GCSE

wjec
cbac

WJEC GCSE in

INFORMATION AND COMMUNICATION TECHNOLOGY

DESIGNATED BY QUALIFICATIONS WALES

SPECIFICATION

Teaching from 2017
For award from 2019

Version 3 March 2019

This Qualification Wales regulated qualification is not available to centres in England.

SUMMARY OF AMENDMENTS

Version	Description	Page number
2	Removal of *Grade Descriptions* to align with reformed GCSE qualifications and consequent re-numbering of sections from page 30.	30 onwards
3	'Awarding, reporting and re-sitting' section has been amended to clarify resit rules, carry forward of Controlled Assessment (NEA) marks and the terminal rule.	29

WJEC GCSE in INFORMATION AND COMMUNICATION TECHNOLOGY

For teaching from 2017

GCSE (Short Course) for award from 2019
GCSE for award from 2019

GCSE ICT (Wales)

SUMMARY OF ASSESSMENT

Unit 1: Understanding ICT
Single Award 20%; Short Course 40%
External Assessment: 1½ hours   80 Marks (40 UMS)

This examination paper will assess the requirements of the Key Stage 4 Programme of Study for Information and Communication Technology and the functional elements of ICT in a home and school context.

Unit 2: Solving Problems with ICT
Single Award 30%; Short Course 60%
Controlled Assessment: 22½ hours   80 Marks (60 UMS)

This controlled assessment consists of a portfolio of work which shows candidates' attainment in obtaining and interpreting different types of information; using, developing and communicating information to meet the purpose of their studies and presenting the results of their work. This assignment will assess the practical aspects of the functional elements of ICT.

Unit 3: ICT in Organisations
Single Award 20%
External Assessment: 1½ hours   80 Marks (40 UMS)

This examination paper will assess the 'application' content of ICT in a business and industry context.

Unit 4: Developing Multimedia ICT Solutions
Single Award 30%
Controlled Assessment: 22½ hours   80 Marks (60 UMS)

This controlled assessment will give candidates the opportunity to develop a piece of work using multimedia software following a single task brief issued by WJEC.

To obtain a **GCSE (Single Award)** in ICT, candidates are required to study Unit 1, Unit 2, Unit 3 and Unit 4.

To complete a **GCSE (Short Course)** in ICT, candidates are required to study Unit 1 and Unit 2.

Candidates may take Unit 1 and Unit 2:
- and cash-in for the short course specification
- before Unit 3 and 4 and cash-in for a full GCSE qualification at the end of the course
- in the same series as Unit 3 and Unit 4 and cash-in for a full GCSE qualification.

Where candidates have cashed-in Unit 1 and Unit 2 for the short course award, the outcomes from Unit 1 and Unit 2 cannot contribute to a full course award.

This unitised qualification will be available in the January series and the summer series each year. There will be an opportunity to enter for Unit 1 and Unit 3 in January 2019. Unit 1 and Unit 2 will be available in summer 2019 and the short course will be awarded for the first time in summer 2019. Unit 3 and Unit 4 will also be available in summer 2019 and the full qualification will be awarded for the first time in summer 2019.

ASSESSMENT OPPORTUNITIES

	Entry Code*		January 2019	Summer 2019
	Subject	Option*		
Unit 1	4331	01 or W1	✓	✓
Unit 2	4332	01 or W1		✓
Unit 3	4333	01 or W1	✓	✓
Unit 4	4334	01 or W1		✓
Single Award	4330	SA or GU		✓
Short Course	4339	SC or CB		✓

* Option Codes
English Medium 01, Welsh Medium W1 - for units
English Medium SA, Welsh Medium GU - for single award
English Medium SC, Welsh Medium CB - for short course

Qualification Designation Number
C00/0477/3 (Single Award); C00/0481/5 (Short Course)

GCSE INFORMATION AND COMMUNICATION TECHNOLOGY

1 INTRODUCTION

1.1 Rationale

A course in Information and Communication Technology offers a unique opportunity in the curriculum for candidates to identify and solve real problems by designing information and communication systems in a wide range of contexts relating to their personal interests. Information and Communication Technology develops candidates' interdisciplinary skills and their capacity for imaginative, innovative thinking, creativity and independence.

The specification encourages the investigation and study of Information and Communication Technology in a variety of contexts. In these contexts, the candidates are given opportunities to acquire competence, capability and critical skills through the creation, implementation, use and evaluation of a range of information and communication systems. Candidates from all cultures and both genders can develop their interest in, enjoyment of, and critical reflection about information technology as an integral part of modern society.

This specification has been developed by WJEC to provide the opportunity for candidates to obtain a qualification in:

GCSE (Single Award) Information and Communication Technology
or
GCSE (Short Course) Information and Communication Technology

Information and Communication Technology can be taken as an independent short course and successful candidates will be awarded a GCSE (Short Course) in Information and Communication Technology. The GCSE (Short Course) forms the core of the GCSE specification: it includes half the content of the GCSE (Single Award) and covers the full range of grades. The short course is designed to be delivered in approximately half the time of the single award.

GCSE (Single Award) candidates take two examination papers: for unit 1 and unit 3. They are also required to submit controlled assignments for unit 2 and unit 4.

GCSE (Short Course) candidates take only the unit 1 examination paper and are required to submit a controlled assignment for unit 2.

This specification:

(a)   is intended to be of interest to a wide range of candidates including those intending to study Information and Communication Technology, Applied Information and Communication Technology or Computing at AS or Advanced Level. All units are intended to be accessible to G grade pupils whilst providing some elements that will challenge those working at A*. Some pupils may go on to follow a higher education course or career in Information and Communication Technology or an associated area. Those with other interests and aspirations can also benefit from the many transferable skills inherent in the study of Information and Communication Technology;

(b)   builds upon the knowledge, understanding and skills established by the National Curriculum Key Stage 3;

(c)   promotes progression through the GCSE and provides a suitable foundation for the study of Information and Communication Technology, Applied Information and Communication Technology or a related area of study, at AS or Advanced Level and/or preparation for future employment and the world of work;

(d)   provides opportunities for candidates to gain a broad understanding of the skills, understanding and knowledge inherent in Information and Communication Technology;

(e)   encourages candidates to develop their critical thinking, to see the relationships between systems designer and user, and the role of Information and Communication Technology within the world in which we live;

(f)   provides opportunities to develop candidates' Key/Essential Skills, particularly those in problem solving, use of IT and communication. They will also have opportunities to develop their skills in application of number, working with others and improving own learning and performance;

(g)   assesses the functional elements of ICT;

(h)   is available through the medium of English and Welsh.

1.2 Aims and learning outcomes

Following a course in GCSE Information and Communication Technology should encourage learners to be inspired, moved and changed by following a broad, coherent, satisfying and worthwhile course of study. They should help learners to gain an insight into related sectors. They should prepare learners to make informed decisions about further learning opportunities and career choices.

This specification in ICT enables learners to:

- become independent and discerning users of ICT, able to make informed decisions about its use and aware of its implications for individuals, organisations and society
- acquire and apply creative and technical skills, knowledge and understanding of ICT in a range of contexts
- develop ICT-based solutions to solve problems
- develop their understanding of current and emerging technologies and their social and commercial impact
- develop their understanding of the legal, social, economic, ethical and environmental issues raised by ICT
- recognise potential risks when using ICT, and develop safe, secure and responsible practice
- develop the skills to work collaboratively
- evaluate ICT-based solutions.

This specification in ICT requires learners to demonstrate knowledge and understanding of:

- current and emerging technologies and their impact on individuals, organisations and society
- a range of ICT tools and techniques and the ways they are used in different contexts to develop ideas and solve problems
- legal, social, economic, ethical and environmental implications of the use of ICT for individuals, organisations and society, issues of risk, safety, security and responsible use of ICT
- collaborative working.

