OCR
RECOGNISING ACHIEVEMENT

Applied AS/A Level GCE

GCE in Applied ICT

OCR Advanced Subsidiary GCE in Applied ICT H115

OCR Advanced Subsidiary GCE in Applied ICT (Double Award) H315

OCR Advanced GCE in Applied ICT H515

OCR Advanced GCE in Applied ICT (Double Award) H715

October 2009

QAN 100/4434/6
QAN 100/4435/8
QAN 100/4436/X
QAN 100/4437/1

Contents

Contents

Contents

Vertical black lines indicate a change to previous versions of the specification. Changes can be found on pages 125, 126, 233, 234 and 235.

1 About these Qualifications

This booklet contains OCR's Advanced Subsidiary GCE, Advanced Subsidiary GCE (Double Award), Advanced GCE and Advanced GCE (Double Award) specifications in Applied ICT for teaching from September 2009.

The specifications build upon the broad educational framework supplied by the Qualification and Subject Criteria (QCA, DCELLS and CCEA, 2002) and employ an investigative and problem-solving approach to the study of the subject. In addition to providing a suitable route for progression for candidates completing GCSE ICT A, ICT B or Applied ICT, the course of study prescribed by these specifications can also reasonably be undertaken by candidates beginning their formal education in the subject at post-16 level. Progression through the Advanced Subsidiary GCE and Advanced GCE, through either a single or double award, may provide a suitable foundation for study of the subject, or related subjects, in further and higher education.

Key Skills are integral to the specifications and *the main* opportunities to provide evidence for the separate Key Skills qualification are indicated.

1.1 The AS GCE

The Advanced Subsidiary (Single and Double Award) GCEs are both 'stand-alone' qualifications and also the first half of the corresponding Advanced (Single and Double Award) GCEs. The AS GCE is assessed at a standard appropriate for candidates who have completed the first year of study (both in terms of teaching time and content) of the corresponding two-year Advanced GCE course, i.e. between GCSE and Advanced GCE.

The AS GCE is made up of **three** mandatory units which form 50% of the corresponding six-unit Advanced GCE.

The AS GCE (Double Award) is made up of **four** mandatory units and **two** optional units which form 50% of the corresponding twelve-unit Advanced GCE (Double Award).

The skills, knowledge and understanding required for the first half of an Advanced GCE course are contained in the 'Advanced Subsidiary' (AS) units. The level of demand of the AS examination is that expected of candidates half-way through a full Advanced GCE course of study.

1.2 The Advanced GCE

The Advanced GCE is made up of **three** mandatory units at AS and **three** further units at A2.

The Advanced GCE (Double Award) is made up of **four** mandatory and **two** optional units at AS and **six** further units at A2.

The skills, knowledge and understanding required for the second half of an advanced GCE course are contained in the 'A2' units. The level of performance expected, therefore, reflects the more demanding Advanced GCE material, including the higher-level concepts and a requirement to draw together knowledge and skills from across the course. The precise pattern across AS and A2 reflects the nature of individual subjects.

The combination of candidates' attainments on the relatively less demanding AS units and relatively more demanding A2 units lead to an award at Advanced GCE standard.

1.3 Qualification Titles and Levels

These qualifications are shown on a certificate as:

- OCR Advanced Subsidiary GCE in Applied ICT.
- OCR Advanced Subsidiary GCE (Double Award) in Applied ICT.
- OCR Advanced GCE in Applied ICT.
- OCR Advanced GCE (Double Award) in Applied ICT.

All qualifications are Level 3 in the National Qualification Framework (NQF).

1.4 Aims

All specifications in Applied ICT aim to encourage candidates to develop broad skills, knowledge and understanding of the ICT sector. They are to prepare candidates for further study or training.

The aims of these specifications are to encourage candidates to:

- Develop a broad range of ICT skills and knowledge of the uses of ICT in vocational contexts, as a basis for progression into further learning in ICT-related fields, including progression from AS to A2;
- Develop knowledge and understanding of the components, functions and applications of information systems within a range of organisations;
- Develop an understanding of the main principles of solving problems using ICT and develop the skills necessary to apply this understanding.

In addition, the aims of the Advanced GCE specification in Applied ICT are to encourage candidates to:

- Apply their knowledge and understanding of ICT and use skills (eg planning, research, evaluation, problem solving) in vocational contexts;
- Develop an understanding of the impact of information systems on organisations' personnel, policies and practices;

- Develop project management skills and an understanding of the need to work with others.

In addition, the aims of the Advanced GCE (Double Award) specification in Applied ICT are to encourage candidates to develop their understanding of:

- Software system design to meet the needs of an end user

  and/or

- Networks and communications.

1.5 Prior Learning/Attainment

Candidates entering this course should have achieved a general educational level equivalent to Level 2 in the National Qualifications Framework, or Levels 7/9 of the National Curriculum. Skills in Numeracy/Mathematics, Literacy/English and Information and Communication Technology will be particularly relevant. However, there is no prior knowledge required for this specification. Prior study of the GCSE in ICT or Applied ICT may be of benefit to some candidates, but is not mandatory.

