✓	✓	✓	✓	✓							✓	✓	✓	✓	✓	✓
Unit R006	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Unit R007	✓	✓	✓	✓	✓	✓							✓	✓	✓	✓	✓	✓
Unit R008	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Unit R009	✓	✓	✓	✓	✓	✓							✓	✓	✓	✓	✓	✓
Unit R010	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Unit R011	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

A Appendix A: Guidance on witness statements

It is anticipated that the majority of evidence will be produced directly by the learner. Indirect evidence, such as witness statements, should only be used where it would be impractical for the learner to produce the evidence themselves.

Witness statements will, ideally, support the direct evidence produced by the learner.

- *Care should be taken that a witness statement is impartial and free from bias. The use of relatives and close friends as witnesses should be avoided, if possible.*
- *In all cases the witness will be required to declare their relationship to the learner.*
- *A witness statement should record what the learner has done and in doing so should not seek to repeat or paraphrase the marking criteria.*
- *The evidence presented by the witness should record the learner's individual contribution and should focus on the contribution made by the individual learner, as distinct from that of the group or team as a whole.*
- *Witnesses should describe what the learner did and not assess the learner. It is the responsibility of the teacher/assessor to judge the learner's skill, knowledge and understanding against the marking criteria. In doing so the teacher/assessor will use the witness statement to determine the value of the evidence against the marking criteria and award marks accordingly.*
- *The teacher/assessor is responsible for briefing anyone who is to provide a witness statement. It is expected that the teacher/assessor will ensure that the witness is appropriately prepared and that any issues related to child protection have been fully considered.*
- *The role of the witnesses should be that of impartial observers and they should not become involved in carrying out the activity on behalf of the learner.*
- *In circumstances where a witness does assist the learner in accomplishing a task or activity their input must be recorded within the statement so that the teacher/assessor can reflect this appropriately in the award of marks.*

Where the above guidance has not been followed, the reliability of the witness statement may be called into question. In circumstances where doubt exists about the validity of a witness statement it cannot be used as assessment evidence and no marks may be awarded on the basis of it. If the unreliability of a witness statement becomes apparent during the visiting moderation process moderators will be instructed to adjust centre marks in accordance with this directive.

An exemplar template for recording a witness statement is available from the OCR website and centres are encouraged to use this to assist in recording witness evidence. However, witness evidence may take different forms including digitally recorded spoken commentary or video. In these cases additional accompanying documentation may be required to corroborate that the guidelines on witness statements detailed above have been followed.

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Appendix B: Marking criteria for centre assessment

B

These qualifications are combined Level 1/2, therefore, the marking criteria for the centre assessed units span both levels.

Unit R002: *Using ICT to create business solutions*

Marking criteria guidance

0 marks must be given where there is no evidence or no evidence worthy of credit.

A range of marks is allocated to each learning outcome. Where marks are allocated to a number of statements within a learning outcome, marks should be awarded using a 'best fit' approach. For each of the learning outcomes, one of the descriptors provided in the mark scheme that most closely describes the quality of the work being marked should be selected. Marking should be positive, rewarding achievement rather than penalising failure or omissions. The award of marks **must be** directly related to the marking criteria.

- Each band descriptor covers all the relevant content for the learning outcomes.
- The descriptors should be read and applied as a whole.
- Make a best fit match between the answer and the band descriptors.
- An answer does not have to meet all of the requirements of a band descriptor before being placed in that band. It will be placed in a particular band when it meets more of the requirements of that band than it meets the requirements of other bands.

When deciding the mark within a band, the following criteria should be applied:

- the extent to which the statements within the band have been achieved.

For example:

- an answer that convincingly meets nearly all of the requirements of a band descriptor should be placed at or near the top of that band. Where the learner's work *convincingly* meets the statement, the highest mark should be awarded
- an answer that meets many of the requirements of the band descriptor should be placed in the middle of the band. Where the learner's work *adequately* meets the statement, the most appropriate mark in the middle range should be awarded
- if an answer is on the border-line between two bands but it is decided that it fits better the descriptors for the lower of these two bands, then it should be placed near the top of that band. Where the learner's work *just* meets the statement, the lowest mark should be awarded.

When learners are taking an assessment task, or series of tasks, for this unit they will be able to use relevant, appropriate knowledge, understanding and skills that they will have developed through the mandatory units R001 and R002.

For a description of the key words in the marking criteria, please see the *Marking criteria glossary of terms* in Appendix D.

Marking criteria grid

LO1: Be able to use techniques to search for, store and share information		
MB1: 1 – 6 marks	**MB2: 7 – 11 marks**	**MB3: 12 – 15 marks**
Produces a **basic** system to store electronic files, in which ○ **some** folders have meaningful names ○ **some** files are saved in an appropriate file type with meaningful names ○ **some** files are stored logically within the folder structure. Demonstrates a **limited** understanding of the most common tools and features of email software. Enters **basic** search criteria into a search engine to find appropriate information which partly meets the specified requirements, and records **limited** information on the Copyright holder(s) of the information found.	Produces a **sound** system to store electronic information, in which ○ **most** folders have meaningful names ○ **most** files are saved in an appropriate file type with meaningful names ○ **most** files are stored logically within the folder structure. Demonstrates a **sound** understanding of the most common tools and features of email and some understanding of the more advanced features of email software. Demonstrates **some** awareness of email etiquette. Enters **sound** search criteria into a search engine to find appropriate information which largely meets the specified requirements, and records the Copyright holder(s) of the information found with **some** accuracy but not **all** the required details.	Produces a well structured, logical system to store electronic information, in which ○ **all** folders have meaningful names ○ **all** files are saved in an appropriate file type with meaningful names and, where appropriate, versions of file(s) are clearly identified ○ **all** files are stored logically within the folder structure. Demonstrates a **thorough** understanding of the common and advanced tools and features of email software. Demonstrates a **thorough** understanding of email etiquette. Enters **effective** search criteria into a search engine to find appropriate information, which fully meets the specified requirements, and records the Copyright holder(s) of the information found accurately and **thoroughly**.

LO2: Be able to select and use software to handle data		
MB1: 1 – 6 marks	**MB2: 7 – 11 marks**	**MB3: 12 – 15 marks**
Creates a spreadsheet or database importing data with some accuracy which meets **some** of the specified requirements. Edits and manipulates data with **some** accuracy and provides **some relevant** information to meet particular purposes. The choice of data-handling software used is of **limited** appropriateness to the audience and purpose.	Creates a spreadsheet or database importing data **mostly** accurately which meets **most** of the specified requirements. Edits and manipulates data **mostly** accurately and provides **mostly** relevant information to meet particular purposes. The choice of data-handling software used is of **sound** appropriateness to the audience and purpose.	Creates a spreadsheet or database importing data with complete accuracy which fully meets the specified requirements. Edits and manipulates data with complete accuracy and provides wholly relevant information to meet particular purposes. The choice of data-handling software used is of wholly appropriate to the audience and purpose.

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LO3: Be able to select and use software to communicate information for a business purpose		
MB1: 1 – 3 marks	**MB2: 4 – 6 marks**	**MB3: 7 – 9 marks**
Creates a **limited range** of file types, sometimes selecting the appropriate medium for the type of communication. Uses some tools and facilities in each type of software with **limited** effectiveness to meet **some** of the specified requirements.	Creates a **range** of file types, **mostly** selecting the appropriate medium for the type of communication. Uses the tools and facilities in each type of software with **sound** effectiveness to meet **most** of the specified requirements.	Creates a **range** of file types, in each case selecting the appropriate medium for the type of communication. Uses the tools and facilities in each type of software **effectively** to meet **all** of the specified requirements.
MB1: 1 – 2 marks	**MB2: 3 – 4 marks**	**MB3: 5 – 6 marks**
Includes content, **some** of which meets the specified requirements and has **limited** suitability for the target audience. Errors may be intrusive and likely to impact significantly on the meaning of the content.	Includes content, **most** of which meets the specified requirements and is **mostly** suitable for the target audience. Occasional errors will not affect the overall meaning.	Includes content that **fully** meets the specified requirements and is **wholly** suitable for the target audience. **Few**, if any, errors in spelling, punctuation and grammar.
LO4: Be able to use software tools to format information		
MB1: 1 – 6 marks	**MB2: 7 – 11 marks**	**MB3: 12 – 15 marks**
Makes **basic** use of formatting tools, there may be **limited** consistency in their use. The **basic** application of formatting tools has **limited** impact on the overall appearance of the document and ease with which information can be read. Requires support to enhance the appearance of the output.	Makes **sound** use of formatting tools and in **most** cases applies them consistently. The **sound** application of formatting tools results in **some** enhancement of the overall appearance of the document and improves the ease with which information can be read. Works with only **occasional** support to enhance the appearance of the output.	Makes **effective** use of formatting tools and applies them consistently. The application of formatting tools **thoroughly** enhances the overall appearance of the document and means the information is consistently clear and easy to read. Works **independently** to enhance the appearance of the output.

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Assessment guidance

Learners must be provided with access to an appropriate range of software that fully meets the requirements of this unit when they are taking their assessment. Learners must have access to a range of software as they must make their own decisions as to the choice of software and the techniques to be used when carrying out activities to generate assessment evidence. For example learners should have access to both word processing and desk top publishing software and must be free to choose for themselves the most appropriate software to use in order to format/create documents which meet a specified purpose. Learners must also make their own decisions when formatting/creating content. For example learners must start with blank documents and then choose an appropriate layout as well as the techniques they will use to import, create and edit content – using wizards will not be appropriate. Similarly, this will apply to their use of spreadsheets and databases.

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Unit R003: *Handling data using spreadsheets*

Marking criteria guidance

0 marks must be given where there is no evidence or no evidence worthy of credit.

A range of marks is allocated to each learning outcome. Where marks are allocated to a number of statements within a learning outcome, marks should be awarded using a 'best fit' approach. For each of the learning outcomes, one of the descriptors provided in the mark scheme that most closely describes the quality of the work being marked should be selected. Marking should be positive, rewarding achievement rather than penalising failure or omissions. The award of marks **must be** directly related to the marking criteria.

- Each band descriptor covers all the relevant content for the Learning Outcomes.
- The descriptors should be read and applied as a whole.
- Make a best-fit match between the answer and the band descriptors.
- An answer does not have to meet all the requirements of a band descriptor before being placed in that band. It will be placed in a particular band when it meets more of the requirements of that band than it meets the requirements of other bands.

When deciding the mark within a band, the following criteria should be applied:

- The extent to which the statements within the band have been achieved.

For example:

- An answer that convincingly meets nearly all the requirements of a band descriptor should be placed at or near the top of that band. Where the learner's work *convincingly* meets the statement, the highest mark should be awarded.
- An answer that meets many of the requirements of the band descriptor should be placed in the middle of the band. Where the learner's work *adequately* meets the statement, the most appropriate mark in the middle range should be awarded.
- If an answer is on the border-line between two bands but it is decided that it fits better the descriptors for the lower of these two bands, then it should be placed near the top of that band. Where the learner's work *just* meets the statement, the lowest mark should be awarded.

When learners are taking an assessment task, or series of tasks, for this unit they will be able to use relevant, appropriate knowledge, understanding and skills that they will have developed through the mandatory units R001 and R002. Examples of this include:

- When creating a spreadsheet structure, learners could apply their learning from unit R002 LO2 regarding the creation of business spreadsheets.
- When learners are selecting data, and carrying out data validations, they could apply their learning from unit R002 LO2 regarding the entering/importing and manipulation of data. Learners could also apply learning from R001 LO2 regarding data capture forms, coding information for use in spreadsheets and data validation methods.
- When learners are selecting formulae and functions to produce a solution that is effective and efficient, they could apply their learning from unit R002 LO2 regarding the use of formulae and functions within spreadsheets.

- When learners create graphs they could apply their learning from unit R002 regarding the manipulation of data (LO2) and the presentation of information in graphs or charts (LO2 and LO3).
- When learners carry out spreadsheet modelling to provide alternative outcomes for different scenarios, they could apply their knowledge from unit R002 regarding the changing of data to model outcomes (LO2) and how information/data can be presented or manipulated to support decision making (LO3).