This specification in ICT requires learners to demonstrate the ability to:

- think creatively, logically and critically
- select, use and integrate ICT tools and techniques to meet needs
- find, select and evaluate information for its relevance, value, accuracy and plausibility
- manipulate and process data and other information, sequence instructions, model situations and explore ideas
- communicate data and information in a form fit for purpose and audience
- adopt safe, secure and responsible practice when using ICT
- develop appropriate and effective ICT-based solutions in a range of contexts
- evaluate their own and others' use of ICT.

1.3 Prior learning and progression

Although there is no specific requirement for prior learning, this specification builds upon the Programmes of Study for Information and Communication Technology in Key Stages 1-3. This specification may be followed by any candidate, irrespective of their gender, ethnic, religious or cultural background.

This specification is not age specific and, as such, provides opportunities for candidates to extend their life-long learning.

This specification builds upon the Programme of study for Information and Communication Technology in Key Stage 3 and allows candidates to fully address the knowledge, skills and understanding required by the National Curriculum Order for Information and Communication Technology.

Whilst there is no specific requirement for prior learning in the WJEC Advanced Subsidiary/Advanced GCE specification in ICT, Applied Information and Communication Technology or Computer Science, there is a clear progression route from this specification.

1.4 Equality and fair assessment

GCSEs often require assessment of a broad range of competences. This is because they are general qualifications and, as such, prepare candidates for a wide range of occupations and higher level courses.

The GCSE qualification and subject criteria have been reviewed to identify whether any of the competences required by the subject pose a potential barrier to any of the six equalities areas: race, religion/belief, disability, age, sexual orientation, gender. None were identified. Whilst it is acknowledged that some religious/belief groups and people with certain types of medical conditions do not engage with ICT, there are no barriers inherent in the qualification criteria that would prevent access to the qualification. Aspects of team work may be difficult for some learners but should not pose a barrier. Team work may be demonstrated through use of supportive and appropriate teaching strategies. Manipulating ICT manually is difficult for some disabled learners, but software and new technologies are available to overcome potential barriers and no part of the qualification is likely to require an exemption for disabled learners.

Reasonable adjustments are made for disabled candidates in order to enable them to access the assessments. Information on reasonable adjustments is found in the Joint Council for Qualifications document *Regulations and Guidance: Access Arrangements, Reasonable Adjustments and Special Consideration.* This document is available on the JCQ website (www.jcq.org.uk).

Candidates who are still unable to access a significant part of the assessment, even after exploring all possibilities through reasonable adjustments, may still be able to receive an award. They would be given a grade on the parts of the assessment they have taken and there would be an indication on their certificate that not all of the competences have been addressed. This will be kept under review and may be amended in future.

1.5 Classification codes

Every specification is assigned a national classification code indicating the subject area to which it belongs. The classification code for this specification is **2650**.

Centres should be aware that candidates who enter for more than one GCSE qualification with the same classification code will have only one grade (the highest) counted for the purpose of the School and College Performance Tables.

Centres may wish to advise candidates that, if they take two specifications with the same classification code, schools and colleges are very likely to take the view that they have achieved only one of the two GCSEs. The same view may be taken if candidates take two GCSE specifications that have different classification codes but have significant overlap of content. Candidates who have any doubts about their subject combinations should check with the institution to which they wish to progress before embarking on their programmes.

2   SPECIFICATION CONTENT

Unit 1

Content	The Learner can:
Data and Quality of data Data and information	Evaluate data for fitness for purpose, accuracy and bias. Understand - that data consists of raw facts and figures e.g. readings from sensors, survey facts, etc. - that information is data which has been processed by the computer - that knowledge is derived from information by applying rules to it - the need for good quality data; G.I.G.O. (Garbage In, Garbage Out).
Data validation	Identify: - data validation techniques for single user and online systems such as range checks, lookup checks, format checks, presence checks and check digits. - potential types of errors and understand methods for minimising the risk of errors
Home entertainment	Understand the use, services, input and output devices used with: - pay-to-view services, interactive services, e.g. shopping, betting, voting, dating - gaming: online, PC gaming and games consoles - basic digital photography: technology of capturing, storing and simple manipulation of images including cameras, megapixels, flash memory, display devices and photo editing software. - webcam services - social networking: Information needed to create accounts, services available - music and sound including downloading from the Internet and related issues - mobile phones - augmented reality systems - virtual reality. Describe the advantages and disadvantages of each of these services.
Home and Personal communication systems	Understand how computers can be connected to the Internet: - broadband - satellite - mobile communication - cable. Understand: 802.11 - Bluetooth - other emerging connection technologies - geographical Information systems (GIS). Describe the benefits, advantages and disadvantages of these technologies.

Home business	Understand the use of computers when carrying out: • online shopping and searching for products on websites • booking online • verification (passwords and online data entry forms). Describe advantages and disadvantages of online booking and shopping services.
Organisations: School, home, environment	Understand and describe the advantages and disadvantages of: • school registration systems • management information systems in schools • data logging in school activities • weather forecasting systems.
Emerging Technologies	Be aware of current and emerging technologies and their impact on themselves and others in the home, school and environment. Describe the advantages and disadvantages of emerging technologies at home, in school and the environment.
ICT and learning Understanding the desktop environment	Understand how to manage the desktop environment including features such as: • adjust window size, mouse settings, icon size, screen resolution, desktop fonts, colour, position, graphics, contrast and volume to meet their own needs • move, copy, delete, rename, files and folders • on-screen help • features of a control panel • print settings • password protection • shortcuts. Understand the features of and the advantages and disadvantages of: • online tutorials e.g. BBC bitesize • online assessment e.g. examinations • Virtual Learning Environments (VLEs) • Massive Open Online Courses (MOOCs).
Learning devices to support disabilities	Understand the uses of input devices such as: • braille keyboards • concept keyboards • specialist devices such as microphones • touch sensitive data entry devices.
Software to support learning disabilities Online and distance learning services	Understand the uses of: • voice recognition software • text to voice software • customised desktop environments.
Applications software	Understand and identify suitable sources of information, including files on physical media (e.g. disks / optical media / SD Cards), databases, cloud storage, the Internet. Understand the purpose and appropriate use of applications software.

Information handling software	Know when it is appropriate to: • update, append or delete records • sort information into Descending and Ascending order on one or more fields • interrogate databases using single and multiple criteria. Understand and appropriately use operators including = , < >, < , >, 'AND', 'OR', 'LIKE'. Understand and appropriately use wildcards (e.g. *). Understand and appropriately use parameters. Have a basic understanding of data types including number, text, date, time, currency, Boolean, lists, picture, sound, video. Identify fields and records in a file. Recognise and understand the purpose of the 'key field'. Search for information using tools such as search engines, keyword searches, etc. Understand: • the outputting of data in report formats • how simple calculated fields are produced • the purpose and suitable application of validation techniques such as 'lists', 'range checks', 'format checks' and 'input masks' for common fields. Understand the benefits of using information handling for: • faster access to data • variety of output formats • data integrity.
Security issues	Understand: • password protection and password protocols • access rights to data • backup and recovery procedures.
Email	Understand how to: • create an email • create a standard outgoing signature and message • send the email to one other email address • send a group email • use cc and bcc • use file attachments • forward mail to another email address • create and manage an address book • create and save contacts • organise and name email groups and folders.
Instant Messaging	Understand the use of messaging systems to share media and text (e.g. SMS).
Security	Discuss the advantages and disadvantages of using email Understand appropriate measures to prevent misuse e.g. viruses, abusive language. Understand that emails and messages can be encrypted. Understand the use of email as a DDoS attack mechanism. Understand the concept of email address spoofing.

Spreadsheet software	Understand:

Understand:
- the difference between labels, data and formula
- formulas and functions to calculate information such as SUM, MIN, MAX, AVERAGE, COUNT variants, or IF
- absolute and relative cell referencing
- appropriate formatting techniques e.g. borders, currency
- cell merging and splitting.

Understand the benefits of using spreadsheets for:
- changing information in a spreadsheet model to make and test predictions (What if investigations)
- generating different charts and graphs from suitable data
- accurate calculations
- auto recalculation.