2 Summary of Content

2.1 AS Units

Unit G040 *Using ICT to communicate*

- The information age;
- Communication of information;
- Accuracy and readability;
- Styles of presentation;
- How organisations present information;
- Standard ways of working.

Unit G041 *How organisations use ICT*

- Types of organisation;
- Functions within organisations;
- Information and its use;
- ICT systems;
- The impact of ICT on working practices;
- The impact of ICT on methods of production;
- Legislation.

Unit G042: *ICT solutions for individuals and society*

- Public-service websites;
- Search engines;
- Databases;
- Use of spreadsheet facilities;
- Development of spreadsheets to present results of data analysis;
- Presentation of the results of an investigation.

Unit G043: *System specification and configuration*

- Hardware;
- Software;
- Basics of software development;
- Safety and security.

- Information;
- Software;
- Quality procedures;
- Systems;
- Evaluation of the solution.

Unit G045: *Software development – design*

- Feasibility studies;
- The investigation stage;
- Structured analysis;
- Design of forms and layouts;
- Producing a conclusion.

Unit G046: *Communicating using computers*

- Acronyms and technical terms used in communicating using computers;
- The internet and intranets;
- The internet and communications systems;
- Web server requirements;
- Internet tools;
- Internet websites;
- Setting up a computer system for use on the internet.

Unit G047: *Introduction to programming*

- Programming languages;
- Program structure.

2.2 A2 Units

Unit G048: *Working to a brief*

- Understand a set brief and plan to meet the requirements of the brief;
- Identification of skills;
- Work with others;
- Plan, develop and deliver a project;
- Continual evaluation of work;
- Production of a summative project.

Unit G049: *Numerical modelling using spreadsheets*

- Develop a working specification;
- Use of spreadsheet facilities;
- Design and development of spreadsheets;
- Implement a spreadsheet solution;
- Present spreadsheet information;
- Test spreadsheets;
- Document the development;
- Candidates evaluate the effectiveness of their solution and performance.

Unit G050: *Interactive multimedia products*

- Review and evaluate interactive multimedia products;
- Consider design;
- Design an interactive multimedia product;
- Create elements of an interactive multimedia product;
- Author an interactive multimedia product;
- Test and document product;
- Review final product.

Unit G051: *Publishing*

- Document types and presentation styles;
- Combining information;
- Researching a brief, planning a response and presenting solutions;
- Final printed output.

Unit G052: *Artwork and imaging*

- Developing artwork and images;
- Editing artwork and images;
- File formats;
- Final printed output;
- Laws and guidelines;
- Researching a brief, planning a response and presenting solutions.

Unit G053: *Developing and creating websites*

- Web server requirements;
- Planning a website;
- Designing and documenting a website;
- Creating a website;
- Testing a website;
- Uploading a website;
- Evaluation;
- Laws and guidelines.

Unit G054: *Software development*

- Initial/feasibility study;
- Analysis and design;
- Implementation and maintenance.

Unit G055: *Networking solutions*

- Computer networks;
- Network design;
- Network software;
- Safety and security.

Unit G056: Program design, production and testing

- Program specification;
- Program design;
- Programming;
- Planning a test strategy;
- Testing;
- Technical documentation;
- Program evaluation and review.

Unit G057: Database design

- Database concepts;
- Logical data modelling;
- Normalisation;
- Relational database structures;
- Relational database construction;
- Testing;
- Documentation.

Unit G058 Developing and maintaining ICT systems for users

- Components of microcomputer systems;
- Compatibility and other factors;
- Meeting a user's needs;
- Upgrading;
- Simple hardware faults.

Unit G059 ICT solutions for people with individual needs

- Types of disability;
- Types of need;
- ICT usage;
- Equipment;
- Software;
- Customising software;
- Legislation.

3 Unit Content

3.1 AS Unit G040: *Using ICT to communicate*

This unit helps candidates to:

- Understand the characteristics and significance of different types of information;
- Understand the different methods for communicating information and the technologies that support them;
- Create original communications in styles that suit the users;
- Improve the accuracy, readability and presentational quality of communications created;
- Understand some of the ways organisations present information and why they use standard layouts for documents;
- Choose and apply standard layouts;
- Understand the need for standard ways of working;
- Develop good practice in the use of ICT.

Candidates will use their presentation knowledge and skills to create a portfolio of different communications, including a presentation on different methods of communicating information and the technologies that support them. They should also compare a collection of standard documents used by organisations. The communications they create and compare need to have sufficient content to enable them to fully demonstrate their presentation knowledge and skills.

Throughout this unit, the terms *communication, presentation, document* and *report* should be taken to mean any appropriate method of communicating information.

This unit provides the basis for all the other units. Candidates will produce:

- a report comparing **two** types of business document from **each** of **three** organisations;
- **six** original communications for different purposes that demonstrate a range of writing and presentation styles and that would be communicated by different methods; the subject of **one** needs to be the different methods of communicating information and the technologies that support them, to include:
  - information sources, plans and annotated draft copies of documents/communications to show their development to meet their purpose;
  - final versions of documents / communications that meet their purpose;
  - appropriate use of a range of software tools and techniques to achieve the desired impact;
  - an evaluation of the documents / communications produced and their performance in completing the task;
  - explanations of the technologies that support different methods of communication.