For a description of the key words in the marking criteria please see the Marking criteria glossary of terms in Appendix D.

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Marking criteria grid

LO1: Be able to create and populate spreadsheets to meet user requirements [1]		
MB1: 1 – 4 marks	**MB2: 5 – 8 marks**	**MB3: 9 – 11 marks**
Creates a **basic** structure which meets **few** of the user requirements from a brief and provides **some** indication to the user of the purpose of the spreadsheet model.	Creates a structure which meets **many** of the user requirements of a brief, makes the purpose of the spreadsheet model **clear** to the user and incorporates **some** features to make it user-friendly.	Creates an organised structure which meets **most** of the user requirements of a brief and uses **appropriate** presentation to make the purpose of the spreadsheet model **clear** and very user-friendly, enabling the user to readily identify where the inputs and outputs are located.
MB1: 1 – 3 marks	**MB2: 4 – 6 marks**	**MB3: 7 – 9 marks**
Uses some data types, **some** of which are relevant, and **limited** data validation. Selects some data that is relevant to user requirements and enters **some** of it accurately. Errors may be intrusive and likely to impact significantly on the functionality of the spreadsheet. Draws upon **limited** skills/knowledge/understanding from other units in the specification.	Uses relevant data types and **some** relevant data validation types to minimise data entry errors including input messages to redirect the user. Selects data that is **mostly** relevant to user requirements and enters most of it accurately. **Occasional** errors will not impact on the functionality of the spreadsheet. Draws upon **some relevant** skills/knowledge/ understanding from other units in the specification.	Uses **relevant** data validation and data types **effectively** to minimise data entry errors including **appropriate** input messages to redirect the user. Selects the data which is **relevant** to user requirements and enters it **accurately**. **Few** if any errors intrude, so the functionality of the spreadsheet is not affected. **Clearly** draws upon **relevant** skills/knowledge/ understanding from other units in the specification.
LO2: Be able to select and use spreadsheet functions to meet user requirements [2]		
MB1: 1 – 4 marks	**MB2: 5 – 7 marks**	**MB3: 8 – 10 marks**
Selects formulae and functions to produce a solution which has **limited** capacity to meet user requirements.	Selects formulae and functions to produce a solution that includes elements of efficiency and satisfies **some** of the user requirements.	Selects formulae and functions to produce a solution that is **effective** and efficient and in the main accurately meets user requirements.
MB1: 1 – 5 marks	**MB2: 6 – 8 marks**	**MB3: 9 – 10 marks**
Gives a **limited** explanation of why the formulae and functions were selected. Demonstrates a **limited** understanding of which formulae and functions will meet user requirements.	Gives a **sound** explanation of why the formulae and functions were selected giving mostly valid reasons. Demonstrating a **sound** understanding of which formulae and functions will meet user requirements.	Gives a **thorough** justification of why the formulae and functions were selected giving full and valid reasons. Demonstrating a **detailed** understanding of which formulae and functions will best meet user requirements.

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LO3: Be able to use spreadsheet models to present information to support decision making [3]		
MB1: 1 – 5 marks	**MB2: 6 – 8 marks**	**MB3: 9 – 10 marks**
Arranges and/or reduces data through selection of criteria to meet **some** of the user requirements. Creates a graph with data, **some** of which relevant. There may be **some** labelling. It gives **limited** information to support to decision-making.	Clearly arranges and/or reduces data through the selection of criteria giving **some** support to decision-making. Most of the user requirements are met. Creates a graph taking into account **most** of the relevant data. Graph is labelled but needs **some** other supporting information for the data to be interpreted. It gives **some** support to decision-making.	Efficiently arranges and/or reduces data through the selection of criteria using multiple data choices, to enable the user to assess information **effectively** to inform decisions. User requirements are met. Creates a graph taking into account the **relevant** data and the graph is suitable for the data type. The graph is labelled **appropriately** meaning that it fully supports decision-making.
MB1: 1 – 4 marks	**MB2: 5 – 7 marks**	**MB3: 8 – 10 marks**
Uses a spreadsheet to change a simple variable to show an alternative outcome. The results give **limited** information to support to decision-making.	Uses spreadsheet modelling to provide a variety of alternative outcomes for a scenario. Describes the results and gives **some** justification for the choice of tools used providing **some** support to decision-making	Uses complex spreadsheet modelling to provide alternative outcomes for a **range** of different scenarios utilising complex data tools. **Detailed** explanation of the results and **thorough** justification of the choice of tools used and fully supporting decision-making.

Guidance on synoptic assessment

Synoptic assessment is based upon demonstrating a broad understanding of the subject. This is achieved by drawing upon the skills/knowledge/understanding that have been studied across the specification and utilising them in an appropriate and relevant way to complete the assessment for this unit in order to meet the marking criteria for a specific Learning Outcome. When completing work for assessment, learners should be encouraged to apply the **relevant** skills/ knowledge/understanding from other units within the specification and not seek to incorporate input from all the previously studied units or content unless it is appropriate to do so. When assessing the learner's work teachers should focus on whether the skills/knowledge/understanding applied are relevant. The links identified below are guidance only and learners may find other skills/knowledge/understanding that they are able to apply synoptically either in addition to or in place of this guidance.

[1] Unit R001 LO2 supports the development of these skills by developing an understanding of them in business contexts.

[2] Unit R002 LO2 supports the development of this Learning Outcome.

[3] Unit R002 LO2 supports this by developing an understanding of appropriate chart types.

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Assessment guidance

To be able to access the full range of marks learners will need to have access to spreadsheet software with graphical representation.

LO1 Learners must be given the opportunity to design and populate a spreadsheet structure and not be provided with a spreadsheet to amend.

LO1, 2 and 3 – Learners should test their spreadsheet as they are developing to ensure that their design, incorporated function/formulae and models are meeting user requirements.

What do learners need to produce (evidence)	Examples of format of evidence (this list is not exhaustive)
Spreadsheet showing data	• Electronic files/evidence • Test plans • Written explanations • Annotated screen prints
Spreadsheet showing formulas – formula view	• Electronic files/evidence • Written/typed or recorded explanation • Test plans – user feedback • Witness statements • Annotated screen shots/printouts
Amended spreadsheet – *changes* – *selection of criteria*	• Electronic files/evidence • Annotated screen shots/printouts
Graph	• Electronic files/evidence • Written/typed or recorded explanation • Annotated screen shots/printouts

Unit R004: *Handling data using databases*

Marking criteria guidance

0 marks must be given where there is no evidence or no evidence worthy of credit.

A range of marks is allocated to each learning outcome. Where marks are allocated to a number of statements within a learning outcome, marks should be awarded using a 'best fit' approach. For each of the learning outcomes, one of the descriptors provided in the mark scheme that most closely describes the quality of the work being marked should be selected. Marking should be positive, rewarding achievement rather than penalising failure or omissions. The award of marks **must be** directly related to the marking criteria.

- Each band descriptor covers all the relevant content for the Learning Outcomes.
- The descriptors should be read and applied as a whole.
- Make a best-fit match between the answer and the band descriptors.
- An answer does not have to meet all the requirements of a band descriptor before being placed in that band. It will be placed in a particular band when it meets more of the requirements of that band than it meets the requirements of other bands.

When deciding the mark within a band, the following criteria should be applied:

- The extent to which the statements within the band have been achieved.

For example:

- An answer that convincingly meets nearly all the requirements of a band descriptor should be placed at or near the top of that band. Where the learner's work *convincingly* meets the statement, the highest mark should be awarded.
- An answer that meets many of the requirements of the band descriptor should be placed in the middle of the band. Where the learner's work *adequately* meets the statement, the most appropriate mark in the middle range should be awarded.
- If an answer is on the border-line between two bands but it is decided that it fits better the descriptors for the lower of these two bands, then it should be placed near the top of that band. Where the learner's work *just* meets the statement, the lowest mark should be awarded.

When learners are taking an assessment task, or series of tasks, for this unit they will be able to use relevant, appropriate knowledge, understanding and skills that they will have developed through the mandatory units R001 and R002. Examples of this include:

- When learners are adding data to a database they could apply their learning from unit R002 LO2 regarding editing database. Learners could also apply their learning from unit R001 regarding data validation methods.
- When learners are producing a report they could apply their learning from unit R002 LO2 regarding database queries and printing of reports from databases.
- Learners are required to produce a data entry form and user interface for data entry and they could apply their learning from unit R002 LO2 regarding entering information into databases. Learners could also apply learning from unit R001 LO2 regarding how to design data capture forms to obtain specified information.

For a description of the key words in the marking criteria please see the Marking criteria glossary of terms in Appendix D.

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Marking criteria grid

LO1: Be able to modify databases to meet user requirements [1]		
MB1: 1 – 6 marks	**MB2: 7 – 11 marks**	**MB3: 12 – 15 marks**
Makes **basic** modifications to a database by adding fields and properties to an existing table and attempting to include validation rules. **Limited** explanation is given for the validation rules used. Data added to the database may contain **some** minor errors. Errors may be intrusive, which are likely to impact significantly on the functionality of the database. Draws upon **limited** skills/knowledge/understanding from other units in the specification.	Makes **sound** modifications to a database by adding fields, properties and validation rules, and adding tables. **Sound** explanation is given for the validation rules used. Data added to the database is largely free from errors; these have no impact the functionality of the database. Draws upon **some relevant** skills/knowledge/ understanding from other units in the specification.	Makes **effective** modifications to a database by adding fields, properties and tables; adding validation rules, including original error messages; and linking tables using key fields. **Detailed** justification is given for the validation rules used. Data added to the database is free from errors. **Clearly** draws upon **relevant** skills/knowledge/ understanding from other units in the specification.
LO2: Be able to produce outputs from databases to meet user requirements [2] [3]		
MB1: 1 – 6 marks	**MB2: 7 – 11 marks**	**MB3: 12 – 15 marks**
Creates simple queries, using single table/single criteria, which meet **some** of the user requirements. Produces reports from simple queries which display some of the relevant data and show **some** attempt at formatting and customisation. Reports may have **some** minor errors such as field names truncated or a field omitted.	Creates simple and complex queries, using single table/single criteria and multiple tables/multiple criteria, which meet **some** of the user requirements. Produces reports from simple and complex queries which **clearly** display **most** of the relevant data and have been formatted and customised in an attempt to create a consistent house style. Reports may require **some** amendment to the layout in more than one area.	Creates complex queries, using single table/single criteria and multiple tables/multiple criteria, which meet **most** of the user requirements. Produces reports from complex queries which **clearly** display **all** of the relevant data and have been formatted and customised to create a consistent house style. Reports require **little** or no amendment to the layout.

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LO3: Be able to create user interfaces for databases to meet requirements [4 5]		
MB1: 1 – 6 marks	**MB2: 7 – 11 marks**	**MB3: 12 – 15 marks**
Creates a **simple** data entry form to enable data to be entered into a single table. Produces a **basic** menu-driven interface which allows the user to select either a table or a form from the menu.	Creates **clear** data entry forms for most of the tables in the database. The forms contain at least one feature to simplify data entry. Produces a **sound** menu-driven interface which allows the user to select some of the database objects from the menu.	Creates **effective** data entry forms for most of the tables in the database. The forms contain a **range** of features to simplify data entry. Produces an **effective** menu-driven interface which allows the user to select **all** of the database objects they have created i.e. forms, queries and reports from the menu.

LO4: Be able to analyse a database's suitability for a business purpose		
MB1: 1 – 6 marks	**MB2: 7 – 11 marks**	**MB3: 12 – 15 marks**
Provides a **basic** explanation of testing that has been used in the database and gives **limited** justification for the choice of method used. Carries out peer testing of a user interface and provides **limited** feedback, some of which is **relevant**. Carries out a **limited** analysis of the test results, identifies **limited** modifications that could be made as a result of testing and, where possible, implements them.	Provides a **sound** explanation of methods of testing that have been used and gives **sound** justification for the choice of methods used. Carries out peer testing of a user interface and provides feedback, most of which is **relevant**. Carries out **a sound** analysis of the test results, identifies **some** modifications that could be made as a result of testing and, where possible, implements them.	Provides a **detailed** explanation for each of the methods of testing that have been used and gives a **detailed** justification for the choice of methods used. Carries out peer testing of a user interface and provides **detailed** and **relevant** feedback. Carries out **a detailed** analysis of the test results, identifies a **range** of **appropriate** modifications that could be made as a result of testing and, where possible, implements them.