Data logging and Control

Understand:
- the process of data logging
- different types of sensor and suitable uses for them
- how to write a sequence of instructions to control a screen image or external device appropriately
- the use of ICT to control and monitor areas of everyday living such as electronic toys, games, central heating systems, burglar alarms, learning thermostats, smart meters, computer control (non-feedback).

DTP Software

Understand the purpose and use of the following:
- spellchecker
- online thesaurus
- online translators
- mail merge
- automatic routines such as: headers and footers and pagination.

Recognise, use and where appropriate evaluate techniques such as:
- changes in font type, style and size
- justification (left, centre, fully justify)
- importing different file formats e.g. clipart, csv, txt, rtf, etc.
- tabulation
- tables
- borders
- single and double line spacing
- tracking and kerning
- manipulation of graphics such as resizing, cropping, rotating and mirror imaging
- autoshapes
- watermarks.

Web and Presentation Software

Understand the appropriate use of good practice in designing web and slide presentations including:
- sequencing instructions
- animations
- transition
- links
- consideration of target audience
- appropriate use of standard navigation techniques
- disability considerations e.g. sound, font style and sizes, pop up comments on images.

Legal and ethical issues	Understand issues concerning copyright misuse.
	• File-sharing
	• ripping and burning of optical media
	• copying of streams
	• infringements of copyright owner's rights

Staying Safe Online	Understand the dangers associated with:
	• the disclosure of personal data
	• misuse of images
	• using inappropriate language
	• Webcams.
	Understand codes of conduct for personal protection
	Prevent unauthorised access to hardware and software (e.g. firewalls)
	Discuss appropriate steps to avoid inappropriate disclosure of personal information.

Data protection issues	Know:
	• how to protect data from accidental destruction
	• how to protect data from deliberate damage caused by viruses and other types of malicious damage
	• how to protect stored or transmitted data from unauthorised access.

| **Health issues** | • State potential health hazards when using computers. |
| | • Suggest methods for prevention or reducing the risk of potential health hazards. |

Unit 3

Content	The Learner can:
Data and Quality of data Data and information	Understand • the potential benefits of encoding data and the reasons for doing it • the improved speed of access to data • the advantages and disadvantages of using Information and Communication Technology for storing data.

Data validation	Define validation and verification.
	Know the methods used for validation and verification and where they are appropriate.
	Describe the following:
	    Verification
	        o parity check
	        o double keying
	        o visual check
	    Validation
	        o batch totals
	        o hash totals
	Understand:
	• the possible sources of error which could exist
	• the techniques used to overcome these errors.

Data logging and Control	Understand: the use of ICT to control and monitor areas of everyday living such as • security systems, automatic doors, traffic control systems, car parking systems, greenhouse control systems and robotics, simulation (for example flight or driving) Discuss the advantages and disadvantages of: • computerised data logging • computer control (non-feedback **and** feedback)
Web and Presentation Software	Describe advantages and disadvantages of data compression techniques for images, movies, sound, pages and slides.

Web Software	Understand browser software:
	• URL
	• keyword searches
	• links
	• menus.

Analyse existing web pages.
Search for and search on web pages.
Make comparisons on house style, audience, size and techniques used.
Use interactive features such as online forms, email, games, quizzes and questionnaires.

Tools and Techniques for creating websites

Understand and use:
- master pages/templates
- home page
- site navigation
- golden triangle
- hyperlinks
- graphical hyperlinks/hotspots/rollover buttons and polygon links
- bookmarks/ anchors
- navigation bars
- leader boards
- banners
- web icons e.g. shopping trolley, email
- HTML
- plugins.

Discuss issues with hosting of websites and factors affecting uploading times.

Describe advantages and disadvantages of:
- the use of web pages and the different features used on them
- RGB colours; decimal and hexadecimal code used for colour.

Presentation software
Tools and techniques for creating slide presentations

Understand and use:
- design templates
- animation
- transitions and timings
- video and sound
- navigation bookmarks, hyperlinks and hotspots
- narration and speaker notes
- printing formats.

Describe advantages and disadvantages of presentation software.

Multimedia	Demonstrate an understanding and awareness of current developments in the multimedia industry and their effects on: • education • entertainment • business • society. Demonstrate an awareness of current and future trends in multimedia.
Multimedia components Hardware	Understand the requirements of multimedia systems in terms of: • screens: size and resolution • input devices: mouse, graphics tablets, touch sensitive input devices, motion sensing input devices, force sensitive input devices, microphones • features of digital still and video cameras, webcams, different megapixels, high dynamic range, multiple cameras, 3D imaging • Midi and other specialist input or output interfaces.
Memory requirements	Understand and make appropriate use of: • internal memory and backing store (both physical and remote)
Software	• digital photographic editing • movie making • animation • music • sound
Interactive components	• keyword searches • quizzes • questionnaire • games • links. Describe advantages and disadvantages of using multimedia software. Discuss differences between techniques for storing text, images, sound and video. Describe advantages and disadvantages of such techniques.
Digital imaging Vector and bit map graphics	Understand: • vector and raster graphical techniques and their implication for memory size and manipulation • pixel dimensions (pixels per inch/cm) and benefits and problems with resizing of images for optimum use • screen resolution and memory requirements for different backgrounds (transparent, white, colour). Describe advantages of vector graphics over bit mapped graphics
Tools and techniques for creating and manipulating still images	Use: • standard tools: zoom, selection, transforming, scaling and sizing, brush settings, distortion, moving, cloning, rotation, layering, toggling between layers • colour effects, colour palettes and gradient tools • imaging effects • transparency effects • composite patterning (repeated patterns). Understand the use, advantages and potential disadvantages of: bmp, jpeg, gif, tiff, eps and other common formats.

Animation
Origins of animation
Animation processes

Compare and contrast different animation techniques
Understand:
- the concept of persistence of vision
- flip books
- Stop Motion animation
- flash/Key frame animation
- 3D animation.

Uses in commercial and learning environments

Understand:
- film making and special effects industries
- VLEs, educational websites, MOOCs
- animations for the web
- identification through logos
- standard banners for web pages/leader boards.

Describe advantages and disadvantages of animation in commercial and educational environments.

Tools and techniques for creating animated images

Plan an animation: folder trees, story boards.
Show awareness of audience: mood boarding

Understand:
- the impact of variety of frame rates and looping
- vector and bit map animation
- claymation and pixilation techniques
- rotoscoping
- tweening and onion skinning
- grouping, cloning, backdrops.

Understand their use and advantages and potential disadvantages of different formats such as gif, cgm, png, etc.

Sound and music
Hardware

Understand:
- sound storage devices e.g. MP3 players
- music workstations
- sound cards
- input devices such as microphones and Midi interfaces including MIDI over USB
- speakers

Software

- sound conversion analogue to digital and digital to analogue
- sequencers (multitrack recording studios)
- samplers
- notators (music composition software)
- sound wave editors
- downloading music.

Discuss potential problems in the capturing and use of sound with respect to copyright.
Understand the use, advantages and potential disadvantages of different formats such as wav, wma, mp3, etc.

Networks	Appreciate the differences between local (LAN) and wide area (WAN) networks.
Types of network	
	Understand and describe computer network operation and devices such as:
	• network topologies including bus, star and ring
	• Internet / Intranet
	• routers
	• switches
Linking LANs and WANs	• gateways
	• bridges
	• packet switching.
Advantages and applications of networks	Compare the advantages and disadvantages of network systems against standalone computers.
	Understand and describe:
	• integrated point of sale (PoS) systems
	• automatic stock control systems.
Human Computer Interfaces (HCI's)	Understand the functions of an operating system
	Recognise and describe the features and uses of the different types of user interface including:
	• command line
	• GUI (graphical user interface)
	o WIMP (windows, icons, mouse/menu, pointer)
	o online tutorials
	o customised desktops
	• voice driven applications
	• menu/dialogue boxes
	• touch sensitive applications e.g. mobile phones, learning aids and PoS systems
	• biometrics e.g. retina, DNA, fingerprints etc.
	Discuss the advantages and disadvantages of each HCI.