The information age

We live in the information age. As individuals, we are bombarded by information in many different forms. Candidates need to learn about the characteristics and significance of different types of information including:

- Written;
- Multimedia;
- Graphical;
- Video;
- Audio;
- Web-based.

Candidates need to learn about the methods by which information is communicated such as:

- Paper-based;
- Screen-based;
- SMS (short message service – telephone text messaging);
- MMS (multimedia messaging service)
- Radio;
- Television;
- Telephone;
- E-mail;
- WWW (World Wide Web);
- RSS feeds (Really Simple Syndication – Rich Site Summary);
- Blogs (web logs);
- Podcasts;
- Virtual learning environments (VLE);
- Real time public information systems.

Candidates need to learn about the technologies that support these forms of communication including:

- Personal computers;
- Touch screens;
- Digital broadcasting (digital television, DAB (digital audio broadcasting)
- DVD (digital versatile disk – digital video disc);
- HD (high definition) / blue ray disks
- Mobile phones, including 3G phones;
- Audio/video compression technologies
- The internet;
- WAP (wireless application protocol).

Candidates also need to learn how to communicate information, both on paper and electronically, using appropriate formats.

Communication of information

Candidates know what they want to communicate. How should they express it? There are **three** important things to remember when preparing information:

- Who is to receive it (the audience);
- The purpose of the communication;
- The method that will be used to communicate the information.

Candidates need to know their audience and use the right kind of language. Unusual words might impress the reader of a job application, but they might annoy someone wanting directions to their house. Candidates also need to consider the purpose of the communication and think about the style of language to use. Formal purposes demand a formal style.

Candidates need to use different writing styles to meet different needs and need to learn how the following needs and document structures affect writing style:

- Attracting attention;
- Setting out facts clearly;
- Writing to impress;
- Summarising information;
- Creating a questionnaire;
- Collecting information from individuals;
- Explaining technical details;
- Writing a reminder;
- Preparing a report;
- Ordering or invoicing goods.

Accuracy and readability

It is important that information is accurate. Inaccuracy of information can mislead or annoy readers. Common mistakes are incorrect spelling and missing or incorrect punctuation.

Spell-checkers help to correct spelling and punctuation. Spell-checkers detect words spelt incorrectly and repeated words, e.g. ‘and and’.

Sometimes a spell-checker will suggest that a word is incorrect when the user knows it is correct. This often happens with *proper names*, for example ‘OCR’ or ‘Caine’. Candidates need to create a special personal dictionary, additional to the main dictionary, which contains any unusual words they may wish to use.

Spell-checkers do not detect when a word is used wrongly or when a capital letter is omitted at the start of a sentence. It will not correct 'capitol' for 'capital' or 'there' for 'their' or 'to' for 'too'. To correct this type of error, candidates need to use software that can check grammar. This type of software can help to make sure that:

- Sentences end with only **one** full stop;
- There is a capital letter at the beginning of a sentence;
- Sentences have a subject and a verb that agree;
- Common errors are avoided like writing 'you and I' when it should be 'you and me';
- For direct effect, writing is in the active voice rather than the passive;
- The readability statistics meet the needs of the readers.

ICT facilities for checking the accuracy of documents do not guarantee that there are no errors. To check that the document makes sense, is correctly laid out and meets the purpose candidates also need to proof-read their documents.

Styles of presentation

It is important to present information clearly – it may annoy or confuse readers if information is presented poorly. Common mistakes are using inconsistent headings or layout and using widely different fonts and point sizes. Candidates need to think about what they want to achieve with their communication and what will appeal to their audience.

There are several essential features that affect presentation style. Candidates need to use or modify these to attain a presentation style to suit the purpose, including:

- Page layout;
- Graphic images;
- Textual styles;
- Special features;
- Paragraph formats;
- Position of common items.

Candidates can create an effective page layout by using suitable:

- Margins;
- Headers and footers;
- Page orientation;
- Paper size;
- Pagination;
- Gutters.

Candidates can create suitable textual styles by careful selection and use of:

- Fonts;
- Heading and title styles;
- Bold, italic and underline;
- Superscript and subscript;
- Text orientation;
- Text animation (on screen).

Candidates can create a variety of presentation styles by using different paragraph formats including:

- Tabs and indents;
- Paragraph numbering;
- Widows and orphans;
- Justification;
- Spacing before/after;
- Use of tables;
- Bullet points;
- Line spacing;
- Hyphenation.

Candidates can make use of special features to develop special presentation styles, including:

- Borders;
- Shading;
- Background colour;
- Text colour;
- A contents page;
- An index;
- A bibliography;
- An appendix;
- Text/picture boxes.

Candidates can use a variety of different types of media to improve presentation style, including:

- Graphs or charts;
- Lines or borders;
- Video clips;
- Pictures;
- Drawings;
- Digital photographs;
- Clip art;
- Scanned images;
- Sound.