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Guidance on synoptic assessment

Synoptic assessment is based upon demonstrating a broad understanding of the subject. This is achieved by drawing upon the skills/knowledge/understanding that have been studied across the specification and utilising them in an appropriate and relevant way to complete the assessment for this unit in order to meet the marking criteria for a specific Learning Outcome. When completing work for assessment, learners should be encouraged to apply the **relevant** skills/knowledge/understanding from other units within the specification and not seek to incorporate input from all the previously studied units or content unless it is appropriate to do so. When assessing the learner's work teachers should focus on whether the skills/knowledge/understanding applied are relevant. The links identified below are guidance only and learners may find other skills/knowledge/understanding that they are able to apply synoptically either in addition to or in place of this guidance.

[1] Unit R001 LO2 supports the development of these skills by developing understanding through their use in business contexts.

[2] Unit R002 LO2 supports this by developing these skills in the context of existing spreadsheets and databases.

[3] Unit R002 LO3 and LO4 support this by developing understanding of how to communicate using business documents, of which these are examples.

[4] Unit R001 LO4 supports this by developing understanding of the need for security measures and the consequences of data loss.

[5] Unit R001 LO2 supports this by developing understanding of how data can be captured using forms.

Assessment guidance

What do learners need to produce (evidence)	Examples of format of evidence (this list is not exhaustive)
Database showing data	• Electronic files/evidence • Annotated screen prints • PDF printouts • Witness statements
Database queries	• Electronic files/ evidence • Annotated screen prints • Printout
Database reports	• Electronic files/evidence • Annotated screen prints • Printout
Data entry form	• Electronic files/evidence • Annotated screen prints • PDF printouts
Database with a menu-driven interface	• Electronic files/evidence • Annotated screen prints • PDF printouts
Testing	• Electronic files/evidence • Test plans • User feedback form • Witness statements • Written/typed or recorded analysis

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Unit R005: *Creating an interactive product using multimedia components*

Marking criteria guidance

0 marks must be given where there is no evidence or no evidence worthy of credit.

A range of marks is allocated to each learning outcome. Where marks are allocated to a number of statements within a learning outcome, marks should be awarded using a 'best fit' approach. For each of the learning outcomes, one of the descriptors provided in the mark scheme that most closely describes the quality of the work being marked should be selected. Marking should be positive, rewarding achievement rather than penalising failure or omissions. The award of marks **must be** directly related to the marking criteria.

- Each band descriptor covers all the relevant content for the Learning Outcomes.
- The descriptors should be read and applied as a whole.
- Make a best-fit match between the answer and the band descriptors.
- An answer does not have to meet all the requirements of a band descriptor before being placed in that band. It will be placed in a particular band when it meets more of the requirements of that band than it meets the requirements of other bands.

When deciding the mark within a band, the following criteria should be applied:

- The extent to which the statements within the band have been achieved.

For example:

- An answer that convincingly meets nearly all the requirements of a band descriptor should be placed at or near the top of that band. Where the learner's work *convincingly* meets the statement, the highest mark should be awarded.
- An answer that meets many of the requirements of the band descriptor should be placed in the middle of the band. Where the learner's work *adequately* meets the statement, the most appropriate mark in the middle range should be awarded.
- If an answer is on the border-line between two bands but it is decided that it fits better the descriptors for the lower of these two bands, then it should be placed near the top of that band. Where the learner's work *just* meets the statement, the lowest mark should be awarded.

When learners are taking an assessment task, or series of tasks, for this unit they will be able to use relevant, appropriate knowledge, understanding and skills that they will have developed through the mandatory units R001 and R002. Examples of this include:

- When learners have to select appropriate software to create the final product they could apply their learning from R002 where they developed the ability to select and use software to meet a specific purpose and audience
- Learners have to create an interactive product and they have the opportunity to apply their learning from R001 regarding applications software (LO1), different file types (LO2) and their understanding of the implications of copyright legislation and the consequences of non-compliance with its provisions (LO4).

For a description of the key words in the marking criteria please see the Marking criteria glossary of terms in Appendix D.

Marking criteria grid

LO1: Be able to design interactive products [1 2]		
MB1: 1 – 3 marks	**MB2: 4 – 6 marks**	**MB3: 7 – 9 marks**
Produces a **basic** specification for an interactive product, identifying success criteria, **some** of which are suitable, and demonstrates a **limited** understanding of the client brief.	Produces a **sound** specification for an interactive product, identifying success criteria, **most** of which are suitable, and demonstrates a **clear** understanding of the client brief.	Produces a **comprehensive** specification for an interactive product, identifying suitable success criteria, and demonstrate a **thorough** understanding of the client brief.
MB1: 1 – 4 marks	**MB2: 5 – 8 marks**	**MB3: 9 – 11 marks**
Reasons for selecting the software to create the final product, including the presentation method of the design, are **basic** and **limited**. Applies **basic** planning techniques, enough to show what the product will look like but with **limited** consideration to the success criteria. **Lists** components sourced for the interactive product and gives **basic** reasons for selection in relation to their success criteria. Stores the components to be used in the interactive product in file types that are not always **appropriate**. Design specification has **limited** structure. There may be errors in spelling, punctuation and grammar which are intrusive and likely to impact on the meaning. Makes limited use of technical terminology and demonstrates a **basic** understanding of the subject matter. Draws upon **limited** skills/knowledge/understanding from other units in the specification.	Selects **appropriate** software to create the final product, including the presentation method of the design, and gives **sound** justification for its use. Applies **sound** planning techniques, including some reference to a house style that takes into consideration of **some** of the success criteria. Lists components sourced for the interactive product, gives **sound** reasons for selection in relation to their success criteria and explains what the legislative constraints that apply to their use. Stores the components to be used in the interactive product in file types that are **mostly appropriate**. Design specification has **some** structure. **Occasional** errors in spelling, punctuation and grammar will not affect the overall meaning. Uses technical terminology with reasonable **accuracy** and demonstrates a **clear** understanding. Draws upon **some relevant** skills/knowledge/ understanding from other units in the specification.	Selects **appropriate** software to create the final product, including the presentation method, and provides a **thorough** and **detailed** justification for its use. Applies **comprehensive** planning techniques in a well organised way, including **some** reference to a clear house style that refers back to the success criteria. Lists components sourced for the interactive product, clearly explaining and justifying choices in relation to their success criteria. Explains legislative constraints that apply to their use, stating how they would comply with them. Stores the components to be used in the interactive product in file types that are consistently **appropriate**. Design specification is logical and coherent. Contains **few**, if any, errors in spelling, punctuation and grammar. Uses technical terminology **accurately** and **appropriately** and demonstrates a **thorough** understanding. **Clearly** draws upon **relevant** skills/knowledge/ understanding from other units in the specification.

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LO2: Be able to create interactive products containing multimedia components		
MB1: 1 – 5 marks	**MB2: 6 – 8 marks**	**MB3: 9 – 10 marks**
Combines components with a working **basic** navigation system when creating the interactive product.	Combines components with a working **sound** navigation system when creating the interactive product.	Combines components **effectively** showing a **clear** and coherent working navigation system when creating the interactive product.
MB1: 1 – 5 marks	**MB2: 6 – 8 marks**	**MB3: 9 – 12 marks**
Applies **basic** techniques with some effects created in the software to allow user interactivity. Makes an attempt to use effects to meet user requirements, with **limited** success. Uses a **basic** template and the product in the **most** part reflects the designs.	Applies **some** advanced techniques of the software enhancing the user interaction of the product. Uses effects **appropriately** to meet **some** of the user requirements. Uses a **sound** template and/or creates and uses a **clear** house-style and the product generally reflects the designs.	Applies a **range** of **advanced** techniques of the software **appropriately** and **effectively**, enhancing the user interaction of the product and are based upon user requirements. Uses effects **appropriately** to **consistently** meet the user requirements. The interactive product is well organised, **effectively** making use of templates and/or creating and using house-styles, and the product fully and **accurately** reflects the designs.
LO3: Be able to carry out usability testing		
MB1: 1 – 5 marks	**MB2: 6 – 8 marks**	**MB3: 9 – 10 marks**
Carries out **some** testing of the product.	Carries out **sound** testing of the product while creating and post completion.	Carries out **thorough** testing of the product while creating and post completion.
MB1: 1 – 3 marks	**MB2: 4 – 6 marks**	**MB3: 7 – 8 marks**
Gathers **limited** feedback and carries out some analysis of it, making a **limited** reference to success criteria.	Gathers **appropriate** feedback and analyses the feedback in relation to the final product and to **most** of the success criteria.	Gathers **appropriate** feedback and justifies the feedback methods used. **Effectively** analyses the feedback in relation to the final product and **all** of the success criteria.

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Guidance on synoptic assessment

Synoptic assessment is based upon demonstrating a broad understanding of the subject. This is achieved by drawing upon the skills/knowledge/understanding that have been studied across the specification and utilising them in an appropriate and relevant way to complete the assessment for this unit in order to meet the marking criteria for a specific Learning Outcome. When completing work for assessment, learners should be encouraged to apply the **relevant** skills/knowledge/understanding from other units within the specification and not seek to incorporate input from all the previously studied units or content unless it is appropriate to do so. When assessing the learner's work teachers should focus on whether the skills/knowledge/understanding applied are relevant. The links identified below are guidance only and learners may find other skills/knowledge/understanding that they are able to apply synoptically either in addition to or in place of this guidance.

[1] Unit R001 LO2 supports this by developing an understanding of appropriate file types.

[2] Unit R001 LO4 supports this by developing an understanding of the implications of copyright legislation and the consequences of non-compliance with its provisions.

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Assessment guidance

To complete the assessment of Unit R005 the learners will need the use of either web authoring software, game making software or presentation authoring software.

Learners will also need access to sourced components e.g. images, video, sound, animation, scripting, sprites.

LO2 – learners are not being assessed on the creation of the components but on combining them to create the interactive product. Learners can not be awarded any marks if the product created has no user interactivity.

It would be inappropriate for learners to produce a simple presentation or a webpage/2 page site

LO3 – Learners must test the usability of their product during the design and production to ensure the client brief is being met.

What do learners need to produce (evidence)	Examples of format of evidence (this list is not exhaustive)
Specification	• Electronic files/evidence • Written/typed report or recorded analysis • Planning documents e.g. storyboards, mind maps, site plans, hand-drawn templates. • Witness statement • Source table • Component log • Print screen
*An **interactive** product using multimedia components*	• An interactive: game, presentation, animation, website or tablet/ mobile phone apps. • Final electronic files/evidence of the interactive product • Print screen evidence • Annotated screen shots
Testing	• Test plans • Self Evaluation
Feedback collected and analysed	• Electronic files/evidence • Peer feedback – questionnaires • Feedback judging form or feedback review • Written/verbal or recorded analysis • Witness statement

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Unit R006: *Creating digital images*

Marking criteria guidance

0 marks must be given where there is no evidence or no evidence worthy of credit.

A range of marks is allocated to each learning outcome. Where marks are allocated to a number of statements within a learning outcome, marks should be awarded using a 'best fit' approach. For each of the learning outcomes, one of the descriptors provided in the mark scheme that most closely describes the quality of the work being marked should be selected. Marking should be positive, rewarding achievement rather than penalising failure or omissions. The award of marks **must be** directly related to the marking criteria.

- Each band descriptor covers all the relevant content for the Learning Outcomes.
- The descriptors should be read and applied as a whole.
- Make a best-fit match between the answer and the band descriptors.
- An answer does not have to meet all the requirements of a band descriptor before being placed in that band. It will be placed in a particular band when it meets more of the requirements of that band than it meets the requirements of other bands.