Organisations	Demonstrate a knowledge and understanding of a variety of computer applications.

Know:
- how data is captured, checked and entered
- which processing method is used, i.e. batch, real time, real time transaction
- what the minimum hardware and software requirements are
- how the information is output
- what the security implications are.

Describe:
- suitable data, file or database structures
- suitable computer systems including data capture, output and communication devices
- suitable software tools and techniques used in the processing and presentation of the data
- suitable verification, validation and security and back-up systems associated with each of the following organisations or applications:

  - banking
  - e-commerce systems
  - payroll
  - modern mail handling methods
  - control processes(feedback)
  - robotics and bionics
  - Artificial Intelligence (AI) and expert systems
  - autonomous vehicles

Data protection methods

Know and understand:
- physical protection e.g. back ups
- restricted physical access e.g. biometric scans
- restricted access to data e.g. hierarchy of passwords and access rights, encryption, firewalls
- monitoring e.g. transaction logs.

Social and environmental impact

Reflect critically on the impact of ICT on their own and others' lives, considering the social, economic, political, legal, ethical and moral issues. Understand issues relating to:
- employment patterns
- retraining
- changes in working practices (collaboration)
- teleworking
- homeworking
- videoconferencing
- the environmental impact
- the impact on rich and poor communities
- emerging technologies.

Legal and ethical issues

Know and understand the:
- provisions of the Data Protection Act (DPA) 1998
  - o rights of the data subject and the holder
  - o exemptions from the DPA
- Computer Misuse Act 1990
- Electronic Communications Act 2000
- Regulation of Investigatory Powers Act 2000
- Freedom of Information Act 2000
- Health and Safety legislation

Identify new crimes created and the implications for computer users.

- pharming
- phishing
- ransomware

Emerging Technologies

Be aware of current and emerging technologies in business and commercial contexts.
Describe the advantages and disadvantages of emerging technologies in business and commercial contexts.

3 SCHEME OF ASSESSMENT

3.1 Classification codes

Assessment for GCSE Information and Communication Technology is untiered, i.e. all units cater for the full range of ability and allow access to grades A*-G.

The specification uses a range of assessment techniques to enable the candidate to respond graphically and in writing through practical and investigative work. Sixty per cent of the marks are based on internally-assessed controlled assignments which allow the candidates to experience an appropriate variety of roles relevant to information technology: user, designer, maker, manager and client. Assessment through controlled assignments will also enable centres to respond positively and quickly to developments in the field of information and communication technology. The remaining forty per cent of the final assessment will be by externally set examinations testing the full ability range.

Five per cent of the marks available in each of the external examinations and controlled assessments will be allocated to the assessment of the quality of the candidate's written communication (in English or Welsh as appropriate).

The scheme of assessment will consist of:

Unit 1 Understanding ICT
Examination 1½ hours **(Single Award 20%; Short Course 40%)**
WJEC will set a theory examination each session with questions related to a home and school context. The following areas may be assessed:
Data and information Data validation Verification (passwords and online data entry forms)
Home entertainment • Gaming • Basic digital photography • Webcam services • Social networking • Email • Music
Home and personal communication systems • Broadband and cable services • Wireless and Bluetooth technology • Mobile phones • Smartphones • GIS systems
Home business • Online shopping and search for and on websites • Booking online

<u>Organisations: School, home, environment</u>
    • School registration systems
    • Management information systems in schools
    • Data logging in school activities
    • Control systems (non-feedback) including sequencing instructions electronic toys, games, central heating systems, burglar alarms, smart meters
    • Weather forecasting systems

<u>ICT and learning</u>
    • Understanding the desktop environment
    • Learning devices to support disabilities
    • DTP, Presentation, Database, Spreadsheet and Multimedia software
    • Online/distance learning services

<u>Staying safe</u>
    • Online
    • Health issues
    • Issues concerning data protection
    • Copyright Act: Issues concerning copyright misuse
    • Codes of conduct for personal protection

<u>Emerging Technologies</u>

Unit 2 Solving Problems with ICT
Controlled Assessment 22.5 hours **(Single Award 30%; Short Course 60%)**

WJEC will set a different assignment each year to be completed using a range of software to demonstrate ability in the practical application of ICT skills.
The following areas will be assessed:

Organisation of folders and files
    Folders and files with correct names
    Sensible naming and use of subfolders and files
    Version management
    Evidence of at least two different folder operations (copy, move, rename, etc.)
    Backup work on an external device

Communicating Information
    Creation of a document and a presentation for different purposes
- At least one draft and final copy of each
- Review and make comments
- Final quality production responding to comments
- Accuracy and plausibility

    Use appropriate page layout and develop and format data
- Use fonts and sizes
- Use of simple formatting techniques e.g. bold, text alignment, colour, fonts
- Use word art or borders, autoshapes simple tables or original templates
- Simple bullets or numbering

    Use images, sound or video
- Insert, crop or resize and position an image fit for purpose
- Combine text with information in different forms *from a library* e.g. images, sound, Gif video

    Develop and format data
- e.g. Enhance tables with borders, cell merging, text direction or rotation; rotation or enhanced manipulation of images; customised bullets using *internal* facilities; numbering with subnumbering; Use of formulas in a document e.g. invoices, etc.
- Use a second different source for data e.g. digital image, sound, original graph, mailmerging, etc.
- Headers and footers OR Page numbering OR Macros *(play and record macros)*

Modelling
    Create and use a spreadsheet model
    Accuracy and plausibility
    Develop and organise numerical data fit for purpose
- Currency, %, Decimal places, or grid
- Use formula with single operator
- Simple function e.g. SUM, AVERAGE, MAX, MIN, RAND, etc.
- Relative referencing
- Create a chart with appropriate title legend axis labels and formatting.
- 'What if' investigation changing data
- 'What if' investigation changing formula
- Use of Date / time function
- Enhanced layout and format of the spreadsheet / enhanced grids/borders, merged cells, text wrap, headers or footers, forms
- Wider variety of functions or advanced features e.g. If, Multiple if, Lookup functions, form features, conditional formatting, goal seek, pivot tables, macros, absolute referencing, multilevel sorts, etc.

Information Handling

Use online information sources
- Use a URL for a purpose
- Use a search engine for different purposes
- Manage and use references to make information easier to find again
- Download, organise and store different types of information

Use other information sources
- Printed sources
- People

Databases
- Import data from a CSV file (or similar)
- Add extra fields and suitable data
- Accuracy and plausibility
- Obtain information fit for purpose using sort
- Obtain information fit for purpose using simple searches
- Obtain information fit for purpose using double searches (search within a search)
- Use logical operators and at least one wild card
- Add a validation technique
- Test validation technique with erroneous data to produce an error message
- Create an on-screen data entry form OR add additional functionality OR add enhancement (must be original, written code, not automatically generated).

Email
- Create and Send email
- Open and reply to email
- Check accuracy and plausibility
- Send to a group
- Attach a file to an email
- Open attachment
- Use a contacts list – add, amend and delete entry
- Contribute to blog or forum
- Forward an email
- Adapt style to suit purpose
- Manage groups and folders

Evaluation
- Evaluation of working practice
- Analysis of research methods and data collected
- Comments on modifications made
- Evaluation of any documents and presentations produced
- Analysis of data and information used in modelling and data handling
- Evaluation of other tools and techniques used
- Review of feedback given and received
- Suggestions for improvement

Unit 3 ICT in Organisations
Examination 1½ hours   **(Single Award 20%)**
WJEC will set a theory examination each session with questions related to a business and industry context. The following areas may be assessed:
Data, information and knowledge   - Data encoding   - Data validation and verification
Multimedia industries   - Digital imaging techniques   - Web authoring and creating business websites   - Animation
Networks   - LANs, WANs   - Bus, Ring and Star topologies   - Internet / Intranet   - Linking LANs and WANs: Integrated PoS systems and automatic stock control systems   - Advantages / disadvantages of the above
Social and environmental impact   - Employment patterns   - Homeworking   - Teleworking   - Videoconferencing   - Environmental impact   - Impact upon rich and poor communities
HCI's   - Operating systems   - GUI   - Command line   - Voice   - Biometrics
Organisations   - Banking   - e-commerce systems (business view)   - Payroll   - Modern postal handling methods   - Control processes (feedback) including security systems, automatic doors, traffic control systems, car parking systems, greenhouse control systems and simulation (for example flight or driving)   - Robotics and bionics   - AI and expert systems   - Data protection methods
Safety in organisations   - Legal issues   - Ethical issues   - Health and safety
Emerging Technologies