Candidates need to understand how to position important items on a communication, including:

- References;
- Signatures;
- Dates;
- Logos;
- Addressee names;
- Headings.

Candidates need to know how and when to use any of these techniques in a communication. They may need to create many communications before they are able to judge when to use particular techniques.

Candidates also need to learn:

- How to create templates to standardise styles of presentation;
- When to use existing information;
- How to select and adapt existing information to the needs of their communication;
- When to create original information;
- When to blend existing and original information;
- How to maintain a consistent style throughout a communication;
- How to combine text, sound, graphics, video and number information harmoniously.

Candidates need to evaluate the communications they produce in terms of:

- Their suitability for the intended audience;
- Their effectiveness in getting the message across.

Candidates then need to consider how they could produce more effective communications in the future.

How organisations present information

Organisations range from multinationals to local shops. In all organisations, a group of people work together to make something or provide a service. They all need to manage information. Candidates need to learn about:

- Why, and how, organisations present information both within, and outside, the organisation;
- Typical uses of illustrations, technical drawings, pictures and artwork;
- Commonly-accepted standards for the layout of formal documents;
- Essential information that appears on formal documents;
- Methods of presenting a corporate image;
- How templates might be used to enforce corporate standards.

Organisations use many different types of document. Candidates need to show their understanding of writing style, presentation style and common standards for layout in documents such as:

- Publicity flyers;
- Questionnaires;
- Business letters;
- Newsletters;
- Visual presentations;
- Brochures;
- Itineraries;
- Forms to collect information from people;
- Business reports;
- Technical specifications;
- Web pages;
- Multimedia presentations.

Standard ways of working

Many organisations have rules and guidelines to help people work effectively and avoid problems. These are known as 'standard ways of working'. They are very important for people working with ICT.

There are many reasons for having standard ways of working in ICT. The most important is that information in ICT systems can be easily lost or misused, for example:

- Unauthorised persons may gain access to confidential information;
- People may copy original work and present it as their own;
- Data files may be lost, corrupted by a virus or damaged in other ways;
- Computers may be damaged so that data stored in them cannot be recovered;
- Information presented professionally may be believed, even though it may be inaccurate.

Standard ways of working help to overcome these problems. In their work with ICT, candidates need to ensure that they:

- Manage their work effectively;
- Keep information secure;
- Work safely.

Managing work

The way candidates manage their ICT work is important. Candidates need to:

- Plan their work to produce what is required to given deadlines;
- Use spaces, tabs and indents correctly to ensure consistent layout and easy editing;
- Use file names that are sensible and remind them of the contents;
- Store files where they can easily be found in the directory/folder structure;
- Keep a log of any ICT problems they meet and how they solve them.

Keeping information secure

Protecting information from loss or misuse is essential in ICT. Candidates need to learn the particular importance of:

- Keeping information secure, e.g. protection from theft, loss, viruses, fire;
- Protecting confidentiality, e.g. preventing illegal access to medical or criminal records – people or companies may wish to keep information confidential so that others do not know about it – this type of information needs to be kept secure and not passed on to others;
- Respecting copyright – a computer program, words, pictures and graphic images may belong to other people – the people who created or own this material have copyright and their work must **not** be used without their permission without breaking copyright law;
  Candidates need to understand and respect copyright law – where information created by others is used, it is important that the source is acknowledged, by using an appropriate reference or listing it in a bibliography;
- If work stored on an ICT system is lost, it is important that there is another file that can be used in its place – there are **two** ways to make this possible:
  – by keeping dated back-up copies of files on another disk and in another location;
  – by saving work regularly and using different filenames.

Working safely

The ICT working environment is relatively safe. However, candidates need to avoid:

- Bad posture and physical stress;
- Eye strain;
- Hazards resulting from equipment or workplace layout.

Candidates need to know that a comfortable working position is important to avoid physical stress, eye strain or safety hazards. This may include:

- Comfortable seating;
- Suitable desk and VDU position;
- Suitable keyboard position;
- Brief rest periods;
- Avoiding long periods of continuous VDU work;
- A surrounding area that includes near and distant objects upon which eyes may focus;
- Careful layout of cables and equipment (to avoid tripping);
- Suitable and complete insulation of cables (from electrical supplies).

3.2 AS Unit G041: *How organisations use ICT*

This unit helps candidates to:

- Understand how organisations are structured;
- Understand how organisations use and exchange information;
- Evaluate how well ICT can and does help organisations;
- Consider how ICT supports many different activities in organisations;
- See how ICT offers new opportunities.

Candidates study how organisations (including at least one large organisation) collect, disseminate and use information, how they manage the flow of information between sections or departments and the way they use ICT to access and exchange information.

Types of organisation

In all types of organisations, a group of people work together to make something or provide a service. The range includes multinational commercial companies, utilities (transport, water, electricity and gas), public-service organisations (hospitals, schools, colleges), shops, banks and a range of enterprises employing small numbers of people that can be found in every town.