When deciding the mark within a band, the following criteria should be applied:

- The extent to which the statements within the band have been achieved.

For example:

- An answer that convincingly meets nearly all the requirements of a band descriptor should be placed at or near the top of that band. Where the learner's work *convincingly* meets the statement, the highest mark should be awarded.
- An answer that meets many of the requirements of the band descriptor should be placed in the middle of the band. Where the learner's work *adequately* meets the statement, the most appropriate mark in the middle range should be awarded.
- If an answer is on the border-line between two bands but it is decided that it fits better the descriptors for the lower of these two bands, then it should be placed near the top of that band. Where the learner's work *just* meets the statement, the lowest mark should be awarded.

When learners are taking an assessment task, or series of tasks, for this unit they will be able to use relevant, appropriate knowledge, understanding and skills that they will have developed through the mandatory units R001 and R002. Examples of this include:

- Learners who have completed unit R002 could apply their learning regarding carrying out internet research (LO1). Learners could also apply their learning from R001 regarding the implications of copyright legislation and the consequences of non-compliance with its provisions (LO4).
- When learners create a storage system for digital files they could apply learning from unit R001 LO1 regarding the optimisation of electronic files here when setting the size and/or resolution of digital images. Learners can also use apply their knowledge from units R001 and R002 regarding why and how storage systems are used.
- When preparing to present the final digital image(s) to the client learners could also apply their learning from R001 (LO1) regarding software to be used with photo editing and R002 where they developed the ability to select and use software to meet a specific purpose and audience.

For a description of the key words in the marking criteria please see the Marking criteria glossary of terms in Appendix D.

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Marking criteria grid

LO1: Be able to specify a digital image solution for a client's needs [1]		
MB1: 1 – 4 marks	**MB2: 5 – 8 marks**	**MB3: 9 – 11 marks**
Produces a **basic** specification for a digital image solution, identifying success criteria **some** of which are suitable and demonstrate a **basic** understanding of the client brief.	Produces a **sound** specification for a digital image solution, identifying success criteria **most** of which are suitable and demonstrate a **sound** understanding of the client brief.	Produces a **comprehensive** specification for a digital image solution, identifying success criteria **all** of which are suitable and demonstrate a **thorough** understanding of the client brief.
MB1: 1 – 3 marks	**MB2: 4 – 6 marks**	**MB3: 7 – 9 marks**
Uses a **limited range** of research methods to inform ideas and produces **basic** designs for a **simple** digital image solution which are based on the familiar or commonly used. Makes a **basic** list of components sourced for the digital image solution and gives **basic** reasons for selection in relation to the identified success criteria with **limited** explanation of what legislation constraints apply to their use. Specification has a **basic** structure. There may be errors in spelling, punctuation and grammar which are intrusive and likely to impact on the meaning. Makes **limited** use of technical terminology which demonstrates a **basic** understanding of the subject matter. Draws upon **limited** skills/knowledge/understanding from other units in the specification.	Uses a **range** of research methods to inform ideas and produces **clear** designs for a digital image solution which show **some** originality and creativity. Makes a **sound** list of components sourced for the digital image solution and gives **sound** reasons for selection in relation to the identified success criteria and explains what legislation constraints apply to their use. Specification has a **sound** structure. Occasional errors in spelling, punctuation and grammar will not affect the overall meaning. Uses technical terminology with **reasonable accuracy** which demonstrates a **clear** understanding of the subject matter. Draws upon **some relevant** skills/knowledge/ understanding from other units in the specification.	Uses a **wide range** of **relevant** research methods effectively to inform ideas and produces **clear** and detailed designs for a digital image solution which show complexity, originality and creativity. Makes a **comprehensive** list of components sourced for the digital image solution, **clearly** explaining and justifying selection in relation to the identified success criteria. Explains legislation constraints that apply to their use, stating how they would comply with them. Specification has a **logical** and **coherent** structure. Contains **few**, if any, errors in spelling, punctuation and grammar. Uses technical terminology **accurately** and **appropriately** which demonstrates a **thorough** understanding of the subject matter. **Clearly** draws upon **relevant** skills/knowledge/ understanding from other units in the specification.

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LO2: Be able to create digital images [2 3]		
MB1: 1 – 5 marks	**MB2: 6 – 8 marks**	**MB3: 9 – 10 marks**
Makes **limited** software choices in relation to the client brief and gives **limited** explanation of their use in relation to the client brief. Sets the image size and/or resolution of the digital images and gives a **basic** explanation of the settings chosen.	Makes **appropriate** software choices in relation to the client brief and gives **sound** explanation of their use in relation to the client brief. Sets the image size and/or resolution of the digital images and gives a **sound** explanation of the settings chosen.	Makes **appropriate** software choices and gives a **thorough** explanation of their use in relation to the client brief. Sets the **appropriate** image size and/or resolution of the digital images and justifies fully and clearly the settings chosen.
MB1: 1 – 5 marks	**MB2: 6 – 8 marks**	**MB3: 9 – 12 marks**
Creates **simple** digital image(s) which communicate the intended message. Uses a **basic** range of **appropriate** standard software tools and techniques with some accuracy. Carries out **basic** evaluation and provides **basic** feedback on digital images.	Creates suitable digital image(s) which show **some** complexity and communicate the intended message **appropriately**. Uses a **range** of appropriate standard and specialised software tools and techniques with a reasonable degree of accuracy. Carries out **sound** evaluation and provides **mostly** relevant feedback on digital images.	Creates **complex** digital image(s) which communicate the intended message **effectively** and creatively. Uses multiple process steps, multi-layering and/or combines output from different software packages. Uses a **range** of appropriate standard and specialised software tools and techniques with a high degree of accuracy. Carries out **thorough** evaluation and provides **detailed** and **relevant** feedback on digital images.
LO3: Be able to store, retrieve and present digital images [4 5 6]		
MB1: 1 – 5 marks	**MB2: 6 – 8 marks**	**MB3: 9 – 10 marks**
Stores digital files using names that enable the files to be located again.	Stores digital files, naming files and folders **appropriately**, using suitable file formats for working files and final output.	Stores digital files **effectively**, naming files and folders **appropriately** and consistently, selecting the most **appropriate** file formats for working files and final output.
MB1: 1 – 3 marks	**MB2: 4 – 6 marks**	**MB3: 7 – 8 marks**
Presents the final digital image(s) to the client. The methods chosen provide a **basic** idea of what the image(s) will look like in the intended final location.	Presents the final digital image(s) to the client **clearly**. Size, resolution, output medium and colour are generally suitable and provide a **clear** representation of the image(s) in the intended final location.	Presents the final digital image(s) to the client effectively. Size, resolution, output medium and colour are the most appropriate and provide an accurate representation of the image(s) in the intended final location.

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Guidance on synoptic assessment

Synoptic assessment is based upon demonstrating a broad understanding of the subject. This is achieved by drawing upon the skills/knowledge/understanding that have been studied across the specification and utilising them in an appropriate and relevant way to complete the assessment for this unit in order to meet the marking criteria for a specific Learning Outcome. When completing work for assessment, learners should be encouraged to apply the **relevant** skills/knowledge/understanding from other units within the specification and not seek to incorporate input from all the previously studied units or content unless it is appropriate to do so. When assessing the learner's work teachers should focus on whether the skills/knowledge/understanding applied are relevant. The links identified below are guidance only and learners may find other skills/knowledge/understanding that they are able to apply synoptically either in addition to or in place of this guidance.

[1] Unit R002 LO1 develops research skills in using the internet.

[2] Unit R001 LO4 supports this by developing an understanding of the implications of legislation including copyright laws and the consequence of non-compliance with their provisions.

[3] Unit R002 LO3 supports this by considering how the purpose and audience influences the choice of product and content.

[4] Unit R001 LO2 supports this by developing an understanding of optimisation and the factors to be taken into account whilst optimising objects.

[5] Unit R001 LO2 develops an understanding of optimisation and filetypes that addresses these three bullets.

[6] Unit R002 LO3 supports this by considering how the purpose and audience influences the choice of document type, and how the document type influences the choice of software.

Assessment guidance

To complete the assessment of Unit R006 the learners will need the use of editing and manipulating bitmaps software as well as software for creating and editing vectors.

Learners will also need access to sourced components e.g. image capture (camera, scanner), hand drawn design, client-provided images, stock images, internet.

LO2 – Learners are not being assessed on the creation of the components but on creating a digital image(s) which communicates the intended message.

LO3 – Learners must present their final digital image to the client and this must provide an idea of what the image will look like in the intended final location.

What do learners need to produce (evidence)	Examples of format of evidence (this list is not exhaustive)
Specification	• Electronic file/evidence • Written/typed report • Planning documents e.g. mood boards, storyboard, mind maps, market research surveys, sketches • Witness statement • Source table • Component log • Print screen
A digital image	• Electronic file/evidence • Annotated print screens • Witness statements
Feedback response/actions	• Electronic file/evidence • Feedback review • Feedback judging form • Written/verbal or recorded analysis • Witness statement
Stored digital file(s) showing naming method	• Electronic evidence/final files of the digital image(s) which use a logical naming method to aid retrieval • Witness statement • Screen shots
Presentation of the final digital image(s)	• Electronic file/evidence • Annotated print screens • Presentation e.g. Framed prints, a DVD case with printed inserts

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Unit R007: *Creating dynamic products using sound and vision*

Marking criteria guidance

0 marks must be given where there is no evidence or no evidence worthy of credit.

A range of marks is allocated to each learning outcome. Where marks are allocated to a number of statements within a learning outcome, marks should be awarded using a 'best fit' approach. For each of the learning outcomes, one of the descriptors provided in the mark scheme that most closely describes the quality of the work being marked should be selected. Marking should be positive, rewarding achievement rather than penalising failure or omissions. The award of marks **must be** directly related to the marking criteria.

- Each band descriptor covers all the relevant content for the Learning Outcomes.
- The descriptors should be read and applied as a whole.
- Make a best-fit match between the answer and the band descriptors.
- An answer does not have to meet all the requirements of a band descriptor before being placed in that band. It will be placed in a particular band when it meets more of the requirements of that band than it meets the requirements of other bands.

When deciding the mark within a band, the following criteria should be applied:

- The extent to which the statements within the band have been achieved.

For example:

- An answer that convincingly meets nearly all the requirements of a band descriptor should be placed at or near the top of that band. Where the learner's work *convincingly* meets the statement, the highest mark should be awarded.
- An answer that meets many of the requirements of the band descriptor should be placed in the middle of the band. Where the learner's work *adequately* meets the statement, the most appropriate mark in the middle range should be awarded.
- If an answer is on the border-line between two bands but it is decided that it fits better the descriptors for the lower of these two bands, then it should be placed near the top of that band. Where the learner's work *just* meets the statement, the lowest mark should be awarded.

When learners are taking an assessment task, or series of tasks, for this unit they will be able to use relevant, appropriate knowledge, understanding and skills that they will have developed through the mandatory units R001 and R002. An example of this is:

  - Learners are required to produce a specification for a dynamic product and have the opportunity to apply their learning from unit R002 LO3 regarding how the purpose and audience can influence the choice of product and content.

For a description of the key words in the marking criteria please see the Marking criteria glossary of terms in Appendix D.