Unit 4 Developing Multimedia ICT Solutions
Controlled Assessment 22.5 hours **(Single Award 30%)**
WJEC will set a different assignment each year to be completed using multimedia software. The following areas will be assessed:
Research Analysis of existing contrasting websites or presentations Analysis of multimedia features used on existing websites or presentations
Design Identify a multimedia project Design web pages or a presentation
Template and Navigation Create navigation paths for 6 web pages or slides Edit an existing template/slide style design Select and use a navigation bar or tool
Graphical Images Create two images; optimise and save them in appropriate format for use in the web pages or presentation
Animation or Animated Movie Storyboard an animation or animated movie Create an animation or animated movie
Sound Create and manipulate sound or music
Additional Techniques Web/presentation effects Animation effects Movie effects Sound effects Interactive elements Enhancement with **original** code (must be original, written code, not automatically generated)
Evaluation Evaluation of working practice Description of the suitability and effectiveness of the features analysed Evaluation of tools and techniques used Review of feedback given and received Comments on modifications made Suggestions for improvement Evaluation of effectiveness of final solution Consideration of output to the web Consideration of download times and file size Justification of choice of image, sound and animation optimisation

3.2 Assessment Objectives

Candidates will be required to demonstrate their ability to:

AO1   Recall, select and communicate their knowledge and understanding of ICT.
AO2   Apply knowledge, understanding and skills to produce ICT-based solutions.
AO3   Analyse, evaluate, make reasoned judgements and present conclusions.

The weighting of assessment objectives across assessment components is as follows:

Single Award	Assessment	AO1	AO2	AO3	Total
Unit 1 Written Paper	20	15		5	20
Unit 2 Controlled Assessment	30		25	5	30
Unit 3 Written Paper	20	15		5	20
Unit 4 Controlled Assessment	30		25	5	30
Total Weighting	100%	30%	50%	20%	100%

Short Course	Assessment	AO1	AO2	AO3	Total
Unit 1 Written Paper	40	30		10	40
Unit 2 Controlled Assessment	60		50	10	60
Total Weighting	100%	30%	50%	20%	100%

3.3 Quality of written communication

For components involving extended writing Information and Communication Technology candidates will be assessed on the quality of their written communication within the overall assessment of that component.

Mark schemes for these components include the following specific criteria for the assessment of written communication:

- legibility of text, accuracy of spelling, punctuation and grammar, clarity of meaning
- selection of a form and style of writing appropriate to purpose and to complexity of subject matter
- organisation of information clearly and coherently, use of specialist vocabulary where appropriate.

4 AWARDING, REPORTING AND RE-SITTING

This is a unitised specification which allows for an element of staged assessment.

GCSE Single Award and Short Course qualifications are reported on an eight point scale from A* to G, where A* is the highest grade. The attainment of pupils who do not succeed in reaching the lowest possible standard to achieve a grade is recorded as U (unclassified) and they do not receive a certificate.

Candidates may resit an individual unit once only. The better uniform mark score from the two attempts will be used in calculating the final overall grade subject to the **terminal rule** being satisfied first i.e. that candidates must complete a minimum amount of the assessment for a qualification in the series in which they are cashing in. The terminal rule is set at 40% of the overall qualification for GCSE Information and Communication Technology. If the assessment being re-taken contributes to the 40% terminal rule requirement, the mark for the new assessment will count.

If any unit has been attempted twice and a candidate wishes to enter the unit for the third time, the candidate will have to re-enter all units and the appropriate cash-in(s). This is referred to as a 'fresh start'. When retaking a qualification (fresh start), a candidate may have up to two attempts at each unit. However, no results from units taken prior to the fresh start can be used in aggregating the new grade(s).

Marks for Controlled Assessment (NEA) may be carried forward for the life of the specification.

If a candidate has been entered for but is absent for a unit, the absence does not count as an attempt. The candidate would, however, qualify as a resit candidate.

Individual unit results are reported on a uniform mark scale (UMS) with the following grade equivalences:

GRADE	MAX.	A*	A	B	C	D	E	F	G
Unit 1	40	36	32	28	24	20	16	12	8
Unit 2	60	54	48	42	36	30	24	18	12
Unit 3	40	36	32	28	24	20	16	12	8
Unit 4	60	54	48	42	36	30	24	18	12

SUBJECT AWARD UMS

Single Award GCSE	MAX	A*	A	B	C	D	E	F	G
Subject Award	200	180	160	140	120	100	80	60	40

Short Course GCSE	MAX	A*	A	B	C	D	E	F	G
Subject Award	100	90	80	70	60	50	40	30	20

5 ADMINISTRATION OF CONTROLLED ASSESSMENT

Regulations for controlled assessment are defined for the three stages of the assessment:

- task setting
- task taking
- task marking

For each stage the regulatory authorities have specified a certain level of control to ensure authenticity and reliability.

The controlled assessments are untiered and differentiation is by outcome.

Task setting – high control

Controlled assessment components may contain more than one task. Tasks will be provided by WJEC. The tasks will allow opportunities for contextualisation to best suit centre-specific circumstances.

For units 2 and 4 a new controlled assignment will be released in September each year, beginning in September 2017. Each assignment is valid for two academic years.

Task taking – medium control

Authenticity control

Candidates must complete all work, with the exception of research, under informal supervision in the classroom. Although the teacher will not see every keystroke of every candidate, sufficient work must be seen by the teacher to verify it as the candidates' own. Research may be completed under limited supervision.

Centres are responsible for providing sufficient supervision to be able to give an assurance that the assessments submitted are based on the work of the candidates concerned.

The teacher responsible for the supervision of the candidates' work will be required to certify that the marks submitted were awarded in accordance with the assessment criteria and that she/he is satisfied that the work submitted is that of the candidate concerned.

Feedback control

Candidates are expected to work on their controlled tasks independently of their teacher although they can receive formative feedback. It is not permitted for candidates to draft work and re-submit it after it has been assessed by the teacher. There will, of course, be occasions when direct teacher intervention and support is necessary. In such cases, the details should be recorded on the assessment sheets and marks awarded must reflect the level of support given.

Time control

All controlled assessments must be carried out under time controlled conditions. The approximate duration of the task(s) is twenty-two and a half hours for Units 2 and 4. It is advisable that centres record the date and time of the assessments, the name of the supervisor(s), i.e. the subject teacher, and a log of any incidents which occurred during the course of the assessments.

Collaboration control

Candidates may collaborate in carrying out research activities and the work of the individual may be informed by discussions with others, but candidates must provide an individual response. Candidates will be asked to collaborate via email or similar technologies with a 'significant friend' who will provide feedback on some of the work they produce. The significant friend may be an end user but will usually be a fellow student.

Resources

It is accepted that certain parts of a candidate's work may be taken from other sources where these are relevant and appropriate. This is perfectly acceptable as long as all such cases are clearly identified in the text and fully acknowledged. Where phrases, sentences or longer passages are quoted directly from a source, it is important that candidates use quotation marks or acknowledge ideas are taken from the work of others. A datafile will be provided for use in the unit 2 controlled assessment. This will be a listing of names and addresses which candidates will be expected to contextualise as part of their assignment.

Task marking – medium control

Teachers mark the controlled assessments using mark schemes and guidance provided by WJEC. **Each unit will be assessed in accordance with the guidelines set out in Appendix 1 of this specification.** The teacher will mark the unit and ensure that there is sufficient annotation and documentation to enable the moderator to assess the unit accurately.