Before candidates can understand how ICT can help organisations and support their activities, they need to learn about how organisations are structured, their information needs and how information moves within an organisation and outside it.

Functions within organisations

Most organisations have staff who have particular responsibilities, such as those dealing with sales, creating products or services, or undertaking research and development. These tasks are often known as job functions.

Candidates need to learn about the many different job functions that can appear in organisations, including:

- Accounts or finance;
- Sales;
- Distribution;
- Marketing;
- Research and development;
- Human resources;
- Design;
- Production (or service provision);
- ICT services;
- Administration.

Candidates need to learn that organisations are often structured into departments for these functions and that there will be a manager for each department.

Candidates need to learn what these departments do and with whom they need to communicate.

Information and its use

Information is vital to any organisation. Some organisations exist solely to gather and disseminate information.

Candidates need to:

- identify the types of information needed by the organisations studied and the significance of this information;
- learn how organisations collect the information they need;
- learn with whom organisations communicate and what information they exchange;
- learn about the types of information that may be exchanged between or about the following:
    - customers and clients
    - wholesalers and retailers
    - distributors
    - suppliers (of services or goods)
    - manufacturers
    - managers and employees
    - products
    - briefs
    - services
    - goods

Organisations need to communicate to people within the organisation as well as those outside, such as suppliers and customers. Candidates need to find out who needs information, who sends it, who receives it and how it is processed.

Most large organisations use very similar key information. Candidates need to understand how organisations use this information. They also need to identify typical features of such information.

Candidates need to learn about the following functions and key systems used by many large organisations:

- Personnel/HR:
  - information about employees, such as name, address, employee number and position
  - often links with training and payroll
- Training:
  - training records are an extension of the personnel system
  - large organisations will probably record training plans for employees
  - records may also note special skills of staff so they can be found quickly when particular skills are required
- Payroll
  - another extension of personnel records – tax codes and rates of pay will link to the employee number
  - often there is a computerised mailing system that prints letters with details of wage payments
  - payroll is one area in an organisation that deals with many changes, eg staff turnover, changes to personal details and changes to pay rates
  - it is also one in which confidentiality of information is particularly important
  - an important external link is with the Inland Revenue
  - reports on payroll information must be available to accounts managers to contribute to statements of profits and losses
- Design and development:
  - records of changes to product design or to new products
  - produce specifications for all products
  - may include production drawings
- Purchasing:
  - links with stock control, accounts, production and most other departments
  - generates purchase orders and contracts for goods and services
- Sales:
  - keeps records of all customer orders
  - initiates the internal requests for provision of services or goods which may be sent to a despatch or delivery department
- Research:
  - keeps records of new products on trial or being investigated
  - may be able to forecast how long existing products will remain saleable
  - may define new areas of productivity for the organisation

- Accounts and finance:
  - tracks money paid and money owed
  - prepares a general ledger summarising accounts
  - preparation of balance sheets and income statements
  - keeps track of cash receipts and payments used to forecast cash-flow
- Stock control or inventory systems:
  - tracks items held in stock by serial number
  - records the number, cost and location of items held in stock
  - often an automatic re-ordering process
  - sometimes links with robotic systems in warehouses
  - can automate much of the re-stocking necessary
- E-mail:
  - used extensively to communicate information within the organisation and with external contacts
  - useful for organising meetings as staff can post their availability on the system
  - problems can arise if too little care is taken to decide who receives what information
- Internet and intranet
  - Offer completely new opportunities that candidates need to consider
  - some external, in that they open websites for outsiders to explore
  - some internal, providing closed network facilities
  - an important aspect is e-commerce, which is used to buy and sell goods and services on-line

Candidates need to draw diagrams that help describe the movement of information in these organisations, including information flowing into and out of the organisation and between departments. This involves finding who needs or uses what information and then showing the connections.

The type of information needs to be clearly identified in the diagrams. The following types might appear:

- Customer orders;
- Purchase orders to suppliers;
- Design and production drawings;
- Wages and tax-paid details;
- Records of staff training;
- Names and addresses of employees;
- Stock details;
- Invoices paid;
- Monthly income;
- Monthly outgoing;
- Web publicity pages;
- Monthly profit or loss.

Diagrams need to show the methods used for communicating information, including:

- Face-to-face;
- Documents via internal or external post;
- Edi (electronic data interchange) or e-commerce;
- Lan (local area network) on internet e-mail;
- Telephone;
- Facsimile;
- Centralised database systems;
- Mobile devices.

Candidates need to find out which methods are effective and efficient for different organisations. Candidates also need to find out which methods are particularly effective for different types of information.

ICT systems

Candidates will have learnt about how organisations are structured, their information needs and with whom they communicate. All organisations use ICT systems to some extent to store, process, present and communicate information. Large organisations could not function without the many ICT systems that support their operations.

Candidates need to learn about the ICT systems that organisations use for different purposes, how these are used to process and communicate information, how they support the functions within the organisation and how these systems interact.