Marking criteria grid

LO1: Be able to prepare for the production of dynamic products [1 2 3]		
MB1: 1 – 4 marks	**MB2: 5 – 8 marks**	**MB3: 9 – 11 marks**
Produces a **basic** specification for a dynamic product, providing a simple solution and identifying success criteria **some** of which are suitable and demonstrate a **basic** understanding of the client brief. May need guidance and support to produce a specification.	Produces a **sound** specification for a dynamic product, providing a solution which shows some originality and creativity, identifying success criteria **most** of which are suitable and demonstrate a **sound** understanding of the client brief. May need **occasional** guidance and support to produce a specification.	Produces a **comprehensive** specification for a dynamic product, providing a **complex** solution, which shows originality and creativity, identifying suitable success criteria which demonstrate a **thorough** understanding of the client brief. Specification is produced **independently**.
MB1: 1 – 3 marks	**MB2: 4 – 6 marks**	**MB3: 7 – 9 marks**
Makes a **basic** list of components sourced for the dynamic product solution and gives **basic** reasons for selection in relation to the identified success criteria. **Limited** explanation of what legislation constraints apply to their use is given. Stores the components to be used in the product in a file type that may be **appropriate**. Selects software to create the final product, giving **basic** reasons for the selection. Information produced is **basic** and presented in a **simple** format with **limited** use of technical terminology. Errors of grammar, punctuation and spelling are intrusive and likely to impact on the meaning. Draws upon **limited** skills/knowledge/understanding from other units in the specification.	Makes a **clear** list of components sourced for the dynamic product solution and gives **sound** reasons for selection in relation to the identified success criteria. **Sound** explanation of what legislation constraints apply to their use. Stores the components to be used the product in an **appropriate** file type. Selects appropriate software to create the final product, including the presentation method of the design, and gives **sound** justification for its use. Information produced is **relevant** and presented in a **clear** format with technical terminology used for the **most** part appropriately. Occasional errors in grammar, punctuation and spelling will not affect the overall meaning. Draws upon **some relevant** skills/knowledge/ understanding from other units in the specification.	Makes a **comprehensive** list of components sourced for the dynamic product solution, **thoroughly** explaining and justifying selection in relation to the identified success criteria. **Detailed** explanation of what legislation constraints apply to their use, stating how they would comply with them. Stores the components to be used in the product in an **appropriate** file type. Selection the most **appropriate** software to create the final product, including the presentation method of the design, and provides a **detailed** justification for the selection in relation to the client brief. **All** information produced is **relevant**, **clear**, organised and presented in a structured and coherent format with technical terminology used **appropriately**. There are **few**, if any, errors in spelling, punctuation and grammar. **Clearly** draws upon **relevant** skills/knowledge/ understanding from other units in the specification.

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LO2: Be able to create dynamic products [4 5 6]		
MB1: 1 – 5 marks	**MB2: 6 – 8 marks**	**MB3: 9 – 10 marks**
Imports **basic** components into the chosen software. Uses **limited** editing and enhancing techniques. Produces a final product which shows **some** resemblance to planning and partly meets user requirements.	Imports **appropriate** components into the chosen software. Uses a **range** of editing and enhancing techniques. Produces a final product which **clearly** resembles planning and generally meets user requirements.	Imports **appropriate**, including **some** original, components into the chosen software. Uses a **range** of sophisticated editing and enhancing techniques. Produces a final product which **clearly** resembles planning and meets user requirements in full.
MB1: 1 – 5 marks	**MB2: 6 – 8 marks**	**MB3: 9 – 10 marks**
Saves timeline-based product in a raw editable file format and exports final product, although may need guidance as to which file type to use. Shows **basic** understanding of the advantages and disadvantages of exporting as different file types.	Saves timeline-based product in a raw editable file format and exports final product as a suitable file type with a **sound** explanation for choice of file type. Shows **sound** understanding of the advantages and disadvantages of exporting as different file types.	Saves timeline-based product in a raw editable file format and exports final product as a suitable file type and **thoroughly** justifies the choice of file type. Shows a **thorough** understanding of the advantages and disadvantages of exporting as different file types.
LO3: Be able to test functionality of dynamic products		
MB1: 1 – 4 marks	**MB2: 5 – 7 marks**	**MB3: 8-10 marks**
Creates a **basic** test plan.	Creates a **clear** test plan, identifying some tests and expected outcomes.	Creates and completes a **detailed** test plan, listing tests, expected and actual outcomes and identifying re-tests.
MB1: 1 – 5 marks	**MB2: 6 – 8 marks**	**MB3: 9 – 10 marks**
Carries out **basic** testing of the product during production and post completion.	Carries out **sound** testing of the product during production and post completion.	Carries out a **thorough** testing of the product during production and post completion.

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Guidance on synoptic assessment

Synoptic assessment is based upon demonstrating a broad understanding of the subject. This is achieved by drawing upon the skills/knowledge/understanding that have been studied across the specification and utilising them in an appropriate and relevant way to complete the assessment for this unit in order to meet the marking criteria for a specific Learning Outcome. When completing work for assessment, learners should be encouraged to apply the **relevant** skills/knowledge/understanding from other units within the specification and not seek to incorporate input from all the previously studied units or content unless it is appropriate to do so. When assessing the learner's work teachers should focus on whether the skills/knowledge/understanding applied are relevant. The links identified below are guidance only and learners may find other skills/knowledge/understanding that they are able to apply synoptically either in addition to or in place of this guidance.

[1] Unit R002 LO3 supports this by considering how the purpose and audience influences the choice of product and content.

[2] Unit R002 LO1 supports this by developing an understanding of how to select, capture and store graphics and text in compliance with copyright.

[3] Unit R001 LO4 supports this by developing an understanding of the implications of legislation including copyright laws and the consequence of non-compliance with their provisions.

[4] Unit R002 LO3 develops an understanding of the importance of purpose and audience when editing content.

[5] Unit R001 LO1 develops an understanding of appropriate filetypes.

[6] Unit R001 LO2 develops an understanding of optimisation.

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Assessment guidance

To complete the assessment of Unit R007 the learners will need the use of either, sound, movie or animation software.

Learners will also need access to sourced assets e.g. music, sounds, graphics, video and text.

LO1 – Learners can be provided with the target audience and purpose from the centre.

LO2 – Learners are not being assessed on the creation of the components but on sourcing, editing, combining and exporting to create a timeline-based product.

LO3 – Learners must test the product against the success criteria (the original brief provided to the learner).

What do learners need to produce (evidence)	Examples of format of evidence (this list is not exhaustive)
Specification	• Electronic file/evidence • Time-line storyboard • Script • Stored components list/log • Source/asset table • Witness statement • Written/typed or recorded analysis • Annotated screen shots
A time-line based product	• Electronic file/evidence: Either a movie (e.g. video news clip), animation (e.g. for a web page) or sound product (e.g. music recording/mix) • Annotated screen shots
Exported final product	• Electronic file/evidence • PDF printouts • Witness statement • Annotated screen shots
Test final product	• Electronic file/evidence • Test plans • Amended product • Witness statement • Written/typed or recorded analysis

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Unit R008: *Introduction to computer programming*

Marking criteria guidance

0 marks must be given where there is no evidence or no evidence worthy of credit.

A range of marks is allocated to each learning outcome. Where marks are allocated to a number of statements within a learning outcome, marks should be awarded using a 'best fit' approach. For each of the learning outcomes, one of the descriptors provided in the mark scheme that most closely describes the quality of the work being marked should be selected. Marking should be positive, rewarding achievement rather than penalising failure or omissions. The award of marks **must be** directly related to the marking criteria.

- Each band descriptor covers all the relevant content for the Learning Outcomes.
- The descriptors should be read and applied as a whole.
- Make a best-fit match between the answer and the band descriptors.
- An answer does not have to meet all the requirements of a band descriptor before being placed in that band. It will be placed in a particular band when it meets more of the requirements of that band than it meets the requirements of other bands.
- When deciding the mark within a band, the following criteria should be applied:
- The extent to which the statements within the band have been achieved.

For example:

- An answer that convincingly meets nearly all the requirements of a band descriptor should be placed at or near the top of that band. Where the learner's work *convincingly* meets the statement, the highest mark should be awarded.
- An answer that meets many of the requirements of the band descriptor should be placed in the middle of the band. Where the learner's work *adequately* meets the statement, the most appropriate mark in the middle range should be awarded.
- If an answer is on the border-line between two bands but it is decided that it fits better the descriptors for the lower of these two bands, then it should be placed near the top of that band. Where the learner's work *just* meets the statement, the lowest mark should be awarded.

When learners are taking an assessment task, or series of tasks, for this unit they will be able to use relevant, appropriate knowledge, understanding and skills that they will have developed through the mandatory units R001 and R002. Examples of this include:

- When learners are producing an algorithm that defines a solution to a problem they could apply learning from unit R002 LO2 where they develop an understanding of variables and formulas in the context of a spreadsheet.
- When producing algorithms to solve problems they can also apply their learning from unit R001 LO2 regarding how ICT can be used to met business needs.

For a description of the key words in the marking criteria please see the Marking criteria glossary of terms in Appendix D.

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Marking criteria grid

LO1: Be able to devise algorithms to solve problems [1]		
MB1: 1 – 3 marks	**MB2: 4 – 6 marks**	**MB3: 7- 9 marks**
Carries out a **basic** analysis of the problem, identifying **some** outputs, inputs, and processing requirements. Uses **limited** analysis to select a programming language and partly justifies choice.	Carries out a **sound** analysis of the problem, identifying **most** outputs, inputs, and processing requirements. Uses analysis to select an appropriate programming language and gives **some** justification for the choice.	Carries out a **thorough** analysis of the problem, accurately identifying the outputs, inputs, and processing requirements. Uses the analysis **effectively** to select an **appropriate** programming language and fully justifies the choice.
MB1: 1 – 4 marks	**MB2: 5 – 8 marks**	**MB3: 9 – 11 marks**
Produces an algorithm that partially defines a solution to **some** elements of the problem. Identifies success criteria which are partially suitable, and demonstrate a **basic** understanding of the problem. Draws upon **limited** skills/knowledge/understanding from other units in the specification.	Produces an algorithm that defines a workable solution to **most** elements of the problem. Identifies success criteria, **most** of which are suitable, and demonstrate a **clear** understanding of the problem. Draws upon **some relevant** skills/knowledge/ understanding from other units in the specification.	Produces an algorithm that defines a complete and **effective** solution to the problem. Identifies suitable success criteria which demonstrate a **thorough** understanding of the problem. **Clearly** draws upon **relevant** skills/knowledge/ understanding from other units in the specification.
LO2: Be able to develop computer programs		
MB1: 1 – 5 marks	**MB2: 6 – 8 marks**	**MB3: 9 – 10 marks**
Uses **some** constructs, variables and operators to produce a partial solution to the problem with limited functionality.	Uses a **range** of constructs, variables and operators to produce a partially working solution to the problem.	Uses a wide **range** of constructs, variables and operators effectively to produce a working solution to the problem.
MB1: 1 – 4 marks	**MB2: 5 – 7 marks**	**MB3: 8 – 10 marks**
Provides **some** annotation of the code using **limited** terminology to demonstrate a **limited** understanding of how the constructs, variables and operators have been used. Errors in spelling, punctuation and grammar may detract from the clarity of the evaluation.	Provides annotation of the code, using **some** terminology **appropriately**, to demonstrate a **sound** understanding of how the constructs, variables and operators have been used. There are occasional errors in spelling, punctuation and grammar that will not affect the overall meaning.	Provides **clear** and **detailed** annotation of the code, using terminology **appropriately**, to demonstrate an **thorough** understanding of how the constructs, variables and operators have been used. Few, if any, errors in spelling, punctuation and grammar.

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LO3: Be able to test and evaluate computer programs		
MB1: 1 – 5 marks	**MB2: 6 – 8 marks**	**MB3: 9 – 10 marks**
Creates a **basic** test plan which partially tests the functionality of the program. Carries out **some** testing.	Creates a **sound** test plan which tests most of the functionality of the program. Carries out **most** of the test plan.	Creates a **comprehensive** test plan which fully tests the functionality of the program. Systematically, carries out the full test plan.
MB1: 1 – 5 marks	**MB2: 6 – 8 marks**	**MB3: 9 – 10 marks**
Uses the results of testing to produce a **basic** evaluation of the solution against **some** of the requirements and the success criteria. There may be **limited** use of technical terminology.	Uses the results of testing to produce a **sound** evaluation of the solution against **most** of the requirements and the success criteria. For the most part the evaluation is relevant and presented in a structured and coherent format. Uses technical terminology that is sometimes accurate and appropriate.	Uses the results of testing to provide a **thorough** evaluation of the solution against all of the requirements and the success criteria. The evaluation is relevant, organised and presented in a structured and coherent format with **appropriate** and accurate use made of technical terminology.