Centres following this specification must apply a consistent standard of marking across different teachers and teaching groups. Where more than one teacher is involved in assessment, centres are responsible for standardising assessments in order to ensure a single rank order of candidates for the centre as a whole.

It is necessary to provide some method of moderating internal assessments of candidates' work to ensure that no injustice occurs to candidates as a result of variation in the standards applied by different centres. For this specification, the internal assessment of units 2 and 4 will be moderated by inspection.

Work will be submitted for moderation in May of the year of the examination. Where fewer than eleven candidates are entered, **all** outcomes will be reviewed. Where more than this number is involved a sample will be moderated in the first instance.

Adjustments to the assessments submitted by a centre will normally ensure that the rank order is unaltered, and will be made to bring centre's assessments into line with the national standard. WJEC reserves the right to request that all submissions are seen if the exercise reveals problems which cannot be resolved by normal moderation procedures.

WJEC moderation will be consistent with the requirements of the Code of Practice for GCSE.

Submission of Controlled Assignments

The controlled assignment for Unit 2 may be submitted electronically or in hard copy. The controlled assignment for Unit 4 will be submitted for moderation electronically. Further details are to be found in the Teachers Guide which is available from WJEC.

Authentication of Controlled Assessments

Candidates are required to sign that the work submitted is their own and teachers/assessors are required to confirm that the work assessed is solely that of the candidate concerned and was conducted under the required conditions. A copy of the authentication form, which forms part of the cover sheet for each candidate's work will be provided by WJEC. It is important to note that **all** candidates are required to sign this form, and not merely those whose work forms part of the sample submitted to the moderator. Malpractice discovered prior to the candidate signing the declaration of authentication need not be reported to WJEC but must be dealt with in accordance with the centre's internal procedures.

Before any work towards the Controlled Assessment is undertaken, the attention of candidates should be drawn to the relevant JCQ Notice to Candidates. This is available on the JCQ website (www.jcq.org.uk) and included in *Instructions for Conducting Coursework/Portfolios.* More detailed guidance on the prevention of plagiarism is given in *Plagiarism in Examinations; Guidance for Teachers/Assessors* also available on the JCQ website.

6   THE WIDER CURRICULUM

Opportunities for the use of technology

The nature of ICT and the controlled assignments used for assessment provide opportunities for the use of a wide range of technology.

Spiritual, moral, ethical, social and cultural issues

This specification provides opportunities for candidates, through the study of Information and Communication Technology systems and applications, to develop an understanding of spiritual, moral, ethical, social and cultural issues as they relate to users of ICT.

The specification requires that candidates should be able to reflect critically on the impact of ICT on their own lives and others' considering the social, economic, political, legal, ethical and moral issues, specifically in relation to employment patterns, the need for re-training, changes in working practices such as homeworking, teleworking and videoconferencing. Codes of conduct in business are also studied.

Candidates are required to know and understand the provisions of the Data Protection Act 1998; study the Act, the rights of the data subject, the holder and the exemptions; know and understand the purpose of copyright law and the Computer Misuse Act; identify new crimes created and the implications for computer users.

Candidates are asked to consider the advantages and disadvantages of using Information and Communication Technology for storing, processing and transmission of data. Consideration is also given to how to protect data from deliberate damage caused by viruses and other types of malicious damage and how to protect stored or transmitted data from unauthorised access.

Citizenship

In this context citizenship is taken to include the development of social and moral responsibility, participation in community activity and development of political literacy. This specification is designed to make a contribution to the development of the knowledge, skills and understanding of citizenship. In particular, the Controlled Assignments will encourage pupils to take an effective part in school-based and community-based activities, showing a willingness and commitment to evaluate such activities critically. Aspects of the Controlled Assignments, for example, could be directly related to the needs of the school or local community, which would provide candidates with the opportunity to tackle problems which are real and meaningful to themselves. In doing so, they will be encouraged to demonstrate personal and group responsibility in their attitudes to themselves and others: they would also need to consider critically and constructively the views of others when developing and evaluating proposed solutions.

The specification content requires candidates to consider the social and moral consequences of the use of information and communication technology. For example, candidates should be able to suggest potential health hazards when using computers and be able to suggest methods for prevention or reducing the risk of potential health hazards in the electronic office. A number of issues including changes in working practices; attitudes to hacking, the spreading of viruses, computer fraud and copyright are also considered.

Environmental issues

Candidates will need to be aware of the effect that the use of ICT has on the environment.

Opportunities to consider environmental issues in this specification occur, for example, through the study of weather forecasting systems and the impact of ICT on rich and poor communities.

Health and safety consideration

Candidates would also be expected to consider health and safety issues when designing their own systems, particularly within the context of the Controlled Assignments.

Information and Communication Technology also provides opportunities to promote enterprise and entrepreneurial skills through the process of identifying an opportunity to design a system to meet a specific need, investigating the work of professional systems analysts and the IT industry, developing their own system and finally evaluating the whole process. Tasks linked to the Controlled Assignments provide opportunities to develop independent thinking skills, through candidates identifying relevant sources of information and developing specific performance criteria for their designs to guide their thinking.

The European dimension

Where appropriate this specification provides opportunities to address the European dimension, for example in the study of changes in working practices, teleworking, the economic impact of e-commerce and health and safety in the electronic office, is consistent with current EC agreements.

The approach used in constructing the specification lends itself to the establishment of links with other areas of study, particularly those involving problem solving or the use of ICT skills, knowledge and understanding for the completion of tasks and assignments in other GCSE specifications.

The above approach conforms with the aspirations expressed in the 1998 Resolutions of the European Community and the Ministers of Education meeting within the Council, concerning the European dimension in education and environmental education, particularly those intended at the level of member states.

Appendix 1 – Controlled Assessment

Unit 2: Solving Problems with ICT
Controlled Assessment - Mark Scheme

Quality of Written Communication
The quality of written communication is assessed as an integral part of the candidate evaluation and not as a standalone element using the following specific criteria:

- legibility of text, accuracy of spelling, punctuation and grammar, clarity of meaning.
- selection of a form and style of writing appropriate to purpose and to complexity of subject matter.
- organisation of information clearly and coherently, use of specialist vocabulary where appropriate.

Mark Grid		Indicative Content
File handling - 5 marks		
5	The candidate: follows efficient and safe working practices with folders, subfolders and files. They consistently use sensible names and version management They adopt a backup strategy and make appropriate use of media to backup and store files safely including email groups and folders.	The controlled assignment may specify details but candidates could include evidence of the following: • use of folders, subfolders and files with evidence of at least two different folder operations • sensible naming of files and folders • backup work to an external device • version management • organise emails, groups and folders.
3-4	has used files and folders efficiently and there is some evidence of the use of sensible naming conventions, version management, backing up and use of media to secure data.	
1-2	has used files but may not use folders at all and does not name files and folders sensibly. There is little evidence of efficient or safe working practices, backing up or use of media.	
0	Not worthy of credit.	
Research and data collection - 6 marks		
5-6	The candidate: used a wide range of appropriate sources showing discrimination in selecting and downloading information which is accurate and fit for purpose for use in documents, files and worksheets. They have used techniques efficiently to refine searches and make it easy to return to useful sites.	The controlled assignment may specify details but candidates could include evidence of the following: • use of online information sources • use a URL for a purpose • use search engines for different purposes • manage and use references to make it easier to find information again • download, organise and store different types of information • data collection from printed sources • data collection from other people.
3-4	used a range of appropriate sources to select and download relevant information which may be accurate or fit for purpose with some evidence of refining searches and organising information.	
1-2	used sources to collect information, some of which is relevant.	
0	Not worthy of credit.	