The impact of ICT on working practices

Candidates need to learn about the technological developments that have taken place and the changes in working styles and employment opportunities that have resulted from these developments. In particular, candidates need to learn how ICT has had an impact on:

- Location and pattern:
  - employer premises or at home
  - allowing a 24-hour operation
  - allowing personal flexibility
  - being static in an office or mobile
- Work skills:
  - keyboard
  - technical
  - design
  - analysis
- Re-training.

These changes made by ICT on working practices have also had a knock-on effect on employees. Candidates need to identify changes to:

- Social aspects:
  - changes in motivation for those no longer supervised directly
  - risk of job loss, due to changes in work skills required and number of staff needed
  - security of work, due to changing contractual arrangements between employers and employees
  - reduced social interaction at work, but increased interaction with family and neighbours
- The balance of responsibilities:
  - who is put under stress
  - who takes the blame when things go wrong
- The amount and timing of leisure time
- The fast-changing pace of ICT developments.

Some employees experience stress as a result of these changes. Candidates need to identify how changes in supervision and increased automation, for example, may result in stress.

The impact of ICT on methods of production

To see how ICT has affected methods of production, candidates need to understand how introducing robotics and other linked ICT systems has improved the processes of:

- Production control;
- Process control.

In particular, candidates need to know how ICT has aided the:

- Speed of the process;
- Cost of the process;
- Safety of the workers involved;
- Quality of the final product.

Candidates then need to recognise how this development in ICT has had, and may in the future have, an impact on society, including issues such as:

- Health and safety;
- Employment levels;
- Working practices.

Legislation

The increased use of ICT to store, process and communicate information has led to the need for different types of legislation. This includes:

- Data Protection Act (1998);
- Copyright, Designs and Patents Act (1988);
- Computer Misuse Act (1990);
- Health and Safety at Work Act (1974);
- EU Health and Safety Directives;
- Electronic Communications Act (2000).

Some of this legislation is designed to protect individuals; some is designed to protect the organisation and its information. Candidates need to learn the purpose of each piece of legislation, how organisations are affected by it and what, if anything, they need to do to comply with the legislation. Candidates need to know of any updates to the legislation identified above.

3.3 AS Unit G042: *ICT solutions for individuals and society*

The World Wide Web allows individuals to access information on almost any topic imaginable. This access to information has had a fundamental effect on society and the way individuals live their lives.

Candidates will produce a presentation of the results of a single investigation, including the use of a spreadsheet to analyse numeric data, along with a report on the sources and methods used to find information and a report that explains the impact of the availability of electronic information, to include:

- The selection and efficient use of research engines to find information required;
- Information accessed from large websites and online databases;
- The use of a local database to find required information;
- The use of spreadsheet software to analyse numeric data and present results;
- Different types of data combined to present the results of the investigation;
- An evaluation of the methods used to find information and present the results;
- An explanation of the impact of the availability of electronic information on individuals and society.

Public-service websites

Virtually all public service organisations have a presence on the World Wide Web. Candidates need to find out about and access websites relating to:

- Government, both national and local, including census material;
- Information services, e.g. Museums, libraries, directory enquiries;
- Emergency services, e.g. Fire station, RNLI;
- The national health service;
- Education;
- Transport;
- Broadcasting.

Many of these websites are very large. Candidates need to navigate such large websites to access specific information using the facilities provided, such as navigation bars, textual hotspots, directories and internal search engines. Candidates also need to download the information they require.

Candidates need to identify the range of information each site offers and consider the impact on individuals and society of this increased availability of information. Candidates also need to consider the impact on methods of communication between organisations, individuals and society, and the effect this has on people who do not have access to ICT.

Search engines

The power of the World Wide Web as a resource is due to the ability of the user to search for specific information. Candidates need to learn:

- What a search engine is;
- The range of search engines available and the differences between them;
- That entering the same search in different search engines may generate different results;
- Which search engine is best for a particular purpose.

Candidates need to use search engines to find and download the information needed for a task.

It is possible to enter search criteria that may generate thousands of responses. Candidates need to use facilities available to add precision to their searches, including the use of:

- advanced-search options;
- logical (AND/+, OR, NOT/-) and other operators (eg ~ define:,*).

Databases

A database is a collection of data stored in a computer system in some organised fashion so that desired items can be retrieved quickly according to various criteria. Databases may be large or small, on-line or stored locally.

Candidates need to search databases to find the information required, including the use of:

- Searches using a single criterion;
- Searches using relational operators such as =, >, <, <>, is the same as, comes before, comes after;
- Complex searches using logical operators (AND, OR, NOT).
- Searches involving parameters, wild cards or functions (eg, date()).

Candidates need to present the results of searches as a report.

Use of spreadsheet facilities

When using spreadsheet facilities, there are a number of activities that candidates will do regularly. Candidates need to carry out these activities without help, including:

- Selecting and setting cell formats to match the data format;
- Selecting and using suitable cell-presentation formats;
- Using and manipulating spreadsheet data;
- Using cell-referencing facilities appropriately;
- Applying and using operators and formulae correctly;
- Using built-in spreadsheet functions appropriately;
- Using wizards.