Guidance on synoptic assessment

Synoptic assessment is based upon demonstrating a broad understanding of the subject. This is achieved by drawing upon the skills/knowledge/understanding that have been studied across the specification and utilising them in an appropriate and relevant way to complete the assessment for this unit in order to meet the marking criteria for a specific Learning Outcome. When completing work for assessment, learners should be encouraged to apply the **relevant** skills/knowledge/understanding from other units within the specification and not seek to incorporate input from all the previously studied units or content unless it is appropriate to do so. When assessing the learner's work teachers should focus on whether the skills/knowledge/understanding applied are relevant. The links identified below are guidance only and learners may find other skills/knowledge/understanding that they are able to apply synoptically either in addition to or in place of this guidance.

[1] This LO is linked to Unit R002 LO2 where an understanding of variables and formulas is developed in the context of a spreadsheet

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Assessment guidance

LO1 – Learners should analyse a problem identifying the required outputs and the necessary inputs and processing required in order to generate these outputs. They should explain how their choice of programming language is suited to developing a solution to the problem. Learners should break down the problem into discrete stages/elements and present their solution using suitable algorithms. They should identify measurable success criteria to be used when evaluating the success of the solution.

LO2 – Learners should develop their solution following their design using the chosen programming environment and an appropriate range of programming constructs and features. The development should be illustrated with testing throughout the development and the resulting code should be fully annotated to explain how it works.

LO3 – A test plan should be produced and implemented by the learner to verify that the code performs as expected. Any errors in the program should be identified and possible causes and solutions discussed. Where there are no errors learners should discuss possible improvements and how these might be carried out. There should be an evaluation of the solution against the success criteria.

Evidence requirements:

What do learners need to produce (evidence)	Examples of format of evidence (this list is not exhaustive)
Design *A computer program* *Testing and evaluation*	• An analysis of the problem, an algorithm, for example as flow charts / structured English /story boards and a written/typed set of success criteria • A working solution with annotated code, (annotated electronically in the file and/or printed with added annotations) and the electronic evidence of the finished program • Test plan with evidence of testing for example screen capture evidence (video and/or still). A written/typed/recorded evaluation of the solution against the success criteria.

Unit R009: *Exploring computer hardware and network*

Marking criteria guidance

0 marks must be given where there is no evidence or no evidence worthy of credit.

A range of marks is allocated to each learning outcome. Where marks are allocated to a number of statements within a learning outcome, marks should be awarded using a 'best fit' approach. For each of the learning outcomes, one of the descriptors provided in the mark scheme that most closely describes the quality of the work being marked should be selected. Marking should be positive, rewarding achievement rather than penalising failure or omissions. The award of marks **must be** directly related to the marking criteria.

- Each band descriptor covers all the relevant content for the Learning Outcomes.
- The descriptors should be read and applied as a whole.
- Make a best-fit match between the answer and the band descriptors.
- An answer does not have to meet all the requirements of a band descriptor before being placed in that band. It will be placed in a particular band when it meets more of the requirements of that band than it meets the requirements of other bands.

When deciding the mark within a band, the following criteria should be applied:

- The extent to which the statements within the band have been achieved.

For example:

- An answer that convincingly meets nearly all the requirements of a band descriptor should be placed at or near the top of that band. Where the learner's work *convincingly* meets the statement, the highest mark should be awarded.
- An answer that meets many of the requirements of the band descriptor should be placed in the middle of the band. Where the learner's work *adequately* meets the statement, the most appropriate mark in the middle range should be awarded.
- If an answer is on the border-line between two bands but it is decided that it fits better the descriptors for the lower of these two bands, then it should be placed near the top of that band. Where the learner's work *just* meets the statement, the lowest mark should be awarded.

When learners are taking an assessment task, or series of tasks, for this unit they will be able to use relevant, appropriate knowledge, understanding and skills that they will have developed through the mandatory units R001 and R002. Examples of this include:

- Learners need to select computer devices to meet the general and specialist user requirements and they could apply their learning from unit R001 LO1 regarding the features, functions and purposes of computing devices.
- When learners are providing a plan for the network they could apply their learning from unit R001 LO1 regarding the connection of computing devices and office configurations, and LO2 regarding how networks are used in business functions. Unit R001 LO4 also provides transferable learning regarding threats to data security and network security that could be used here.

For a description of the key words in the marking criteria please see the Marking criteria glossary of terms in Appendix D.

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Marking criteria grid

LO1: Be able to select computer system devices and platforms [1]		
MB1: 1 – 4 marks	**MB2: 5 – 7 marks**	**MB3: 8 – 9 marks**
Selects **some** computer devices with **limited** reference to user requirements.	Selects **appropriate** computer devices to meet **some** of the general and specialist user requirements.	Selects **appropriate** computer devices to fully meet the general and specialist user requirements.
MB1: 1 – 4 marks	**MB2: 5 – 8 marks**	**MB3: 9 – 11 marks**
Describes the choices made, demonstrating a **basic** understanding of the use and function of **some** computer components and/or devices.	Largely justifies the choices made demonstrating a **sound** understanding of the use and function of a **range** of computer components and devices.	Fully justifies the choices made demonstrating a **detailed** understanding of the use and function of a **wide range** of computer components and devices.
LO2: Be able to devise network solutions [2 3 4]		
MB1: 1 – 6 marks	**MB2: 7 – 11 marks**	**MB3: 12 – 15 marks**
Produces a **basic** plan for the network which partly meets the user requirements. Suggests **some** network components.	Produces a **sound** plan for the network which meets most of the user requirements. Suggests **some appropriate** network components describing their purpose.	Produces an accurate and **detailed** plan for the network which fully meets the user requirements. Defines and justifies the **appropriate** choice of network components **clearly** and **accurately**.
MB1: 1 – 4 marks	**MB2: 5 – 7 marks**	**MB3: 8 – 10 marks**
Proposes network topologies with **some** relevance to the user requirements. Gives a **basic** description of relevant LAN and WAN services for the proposed network.	Proposes **appropriate** topologies which in the most part meet user requirements, describing the format of device addresses to be used on the network. Defines **appropriate** LAN and WAN services for the proposed network.	Proposes and justifies **appropriate** topologies to meet user requirements, with a detailed explanation of how IP addresses could be assigned. Distinguishes **accurately** between LAN and WAN services appropriate for the proposed network.

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LO3: Be able to identify and solve hardware and network problems [5]		
MB1: 1 – 5 marks	**MB2: 6 – 10 marks**	**MB3: 11 – 15 marks**
Presents a **limited** range of troubleshooting activities which have some relevance to requirements, by selecting some problems that are likely to be encountered and producing a **limited** range of possible solutions. The information has **limited** structure. Errors of grammar, punctuation and spelling are intrusive and likely to impact on the meaning. Draws upon **limited** skills/knowledge/understanding from other units in the specification.	Presents a **range** of troubleshooting activities which have **some** relevance to requirements, by selecting **some** problems that are likely to be encountered and producing a **range** of possible solutions. Organises **most** of the information **clearly** to enable the user to locate solutions to specific problems. Uses technical terminology that is sometimes accurate and **appropriate**. **Occasional** errors in grammar, punctuation and spelling will not affect the overall meaning. Draws upon **some relevant** skills/knowledge/ understanding from other units in the specification.	Presents a **wide range** of troubleshooting activities that are relevant to requirements, by selecting problems that are likely to be encountered and producing a **wide range** of possible solutions. Organises all of the information **clearly** to enable the user to easily locate solutions to specific problems. Uses any technical terminology accurately and **appropriately**. There are few, if any, errors in spelling, punctuation and grammar. **Clearly** draws upon **relevant** skills/knowledge/ understanding from other units in the specification.

Guidance on synoptic assessment

Synoptic assessment is based upon demonstrating a broad understanding of the subject. This is achieved by drawing upon the skills/knowledge/understanding that have been studied across the specification and utilising them in an appropriate and relevant way to complete the assessment for this unit in order to meet the marking criteria for a specific Learning Outcome. When completing work for assessment, learners should be encouraged to apply the **relevant** skills/ knowledge/understanding from other units within the specification and not seek to incorporate input from all the previously studied units or content unless it is appropriate to do so. When assessing the learner's work teachers should focus on whether the skills/knowledge/understanding applied are relevant. The links identified below are guidance only and learners may find other skills/knowledge/understanding that they are able to apply synoptically either in addition to or in place of this guidance.

[1] This section is supported by Unit R001 LO1 where an understanding of the elements of computer systems is developed.

[2] Unit R001 LO2 develops an understanding of how networks are used in business organisations.

[3] Unit R001 LO1 supports this by developing an understanding of how to connect a device to an existing network.

[4] Unit R001 LO4 develops an understanding of the threats to data security, including those affecting computer networks.

[5] Unit R001 LO1 supports this by developing an understanding of how to connect a device to an existing network.

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Assessment guidance

LO1 – Learners produce a specification for a system required to carry out specific tasks. Their chosen components show understanding of the range of currently available technologies. Teachers should provide learners with a realistic scenario for system specification. This could be based on the needs of a real user who, for example, has a disability and would require assistive devices or who has a hobby of editing high-quality digital photographs.

LO2 – Learners produce a network plan that specifies the resources and services required for a network. A scenario should be given for example, a small business network to be installed in a client's home or a shop unit and office within a shopping centre complex. If the centre is in a rural location, this would provide an interesting scenario and permit learners to consider how mobile broadband and satellite technologies could provide Internet access.

LO3 – Learners will undertake troubleshooting of computer hardware and network systems. They will demonstrate systematic recording of system information and testing activities. They will eliminate possible causes using standard techniques to identify the most likely source of the problem. Learners should devise their own recording system which must compare the actual result against the expected outcome.

Evidence requirements:

What do learners need to produce (evidence)	Examples of format of evidence (this list is not exhaustive)
System Specification	• This could take the form of a written report or an oral presentation
Network plan and proposal	• To meet this learning outcome, a diagram of the network accompanied by a written report or an oral presentation
Testing and troubleshooting record	• This could be screen capture videos with commentary or video of the learner carrying out activities which they will describe. A diary of troubleshooting activities could also be presented. A written test plan and completed log should accompany the evidence.

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Unit R010: *Developing control systems*

Marking criteria guidance

0 marks must be given where there is no evidence or no evidence worthy of credit.

A range of marks is allocated to each learning outcome. Where marks are allocated to a number of statements within a learning outcome, marks should be awarded using a 'best fit' approach. For each of the learning outcomes, one of the descriptors provided in the mark scheme that most closely describes the quality of the work being marked should be selected. Marking should be positive, rewarding achievement rather than penalising failure or omissions. The award of marks **must be** directly related to the marking criteria.

- Each band descriptor covers all the relevant content for the Learning Outcomes.
- The descriptors should be read and applied as a whole.
- Make a best-fit match between the answer and the band descriptors.
- An answer does not have to meet all the requirements of a band descriptor before being placed in that band. It will be placed in a particular band when it meets more of the requirements of that band than it meets the requirements of other bands.

When deciding the mark within a band, the following criteria should be applied:

- The extent to which the statements within the band have been achieved.

For example:

- An answer that convincingly meets nearly all the requirements of a band descriptor should be placed at or near the top of that band. Where the learner's work *convincingly* meets the statement, the highest mark should be awarded.
- An answer that meets many of the requirements of the band descriptor should be placed in the middle of the band. Where the learner's work *adequately* meets the statement, the most appropriate mark in the middle range should be awarded.
- If an answer is on the border-line between two bands but it is decided that it fits better the descriptors for the lower of these two bands, then it should be placed near the top of that band. Where the learner's work *just* meets the statement, the lowest mark should be awarded.

When learners are taking an assessment task, or series of tasks, for this unit they will be able to use relevant, appropriate knowledge, understanding and skills that they will have developed through the mandatory units R001 and R002. Examples of this include:

- When designing a control system learners could apply their learning from unit R001 LO1 regarding how the different variable factors can affect the choice of system
- Learners can also apply their learning from unit R001 LO2 regarding the use of control system sensors.