Email - 6 marks		
5-6	The candidate: can select and use software to open, create, send and respond to emails. Emails are accurate and fit for audience and purpose. They can open and add attachments and use a contacts list to send to a group	The controlled assignment may specify details but candidates could include evidence of the following where appropriate: • open email • save emails efficiently • create and send email • reply to email • send to a group • attach a file to an email • open attachment • use a contacts list – add amend and delete entry • forward an email • adapt style to suit purpose • contribute to blog or forum
3-4	can use software to open, create, send and respond to emails. Emails have few inaccuracies and are fit for audience or purpose. They can open and add attachments.	
1-2	can open, create and send emails.	
0	Not worthy of credit.	
Communicating Information - 16 marks		

12-16	The candidate:
	has developed a document and a presentation using appropriate content and features of the chosen software effectively. Accurate and plausible data has been entered and processed. Basic skills have been enhanced by the inclusion of a range of advanced skills to develop and format data effectively. They have used feedback from others to enhance their document and presentation so that they are fit for purpose and audience.
		The controlled assignment may specify details but candidates could include evidence of the following:
		• first draft of a document
		• final version of same document
		• a presentation sequencing a set of events using different sources of data
		• use of appropriate page layout and formatting of data e.g.
		   o fonts and sizes
		   o simple formatting techniques e.g. bold, text alignment, colour fonts
		   o word art or borders, autoshapes, simple tables or original templates
		   o simple bullets or numbering
		   o Insert, crop or resize and position an image fit for purpose
		• combine text with information in different forms *from a library* e.g. images, sound, Gif video
		• develop and format data e.g.
		   o enhance tables with borders, cell merging, text direction or rotation, rotation or enhanced manipulation of images, customised bullets using *internal* facilities, numbering with subnumbering.
		   o Use of formulas in a document e.g. invoices, etc.
		   o Use a second different source for data e.g. digital image, sound, original graph, mailmerging, etc.
		• headers and footers or page numbering or macros *(play and record macros).*

7-11	has developed a document and a presentation using appropriate content and a range of features of the chosen software. Accurate and plausible data has been entered and basic skills have been used with some advanced skills to develop, process and format data effectively. They have improved first drafts of their document and presentation but these may not be fully fit for purpose	
1-6	may have developed a document and a simple presentation, but they are not fit for purpose and data may be inaccurate or implausible. Some basic skills have been used to process data but there is limited evidence.	
0	Not worthy of credit.	

Modelling - 16 marks

	The candidate:	The controlled assignment may specify details but candidates could include evidence of the following:
12-16	has developed a complex spreadsheet model which suits the given audience. Accurate and plausible data has been entered and processed. Basic skills have been enhanced by the inclusion of a range of advanced skills. Testing has been carried out to show that the model is fit for purpose with 'what if' investigations changing both data and formulas. The model demonstrates efficient use of the features of the software.	Development of the model. Data entry. A range of basic skills e.g. - formatting, e.g. currency, or % decimal places - use formula with single operator - simple function e.g. SUM, AVERAGE, MAX, MIN, RAND, etc. - relative referencing - creation of a chart with appropriate title, legend, axis labels and formatting. 'what if' investigation changing data 'what if' investigation changing formula.
7-11	has developed a spreadsheet model for the given audience. A range of basic and some advanced skills have been used to enter and process accurate and plausible data. Some calculations may not be efficient. Some testing has been carried out but the model may not be fully fit for purpose. A 'what if' investigation has been used.	A range of more advanced skills e.g. - enhanced layout and format of the spreadsheet - enhanced grids/borders, merged cell, text wrap, headers or footers, forms. - more advanced functions e.g. IF, LOOKUP, COUNT, etc. - absolute referencing - goal seek - pivot tables - macros - further testing.
1-6	has developed a spreadsheet model but data may be inaccurate or implausible. Some basic skills have been used to process data and there is limited evidence that the model has been tested using investigations to show it is fit for purpose.	
0	Not worthy of credit.	

Data handling – 16 marks

12-16	The candidate:
	has imported data and used it in developing a datafile which suits the given audience. Accurate and plausible data has been entered and processed. Basic skills have been enhanced by the inclusion of a range of advanced skills. Testing has been carried out to show that the datafile is fit for purpose and can be used to search, sort, and print lists. The datafile demonstrates efficient use of the features of the software. Complex searches, sorts and validation are carried out for stated useful purposes.
		The controlled assignment may specify details but candidates could include evidence of the following:
		Importing data from csv file.
		A range of basic skills e.g.
		  • adding key field
		  • adding fields with suitable fieldnames
		  • adding suitable data types
		  • adding suitable data
		  • editing and deleting a record
		  • obtaining information fit for purpose using sort
		  • obtaining information fit for purpose using simple search.

7-11	has developed a datafile using imported data which suits the given purpose. A range of basic and some advanced skills have been used to enter and process accurate and plausible data. Some testing has been carried out but searches, sorts or validation may not be efficient, have a purpose or work correctly.	A range of more advanced skills e.g.
		  • create an on-screen data entry form
		  • add a validation technique
		  • testing that validation works
		  • use logical operators and at least one wild card
		  • sort on multiple fields

1-6	has developed a datafile but fields may not have been added. Data may be inaccurate or implausible. Some basic skills have been used to process data and the datafile may have been tested with a simple search or sort. There is limited evidence that it is fit for purpose.	• obtain information fit for purpose using double searches (search within a search)
		  • use of clearly explained logical operators
		  • Use of a wildcard in queries for a defined purpose
		  • use reports

0	Not worthy of credit.	• command buttons on forms or macros or reports • VB enhancements (must be original, written code)

Evaluation - 15 marks

11-15	The candidate: has written a clear, coherent evaluation making effective comments on the outcomes of all the tasks including feedback they have given and received. They have analysed the tasks and the methods they have used and suggested effective improvements, **both formative and summative,** to their work. They use appropriate terminology and accurate spelling, punctuation and grammar.	Evaluation may be iterative and/or summative. The controlled assignment may specify what should be evaluated but candidates could include the following: • evaluation of working practice • analysis of stages within tasks • analysis of research methods and data collected • comments on modifications made • evaluation of any documents and presentations produced • analysis of data and information used in modelling and data handling • evaluation of other tools and techniques used • review of feedback given and received • suggestions for improvement.
6-10	has made comments, evaluating the outcome of some of the tasks including on feedback either given or received. There is some analysis of the tasks and methods they have used but comments and suggestions for improvements lack clarity. They have used some terms were appropriate and there are a few errors in spelling, punctuation and grammar.	
1-5	has used everyday language and comments lack clarity, are poorly organised with significant errors in spelling, punctuation and grammar.	
0	Comments not worthy of credit.	

Unit 2 Solving Problems with ICT Outline Scheme of Assessment	
File handling	**5**
Research and data collection	**6**
Email	**6**
Communication information	**16**
Modelling	**16**
Data handling	**16**
Evaluation	**15**
Total	**80**

Unit 4: Developing Multimedia ICT Solutions
Controlled Assessment - Mark Scheme

Quality of Written Communication
The quality of written communication is assessed as an integral part of the candidate evaluation and not as a standalone element using the following specific criteria: • legibility of text, accuracy of spelling, punctuation and grammar, clarity of meaning. • selection of a form and style of writing appropriate to purpose and to complexity of subject matter. • organisation of information clearly and coherently, use of specialist vocabulary where appropriate.

Mark grid		Indicative content
Efficient working practice - 5 marks		
5	The candidate: follows efficient and safe working practices with folders, subfolders and files. They consistently use sensible names and version management They adopt a backup strategy and make appropriate use of media to backup and store files safely. They have provided a comprehensive log of sources they have used.	The controlled assignment may specify details but candidates could include evidence of the following: • use of folders, subfolders and files • sensible naming of files and folders • backup of work to an external device • version management • sources log.
3-4	has used files and folders efficiently and there is some evidence of the use of sensible naming conventions, version management, backing up and use of media to secure data. A log of sources used has been provided.	
1-2	has used files but may not use folders at all and does not name files and folders sensibly. There is little evidence of efficient or safe working practices, backing up or use of media. The sources log is either absent or limited.	
0	Not worthy of credit.	