Candidates need to learn how to:

- Set cell formats to match the data format, including:
  – decimal number;
  – integer number;
  – percentage;
  – date;
  – fraction;
  – text or character;
  – currency;
  – scientific;
  – custom or special;
- Set cell-presentation formats, including:
  – horizontal alignment;
  – colour;
  – vertical alignment;
  – shading;
  – fonts;
  – borders;
- Use and manipulate a spreadsheet to:
  – find data;
  – go to a specified cell;
  – search and replace data;
  – cut, copy, paste, move;
  – clear cell formats/contents;
  – use paste special;
- Make appropriate use of cell-referencing facilities, including:
  – relative referencing;
  – cell ranges;
  – absolute cell referencing;
  – 3D referencing;
  – mixed cell referencing;
  – R1C1 referencing;
- Apply and use the following operators in formulae correctly:
  – arithmetic operators, such as +, -, *, /, %, ^;
  – relational operators, such as =, <, >, >=, <=, <>;
  – the logical value FALSE, TRUE;
  – text concatenation & or +;
  – the use of parentheses ( );
- Use common built-in spreadsheet functions, including:
  – SUM;
  – INT;
  – COUNT;
  – MAX;
  – AVERAGE;
  – RAND;
  – MODE;
  – MIN;
  – SQUARE;
  – IF;
  – MEDIAN;
  – DATE.

Development of spreadsheets to present results of data analysis

Candidates need to use spreadsheet facilities to analyse numerical data, e.g. census data for a region or viewing figures for particular types of television programme.

Candidates then need to present results in appropriate ways, including good use of:

- Cell formatting, such as colour and borders;
- Drawing tools and graphic images;
- Charts and line graphs.

Candidates need to make good use of macros to simplify the use of the spreadsheet, including macros that:

- Replace multiple key depressions for a required action;
- Enable or simplify data input;
- Produce printed or screen reports.

Candidates need to ensure the accuracy of their results by testing the formulae in the spreadsheet to ensure they generate the expected results.

Presentation of the results of an investigation

Candidates need to combine different types of information from different sources into a coherent presentation, including:

- Text both created by the candidate and from existing sources;
- Graphics from websites and other sources;
- Numerical data from spreadsheets;
- Graphs and charts;
- Results of database searches;
- Hyperlinks to other information sources.

Candidates need to understand the importance of checking the accuracy and currency of the information and of acknowledging the sources used.

3.4 AS Unit G043: *System specification and configuration*

Candidates will produce a specification for an ICT system to meet the needs of a given user, together with a working system on which they have installed and configured software to meet a user's needs, and recommendations for ensuring safety and security, and an explanation of the basics of software development, to include:

- A statement of the user's needs and how these might be met;
- A specification for an ICT system;
- Evidence of software installation, configuration, testing and implementation of security procedures;
- Evidence that the software has been configured by installing toolbars and setting up macros and templates to meet a user's needs;
- Recommendations for safety and security;
- An explanation of the basics of software development;
- An evaluation of the specification the candidate produced and the methods used for installation, configuration and testing.

Hardware

This involves understanding the purpose of significant pieces of computer equipment and their links with other components.

Candidates need to understand the purpose of and specify, using reference materials, any of the following components to create an ICT system to meet specified user requirements:

- Main processing unit;
- Keyboard;
- Mouse;
- VDU (visual display unit);
- Processor (CPU – central processing unit);
- Connectors;
- Video card;
- Sound card;
- Network card;
- Disk drives;
- Optical drive;
- Printer;
- Scanner;
- Serial port;
- Parallel port;
- USB (universal serial bus) port;
- Microphone;

- Speaker;
- SCSI (small computer system interface) controller.

Candidates need to learn how different systems meet different purposes and the importance of particular components. Candidates also need to learn to judge the effectiveness of systems designed for similar purposes, e.g. how different types of RAM are more efficient and how different sound cards and speakers affect the quality of sound coming from a multimedia system.

Technical terms

Technical terms are used extensively in ICT. Following are lists of terms. Candidates do **not** need to acquire extensive theoretical knowledge about these terms, but they do need to understand how they are used in system specifications and how the items listed affect the selection and installation of a system.

Candidates need to know the terms relating to:

- Memory, for example:
  – bit;
  – byte;
  – Kb, Mb, Gb, Tb;
  – RAM;
  – address;
  – buffer;
  – ROM;
  – volatility;
  – cache
  – flash;
- The main processing unit, for example:
  – tower;
  – desk unit;
  – motherboard;
  – processor (CPU);
  – co-processor;
  – ISA (integrated systems architecture);
  – PCI (peripheral component interconnect);
  – AGP (accelerated graphics port);
  – controller;
  – card;
  – bus (address, data);
  – clock;
  – serial port;
  – parallel port;
  – expansion slot;
- Disk-drive / storage systems, for example:
  – hard disk;
  – optical disk;
  – USB flash drive
  – memory card / reader
  – write protect;
  – data compression;
  – rotation speed;
  – access time;
  – capacity;
  – IDE (integrated drive electronics);
  – SCSI (small computer system interface);

– SATA (serial advanced technology attachment);

- Optical disks, for example:
  – CD-ROM;
  – DVD-ROM/RAM;
  – CD-RW;
- Printers, plotters and VDUs, for example:
  – resolution;
  – flatbed;
  – ink jet;
  – laser;
  – buffer;
  – colour mode (bits);
  – scan frequency;
  – interlace;
  – refresh rate;
- Connector plugs and sockets, for example:
  – centronics/parallel;
  – serial;
  – SCSI;
  – RJ (registered jack) series;
  – DB series;
  – DIP, DIL switches;
  – USB;
  – Firewire.