For a description of the key words in the marking criteria please see the Marking criteria glossary of terms in Appendix D.

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Marking criteria grid

LO1: Be able to design control systems [1]		
MB1: 1 – 4 marks	**MB2: 5 – 8 marks**	**MB3: 9-11 marks**
Identifies success criteria that are partly suitable and demonstrates a **basic** understanding of the requirements. Selects components that partly meet the requirements, demonstrating a **basic** understanding of the properties and applications of **some** components. Uses block diagrams to create a design that partly meets requirements and demonstrates a **basic** understanding of input, process and output. Creates sequences of instructions with **limited** suitability.	Identifies success criteria that are **mostly** suitable and demonstrates a **sound** understanding of the requirements. Selects **appropriate** components that meet **most** of the requirements, demonstrating a **sound** understanding of the properties and applications of a good **range** of components. Uses block diagrams to create a design that **mostly** meets requirements and demonstrates a **sound** understanding of input, process (including variables and/or feedback) and output. Creates sequences of instructions to define **some** of the control structures within the system.	Identifies success criteria that are **all** suitable and demonstrates a **thorough** understanding of the requirements. Selects **appropriate** components that fully meet requirements, demonstrating a **thorough** understanding of the properties and applications of a comprehensive **range** of components. Uses block diagrams to create a design that fully meets **all** of the requirements and demonstrates a **thorough** understanding of input, process (including variables and feedback) and output. Creates sequences of instructions to fully define the control structures within the system using variables and feedback.
MB1: 1 – 3 marks	**MB2: 4 – 6 marks**	**MB3: 7 – 9 marks**
Describes and gives a **basic** explanation for choices made in **some** aspects of the design with **limited** use of **appropriate** terminology and demonstrating a **basic** understanding of control systems. Information is partly relevant and presented in a **basic** format. Errors of grammar, punctuation and spelling prevent **clear** communication of these choices. Draws upon **limited** skills/knowledge/understanding from other units in the specification.	Describes and gives a **clear** explanation for choices made in **most** aspects of the design, with **some** use of **appropriate** terminology and demonstrating a **sound** understanding of control systems. Information is for the **most** part relevant and presented in a well structured format. There are **occasional** errors in grammar, punctuation and spelling that do not affect the overall meaning. Draws upon **some relevant** skills/knowledge/ understanding from other units in the specification.	Gives a **clear** and **detailed** explanation for choices made in the design, using **appropriate** terminology consistently demonstrating a **detailed** understanding of control systems. Information is **consistently** relevant and presented in a **clear** and coherent format with **few**, if any errors in grammar, punctuation and spelling. **Clearly** draws upon **relevant** skills/knowledge/ understanding from other units in the specification.

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LO2: Be able to implement control systems		
MB1: 1 – 4 marks	**MB2: 5 – 7 marks**	**MB3: 8 – 10 marks**
Partly implements a design incorporating a **limited range** of sensors and actuators with **limited** evidence of feedback and modification to the design.	Implements a design incorporating a **range** of sensors, actuators and some feedback, carrying out **some appropriate** modifications to the design where necessary.	Implements a design incorporating a **wide range** of sensors, actuators and feedback, consistently carrying out **appropriate** modifications to the design where necessary.
MB1: 1 – 5 marks	**MB2: 6 – 8 marks**	**MB3: 9 – 10 marks**
The system meets **limited** aspects of the design.	The system meets **some** of the success criteria identified in the design.	The system **thoroughly** meets the success criteria identified in the design.
LO3: Be able to test control systems		
MB1: 1 – 6 marks	**MB2: 7 – 10 marks**	**MB3: 11 – 13 marks**
Creates a **basic** test plan which tests a **limited** amount of the functionality of the control system. Carries out **basic** testing of the test plan.	Creates a **sound** test plan which tests **some** of the functionality of the control system. Carries out **sound** testing of the test plan.	Create a **comprehensive** test plan which fully tests the functionality of the control system. Carries out **thorough** and **effective** testing of the test plan.
MB1: 1 – 3 marks	**MB2: 4 – 5 marks**	**MB3: 6 – 7 marks**
Where necessary, devises **basic** refinements to the system in response to the results of the testing, with **basic** justification.	Where necessary, devises **some appropriate** refinements to the system, in response to the results of the testing, with **clear** justification.	Where necessary, devises **appropriate** refinements to the system, in response to the results of the testing with **thorough** justification.

Guidance on synoptic assessment

Synoptic assessment is based upon demonstrating a broad understanding of the subject. This is achieved by drawing upon the skills/knowledge/understanding that have been studied across the specification and utilising them in an appropriate and relevant way to complete the assessment for this unit in order to meet the marking criteria for a specific Learning Outcome. When completing work for assessment, learners should be encouraged to apply the **relevant** skills/ knowledge/understanding from other units within the specification and not seek to incorporate input from all the previously studied units or content unless it is appropriate to do so. When assessing the learner's work teachers should focus on whether the skills/knowledge/understanding applied are relevant. The links identified below are guidance only and learners may find other skills/knowledge/understanding that they are able to apply synoptically either in addition to or in place of this guidance.

[1] Unit R001 LO1 develops an understanding of input devices and Unit R001 LO2 develops an understanding of data capture methods and the factors affecting the choice of appropriate method.

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Assessment guidance

LO1 – Learners should interpret a brief to design a control system that makes correct use of sensors, actuators and feedback. This should be presented using standard techniques. They will demonstrate understanding of the purpose of the system and how this relates to real-world systems. Learners should be provided with a straightforward scenario for example, a system to regulate ventilation and watering inside a greenhouse or a simple burglar alarm system.

LO2 – Learners will be able to demonstrate the correct construction of a control system using either simulator software or hardware components. It is acceptable to use the same scenario for LO1 and 2 but the teacher must ensure that the learner's block diagram is correct before they proceed to develop the system. It is also acceptable to use a different scenario for LO2 where a design is provided for the learner to implement as a system.

LO3 –A test plan should be produced and implemented by the learner to verify control system operation. Deviations from expected outcomes will be identified. The learner can test the system that they have implemented for LO2. It is not essential that the system produced functions correctly as this learning outcome assesses the ability to carry out structured testing and record results accurately.

Evidence requirements:

What do learners need to produce (evidence)	Examples of format of evidence (this list is not exhaustive)
Control system design. Block diagram of the proposed system	• Written report or oral presentation describing the system accompanied by a block diagram. A flow chart may also be produced.
Modelled control system	• Working control system
Test plan and log for a control system	• Test plan and log

Unit R011: *Understanding technology – a project approach*

Marking criteria guidance

0 marks must be given where there is no evidence or no evidence worthy of credit.

A range of marks is allocated to each learning outcome. Where marks are allocated to a number of statements within a learning outcome, marks should be awarded using a 'best fit' approach. For each of the learning outcomes, one of the descriptors provided in the mark scheme that most closely describes the quality of the work being marked should be selected. Marking should be positive, rewarding achievement rather than penalising failure or omissions. The award of marks **must be** directly related to the marking criteria.

- Each band descriptor covers all the relevant content for the Learning Outcomes.
- The descriptors should be read and applied as a whole.
- Make a best-fit match between the answer and the band descriptors.
- An answer does not have to meet all the requirements of a band descriptor before being placed in that band. It will be placed in a particular band when it meets more of the requirements of that band than it meets the requirements of other bands.

When deciding the mark within a band, the following criteria should be applied:

- The extent to which the statements within the band have been achieved.

For example:

- An answer that convincingly meets nearly all the requirements of a band descriptor should be placed at or near the top of that band. Where the learner's work *convincingly* meets the statement, the highest mark should be awarded.
- An answer that meets many of the requirements of the band descriptor should be placed in the middle of the band. Where the learner's work *adequately* meets the statement, the most appropriate mark in the middle range should be awarded.
- If an answer is on the border-line between two bands but it is decided that it fits better the descriptors for the lower of these two bands, then it should be placed near the top of that band. Where the learner's work *just* meets the statement, the lowest mark should be awarded.

When learners are taking an assessment task, or series of tasks, for this unit they will be able to use relevant, appropriate knowledge, understanding and skills that they will have developed through the mandatory units R001 and R002.

For a description of the key words in the marking criteria please see the Marking criteria glossary of terms in Appendix D.

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Marking criteria grid

LO1: Be able to initiate projects		
MB1: 1 – 6 marks	**MB2: 7 – 11 marks**	**MB3: 12 – 15 marks**
Gives a **basic** rationale for doing the project, making **few** links to the purpose of the project. Produces a **basic** description of the project objectives. Produces a **basic** project plan with a **limited** description of what is to be done and a very brief outline of timescales. May have required significant support and guidance in identifying and scoping a project topic.	Gives a **clear** rationale for doing the project, making **some** links to the purpose of the project. Produces a **sound** description of the project objectives. Produces a **sound** project plan which is **detailed** and assigns timescales to the tasks. May have required **some** support and guidance in identifying a project topic.	Gives a **detailed** rationale for doing the project, consistently making **clear** links to the project. Produces a **detailed** description of the project objectives. Produces a **thorough** project plan showing **clearly** the realistic expected timescales for all of the tasks. Worked independently in identifying and scoping a project topic.
LO2: Know how to conduct research projects [1]		
MB1: 1 – 6 marks	**MB2: 7 – 11 marks**	**MB3: 12 – 15 marks**
There is **some** evidence of research. Produces a bibliography which shows evidence of the use of a **limited range** of resources which is partly **relevant** to the project. Gives a **basic** justification for the choice of resources and makes a **limited** check on the reliability of the resources.	There is evidence of **relevant** research. Produces a bibliography which shows evidence of the use of a **range** of resources which is **mostly relevant** to the project. Gives **clear** justification for the choice of resources and makes an attempt to check on their reliability.	There is evidence of extensive, **relevant** research. Produces a bibliography which shows evidence of the use of a **wide range** of resources which are consistently **relevant**. Gives a **detailed** justification for the choice of resources and **thoroughly** checks the reliability of the resources.

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LO3: Be able to carry out projects [2]		
MB1: 1 – 6 marks	**MB2: 7 – 11 marks**	**MB3: 12 – 15 marks**
An attempt has been made to meet the project objectives. The project record contains: ○ a **basic** description and explanation of the progress of the tasks ○ **limited** evidence of review of the original plan and any consequent amendments made as a result of problems encountered or feedback ○ **basic** articulation of the project objectives ○ **limited** use of technical language ○ some errors in spelling, punctuation and grammar which may detract from the clarity of the report The information in the project record is partly relevant and presented in a **basic** format. Draws upon **limited** skills/knowledge/understanding from other units in the specification.	**Some** of the project objectives have been met. The project record contains: ○ a **sound** description and explanation of the development of the project ○ **some** evidence of review of the original plan and any consequent amendments made as a result of problems encountered or feedback ○ **sound** articulation of the project objectives ○ **sound** use of technical language. ○ **occasional** errors in spelling, punctuation and grammar but insufficient to detract from the clarity of the report. The information in the project record is mostly relevant and presented in a **clear** format. Draws upon **some relevant** skills/knowledge/ understanding from other units in the specification.	**Most** of the project objectives have been met. The project record contains: ○ **thorough** and **clear** description and explanation of the development of the project ○ **detailed** evidence of review of the original plan and any consequent amendments made as a result of problems encountered or feedback ○ **detailed** articulation of the project objectives ○ **effective** and **thorough** use of technical terminology ○ **few**, if any, errors in spelling, punctuation and grammar so that the report is clear and coherent. The information in the project record is consistently relevant, and is organised and presented in a **coherent** format. **Clearly** draws upon **relevant** skills/knowledge/ understanding from other units in the specification.