Analysis and Research - 12 marks		
9-12	The candidate: has analysed at least two existing contrasting websites or presentations making relevant comments on the purpose, house style and target audience of each. They have described in detail a wide range of multimedia features used on these websites or presentations, comparing and contrasting design, layout and the features used in each.	The controlled assignment may specify details but candidates could include evidence of the following for each website or presentation: Description of: • the purpose • the house style • target audience. Comparison and contrasting the design and layouts used in each. e.g.
5-8	has analysed at least two existing contrasting websites or presentations making relevant comments on the purpose, house style and target audience of each. They have described a range of multimedia features used on these websites or presentations, comparing or contrasting some of the design, layout and features used.	• navigation • template design • hyperlinks or hotspots • anchors or bookmarks • rollover buttons • pop up comments • mood colours • number of pages • interactive features, etc.
1-4	has attempted analysis of two existing contrasting websites or presentations making some comment on the purpose, house style or target audience. They have described some multimedia features used on these websites.	Collection of evidence of examples of multimedia features used on these websites and/or existing presentations, e.g. • banners and/or animations • web icons • digital images • animations • movies • sound. Description detailing the type and size of these features.
0	Not worthy of credit.	

Design - 5 marks		
5	The candidate: has developed a comprehensive solution for the multimedia task, explained how it is fit for audience and purpose and justified their design decisions. They have provided detailed designs for their solution including master page style and mood colours.	The controlled assignment may specify details but candidates could include evidence of the following: • identification of a solution to the multimedia task • explanation of how or why their solution is fit for purpose and audience • design of master page style • design of mood colours.
3-4	has developed a detailed solution for the multimedia task with some explanation of how it is fit for audience and purpose or justification of their design decisions. They have provided designs for a master page style and mood colours.	
1-2	has developed a solution for the multimedia task and provided designs for a master page or mood colours.	
0	Not worthy of credit.	

Development - Template and Navigation - 12 marks

	The candidate:	The controlled assignment may specify details but candidates could include evidence of the following where appropriate:
9-12	has developed efficient navigation paths for the web pages or presentation. They have edited an existing template/slide style design and made good use of house style colours. They have selected and used a navigation bar or tools available in their chosen software and developed a standard navigation tool including colour scheme, hyperlinks and icons. They have entered suitable text.	- creation of navigation paths for 6 web pages or slides - editing an existing template/slide style design - use of house style colours - selection and use of a navigation bar or tool - use of navigation tools from a library of facilities provided by the software - editing the standard navigation tool to include:
5-8	has developed navigation paths for the web pages or presentation. They have edited an existing template/slide style design making some use of house style colours. They have used a navigation bar or tools available in their chosen software and edited a standard navigation tool. Suitable text has been entered.	- colour scheme - hyperlinks - icons - text fit for purpose.
1-4	has developed some web pages or presentation slides. There is some evidence of use of house style colours but navigation may be incomplete or missing. Text has been entered but is not fit for audience or purpose.	
0	Not worthy of credit.	

Development - Graphical images - 10 marks

	The candidate:	The controlled assignment may specify details but candidates could include evidence of the following:
8-10	has created two images one of which is a logo or web icon. One of the images has three layers and both are optimised and saved in an appropriate format. The images demonstrate efficient use of a wide range of features of the software and are fit for purpose and audience.	- one image: a logo or web icon created by the candidate - a second image created by the candidate - one of these images must be created with at least three layers. - both images optimised and saved in appropriate format - a range of software tools e.g.
4-7	has created two images one of which is a logo or web icon. One of the images has layers and both are saved in an appropriate format. The images demonstrate use of a range of features of the software and are fit for purpose and audience.	- standard shapes and or lines - fill tools - brush tools - text tools - selection tools - distortion tools
1-3	has created two images using features of the software but they may not be fit for purpose or audience.	- sizing or cropping tools - repeated patterning or cloning - transparency tools.
0	Not worthy of credit.	

Development - Animation or animated movie - 10 marks

	The candidate:	The controlled assignment may specify details but candidates could include evidence of the following:
8-10	has created a storyboard for an animation or animated movie and developed this animation with at least three techniques or elements. The animation is fit for purpose and audience and includes an explanation of the timing and /or frame rate used and an animated moving banner combining text and graphics.	• a storyboard for an animation or animated movie • an animation or animated movie created by the candidate with one of the following:
4-7	has created a storyboard for an animation or animated movie and developed this animation using techniques or elements available in the software. The animation is fit for purpose or audience and includes an animated moving banner combining text and graphics which may not work correctly. Some attempt has been made to explain the timing and /or frame rate used.	• an animation from clipart using evidence of at least 3 different techniques, e.g. cloning, onion skinning, tweening, etc. • a stop frame animation with at least 3 frames showing movement • a flash animation with at least 3 frames showing movement and
1-3	may have created a storyboard and there is some evidence of animation created by the candidate.	• an explanation of timing and/or frame rate used • an animated moving banner combining text and graphics.
0	Not worthy of credit.	

Development - Sound - 3 marks

	The candidate:	The controlled assignment may specify details but candidates could include evidence of the following:
3	has created and manipulated sound, music or narration which is fit for purpose and audience.	• use of sound, music or narration • editing of sound, music or narration to produce an original sound file.
2	has created and manipulated sound, music or narration.	
1	has used sound, music or narration.	
0	Not worthy of credit.	

Development - Additional techniques - 9 marks		

7-9	The candidate:
	has enhanced their work with the use of a wide range of additional tools or techniques which may be: web/presentation effects; animation effects; movie effects; sound effects; interactive elements; or enhancement with original code. Each use is fit for purpose and audience.
		The controlled assignment may specify details but candidates could include evidence of the following:
		• Web/presentation effects:
		   o rollover buttons or polygon hotspots
		   o special effects added to objects e.g. shadow, raised/outer glow.
		   o use of drop down boxes or expanding collapsing menus of at least two choices
		   o hyperlinks in the form of text or graphics to external files.

3-6	has enhanced their work with the use of a range of additional tools or techniques which may be: web/presentation effects; animation effects; movie effects; sound effects; interactive elements; or enhancement with original code. Each use is fit for purpose or audience	• Animation effects:
		   o more complex animation of at least six frames or techniques or a mixture of both
		   o use of background or overlay frames
		   o looping or repeating techniques

1-3	has used some additional tools or techniques which may be: web/presentation effects; animation effects; movie effects; sound effects; or interactive elements.	• Movie effects:
		   o title or credits
		   o video or transition effects
		• Sound effects:
		   o envelopes, echo, etc.
		   o looping or repeating
		   o overlay tracks
		   o podcasting

0	Not worthy of credit.	• Interactive element(s) from a library • Enhancement with original code e.g. HTML, visual basic (must be original, written code). *NB Other techniques/tools may be acceptable upon application to WJEC.*

	Evaluation - 14 marks	
11-14	The candidate: has written a clear, coherent evaluation making effective comments on the outcomes of all the tasks including feedback they have given and received. They have suggested effective improvements, **both formative and summative,** to their work. They use appropriate terminology and accurate spelling, punctuation and grammar.	Evaluation may be iterative and/or summative. The controlled assignment may specify what should be evaluated but candidates could include the following: - evaluation of working practice - description of the suitability and effectiveness of the features analysed - evaluation of tools and techniques used - review of feedback given and received - comments on modifications made - suggestions for improvement - evaluation of effectiveness of final solution - consideration of output to the web - consideration of download times and file size - justification of choice of image, sound and animation optimisation.
6-10	has made comments, evaluating the outcome of some of the tasks including on feedback either given or received. Some suggestions for improvements are made but comments lack clarity. They have used some terms where appropriate and there are a few errors in spelling, punctuation and grammar.	
1-5	has used everyday language and comments lack clarity, are poorly organised with significant errors in spelling, punctuation and grammar.	
0	Comments not worthy of credit.	

Unit 4 Developing Multimedia ICT Solutions Outline Scheme of Assessment	Marks
Efficient working practice	**5**
Analysis and Research	**12**
Design	**5**
Development – Template and Navigation	**12**
Development – Graphical images	**10**
Development – Animation or animated movie	**10**
Development –Sound	**3**
Development – Additional techniques	**9**
Evaluation and QWC	**14**
Total	**80**