LO4: Know how to review projects		
MB1: 1 – 6 marks	**MB2: 7 – 11 marks**	**MB3: 12 – 15 marks**
Produces a review of the project which: • makes **basic** reference back to the project objectives • shows **basic** understanding of what went well and what could have been improved ○ demonstrates **basic** understanding of the learning achieved as a result of completing the project ○ demonstrates **basic** understanding of the process	Produces a review of the project which: ○ makes **clear** reference back to the project objectives ○ shows **sound** understanding of what went well and what could have been improved ○ demonstrates **sound** understanding of the learning achieved as a result of completing the project ○ demonstrates **sound** understanding of the process	Produces a review of the project which: ○ consistently refers back to the project objectives ○ shows **thorough** understanding of what went well and what could have been improved ○ demonstrates **thorough** understanding of the learning achieved as a result of completing the project ○ demonstrates a **detailed** understanding of the process

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Guidance on synoptic assessment

Synoptic assessment is based upon demonstrating a broad understanding of the subject. This is achieved by drawing upon the skills/knowledge/understanding that have been studied across the specification and utilising them in an appropriate and relevant way to complete the assessment for this unit in order to meet the marking criteria for a specific Learning Outcome. When completing work for assessment, learners should be encouraged to apply the **relevant** skills/knowledge/understanding from other units within the specification and not seek to incorporate input from all the previously studied units or content unless it is appropriate to do so. When assessing the learner's work teachers should focus on whether the skills/knowledge/understanding applied are relevant. The links identified below are guidance only and learners may find other skills/knowledge/understanding that they are able to apply synoptically either in addition to or in place of this guidance.

[1] This section is supported by Unit R002 LO1 where learners develop the ability to use ICT based sources to carry out research.

[2] This builds on Unit R001 LO3 which develops an understanding of how ICT can be used to support working practices.

Assessment guidance

To complete the assessment of Unit R011 the learners need to produce a project record which must consist of; a project proposal form, project plan, record of research, project log, the actual project outcome and a project review. The suggested formats for these are given below. It is envisaged that learners will use word processing software to produce some or possibly all of this record. Other software may be used depending on the way they chose to present some evidence for assessment. For example they could choose to use a spreadsheet to present their project plan and timeline or a video diary to record the progress of their project. Learners should be encouraged to use software to produce their project record but this does not mean that hand written notes, designs etc cannot be included.

Software used to complete the project and to present the project outcome will depend on the topic the learner chooses to investigate. Learners have complete freedom to use whatever software is appropriate and to present the project outcome in a variety of formats.

What do learners need to produce (evidence)	Examples of format of evidence (this list is not exhaustive)
Project proposal form	• Written/typed form
Project plan	• Electronic file/evidence • Spreadsheet/PDF printout • Written/typed table
Record of research	• Written/typed bibliography
Project log	• Written/typed diary • Documented changes to project plans • Blog • Video diary • Feedback review notes • Presentation notes
Project outcome	• Blog • Video • Photographs • Witness statement/s • Annotated print screens • Drawn designs/sketches • Written/typed report • Presentation – visual or verbal • End user feedback questionnaires • PDF printouts
Project review	• Written/typed or recorded analysis

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Appendix C: Guidance for the production of electronic internal assessment

C

Structure for evidence

The centre assessed units are comprised of R002, the OCR-set task and Units R003-R011. For each learner, all the tasks together will form a portfolio of evidence, stored electronically. Evidence for each unit must be stored separately.

An internal assessment portfolio is a collection of folders and files containing the learner's evidence. Folders should be organised in a structured way so that the evidence can be accessed easily by a teacher or moderator. This structure is commonly known as a folder tree. It would be helpful if the location of particular evidence is made clear by naming each file and folder appropriately and by use of an index called 'Home Page'.

There should be a top level folder detailing the learner's centre number, OCR candidate number, surname and forename, together with the unit code (R002, R005 etc), so that the portfolio is clearly identified as the work of one learner.

Each learner's internal assessment portfolio should be stored in a secure area on the centre's network. Prior to submitting the portfolio to OCR, the centre should add a folder to the folder tree containing the internal assessment and summary forms.

Data formats for evidence

In order to minimise software and hardware compatibility issues it will be necessary to save learners' work using an appropriate file format.

Learners must use formats appropriate to the evidence that they are providing and appropriate to viewing for assessment and moderation. Open file formats or proprietary formats for which a downloadable reader or player is available are acceptable. Where this is not available, the file format is not acceptable.

Centre assessed tasks are designed to give learners an opportunity to demonstrate what they know, understand and can do using current technology. Learners do not gain marks for using more sophisticated formats or for using a range of formats. A learner who chooses to use only digital photographs (as required by the specification) and word documents will not be disadvantaged by that choice.

Evidence submitted is likely to be in the form of word processed documents, PowerPoint presentations, digital photos and digital video.

To ensure compatibility, all files submitted must be in the formats listed below. Where new formats become available that might be acceptable, OCR will provide further guidance. OCR advises against changing the file format that the document was originally created in. It is the centre's responsibility to ensure that the electronic portfolios submitted for moderation are accessible to the moderator and fully represent the evidence available for each learner.

Movie formats for digital video evidence
MPEG (*.mpg)
QuickTime movie (*.mov)
Macromedia Shockwave (*.aam)
Macromedia Shockwave (*.dcr)
Flash (*.swf)
Windows Media File (*.wmf)
MPEG Video Layer 4 (*.mp4)

Audio or sound formats
MPEG Audio Layer 3 (*.mp3)

Graphics formats including photographic evidence
JPEG (*.jpg)
Graphics file (*.pcx)
MS bitmap (*.bmp)
GIF images (*.gif)

Animation formats
Macromedia Flash (*.fla)

Structured markup formats
XML (*xml)

Text formats
Comma Separated Values (.csv)
PDF (.pdf)
Rich text format (.rtf)
Text document (.txt)

Microsoft Office suite
PowerPoint (.ppt)
Word (.doc)
Excel (.xls)
Visio (.vsd)
Project (.mpp)

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Appendix D: Marking criteria glossary of terms

D

Accurately	Acting or performing within care and precision; within acceptable limits from a standard
Advanced	Being at a high level; progressive
All	All relevant as described in the unit content for a specific area
Appropriate	Relevant to the purpose/task
Basic	The work comprises the minimum required and provides the base or starting point from which to develop. Responses are simple and not complicated; the simplest and most important facts are included
Basic	Gives the minimum required
Brief	Accurate and to the point but lacking detail/contextualisation/examples
Clear	Focussed and accurately expressed, without ambiguity
Comment	Present an informed opinion
Communicate	Make known, transfer information
Complex	Consists of several interwoven parts, all of which relate together
Comprehensive	The work is complete and includes everything that is necessary to evidence understanding in terms of both breadth and depth
Confident	Exhibiting certainty; having command over one's information/argument etc
Consider	Review and respond to given information
Considered	Reached after or carried out with careful thought
Create	To originate (e.g. to produce a solution to a problem)
Critical	Incisive – exposing/recognising flaws
Describe	Set out characteristics
Design	Work out creatively/systematically
Detail	To describe something item by item, giving all the facts
Detailed	Point-by-point consideration of (e.g. analysis, argument)
Discuss	Present, explain and evaluate salient points (e.g. for/against an argument)
Effective	Applies skills appropriately to a task and achieves the desired outcome; Successful in producing a desired or intended result
Efficient	Performing or functioning in the best possible manner with the least waste of time and effort; having and using requisite knowledge, skill and effort
Note on effective versus efficient: both express approval of the way in which someone or something works but their meanings are different. ***Effective*** *describes something which successfully produces an intended result, without reference to morality, economy or effort, or efficient use of resources.* ***Efficient*** *applies to someone or something able to produce results with the minimum expense or effort, as a result of good organisation or good design and making the best use of available resources*	
Evaluate	Make a qualitative judgement taking into account different factors and using available knowledge/experience
Explain	Set out the purposes or reasons
Extensive	Large in range or scope
Few	A small number or amount, not many but more than one

High	Advanced in complexity or development
Independent	Without reliance on others
Limited	The work produced is small in range or scope and includes only a part of the information required; it evidences partial, rather than full, understanding
List	Document a series of outcomes or events or information
Little	A very small amount of evidence, or low number of examples, compared to what was expected, is included in the work
Many	A large number of *(less than 'most' see below)*
Most	Greatest in amount; the majority of; nearly all of; at least 75% of the content which is expected has been included
Occasionally	Occurring, appearing or done infrequently and irregularly
Outline	Set out main characteristics
Plan	Consider, set out and communicate what is to be done
Present	1. Produce an exposition/resumé for an audience (e.g. at the conclusion of the project to demonstrate what has been done and the outcome) 2. Set out (project) aims, content, outcomes and conclusions clearly/logically for the use/benefit of others
Range	The evidence presented is sufficiently varied to give confidence that the knowledge and principles are understood in application as well as in fact
Reasoned	Justified, to understand and to make judgments based on practical facts
Relevant	Correctly focused on the activity
Simple	The work is composed of one part only, either in terms of its demands or in relation to how a more complex task has been interpreted by the learner
Some	About 50% of the content which would have been expected is included
Sound	Valid, logical, shows the learner has secured relevant knowledge/understanding
Support	Teacher gives training, instruction, guidance and advice as appropriate and monitors activities to assist learners in tackling/completing their projects, ensuring authenticity and a fair and accurate assessment
Thorough	Extremely attentive to accuracy and detail
Wide	The learner has included many relevant details, examples or contexts thus avoiding a narrow or superficial approach, broad approach taken to scope/scale; comprehensive list of examples given

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Your checklist

Our aim is to provide you with all the information and support you need to deliver our specifications.

- ☑ Bookmark **cambridgenationals.org.uk**
- ☑ Be among the first to hear about support materials and resources as they become available. Register for email updates at **cambridgenationals.org.uk**
- ☑ Join our social network community for teachers at **www.social.ocr.org.uk**

Need more help?

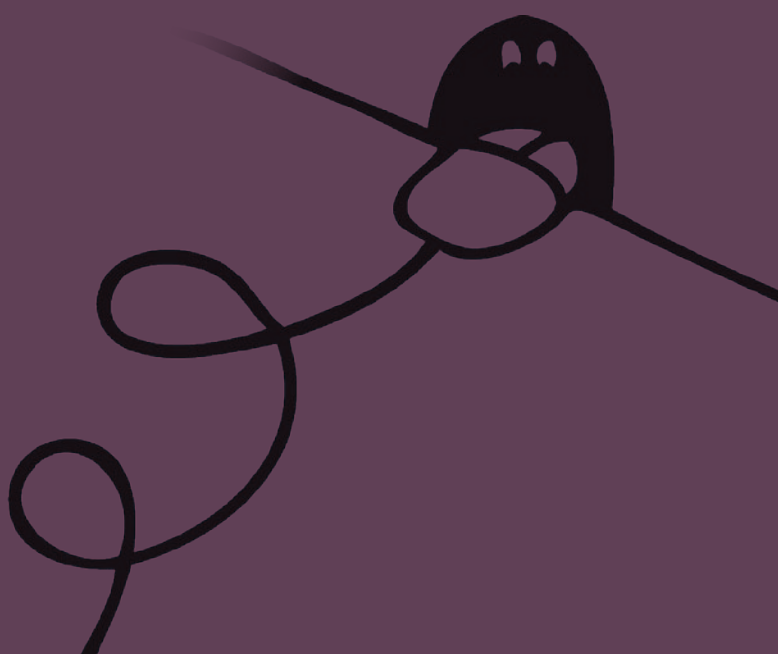
Here's how to contact us for specialist advice:

Phone: 02476 851509
Email: cambridgenationals@ocr.org.uk
Online: http://answers.ocr.org.uk
Fax: 01223 552627
Post: Customer Contact Centre, OCR, Progress House, Westwood Business Park, Coventry CV4 8JQ

What to do next

1) Sign up to teach – let us know you will be teaching this specification to ensure you receive the support you need. Simply complete the online form at **cambridgenationals.org.uk/signup**

2) Become an approved OCR centre – if your centre is completely new to OCR and has not previously used us for any examinations, visit **www.ocr.org.uk/centreapproval** to become an approved OCR centre.



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