Candidates need to configure and test complete systems and individual components of a system, including:

- Main processing unit;
- Keyboard;
- Mouse;
- VDU;
- Speaker and microphone;
- Scanner;
- Disk or optical drive;
- Printer;
- Application software;
- Connecting cables;
- Expansion cards (video, sound or network).

Software

Some software operates the computer system as soon as it is switched on. Candidates need to know about the minimum software needed in a computer to enable a user to communicate with it.

Candidates need to change (configure) various settings, such as setting the right time and date, and more important settings, like setting a password that users need to enter for the system to work, calling up a device driver or selecting between alternative operating systems.

Some incorrect configurations are easily corrected. Others could delete all the existing data and make the system unusable. Candidates have to learn to configure systems safely.

There is a range of different types of software. Candidates need to know what types of software are available and understand the purpose of each type, including:

- BIOS (basic input output system) start-up software;
- Operating systems;
- GUI (graphic user interfaces);
- Applications software.

The BIOS is used when the hardware first powers up. Access to these has to be initiated on starting the system. Candidates need to understand what this start-up software controls and set or define parameters to meet requirements, such as:

- Select start-up (boot) disk drive;
- Define a new disk drive;
- Set system password;
- Configure a new card, e.g. video.

Operating systems control the computer and the way it handles all the attached peripheral devices. They also provide the user with a way of communicating with the computer system to configure the way that hardware operates.

There are many different types of operating system (OS). One of the most common provides a graphic user interface (GUI). This OS presents the user with a visually pleasing, simple interface. Other systems only provide a textual (command) interface. To use this type, the user has to understand how to enter commands. Candidates need to select, install and configure operating systems that may have either a command interface or a graphic user interface.

ICT systems can be configured to start up and operate in different ways. The ICT system manager controls many of these. Others can be configured to suit the needs of users. Candidates need to set up different system-boot or start-up configurations so that a system can be made to start up according to specified requirements. The system also needs to be set up to suit user requirements. Candidates need to use the operating system for settings such as:

- Time and date;
- Password properties;
- Scheduled tasks;
- Virus-protection configuration;
- Directory (folder) structure and settings;
- Multimedia configuration;
- Printer, mouse and keyboard configuration;

- GUI desktop and display set-up;
- Application-software icons;
- Checking and setting system properties.

There is a wide variety of applications software to meet user needs. Candidates need to know which type of software suits a particular processing activity, and need to select, install and configure software most suited to a specified need, including:

- Document (word) processing;
- Desktop publishing;
- Multimedia reference;
- Programming languages;
- Web browsers;
- E-mail software;
- Database (record structure);
- Spreadsheet (numeric structure);
- Vector graphics, e.g. geometric objects;
- Bit-map graphics, e.g. photo images.

To enable users to make immediate and effective use of the system, candidates also need to configure the application software in different ways, including preparing or setting items such as:

- Preferences (or configuration files);
- Macros;
- Toolbars and the buttons available;
- Directory structures and defaults;
- Data templates;
- Saving and back-up security;
- Menu layout and contents;
- Borders, rules and scroll bars.

Basics of software development

Candidates need to understand that software consists of a set of instructions which are in a specific sequence to obtain the desired outcome. Software can be developed using different languages, each of which has its own set of rules or syntax.

Candidates need to learn that, when developing software, there are a number of aspects that need to be considered, including:

- The data that will be input and the output required;
- How the data will be stored;
- How the processing of data will be controlled;
- The efficiency of the program which relates to the precision in framing instructions.

Candidates also need to know how to organise information into a form suitable for processing.

Safety and security

When specifying ICT systems, to ensure the user can work safely, it is important to consider the ergonomics of:

- Hardware;
- Software;
- Workstation layout;
- Furniture.

Candidates also need to implement or recommend proper management and security procedures, including those that ensure:

- Data and software back-up is maintained;
- Confidential information is protected;
- Passwords are used;
- Virus checking is undertaken;
- Copyright is protected;
- Theft is avoided (data, software, equipment);
- Users are assigned appropriate rights and file permissions.

3.5 AS Unit G044: *Problem solving using ICT*

In this unit candidates need to understand the difference between *data, information* and *knowledge*.

The data and information which are used by an organisation can come from a variety of sources. Some of these will be external to the organisation and others will be internal. In today's world, much of the information used by an organisation may come from the internet. In order to solve the problems of an organisation through the use of ICT, candidates need to identify where the information used by the organisation comes from and how it is used within the organisation.

Candidates need to:

- Define the term *data*, clearly identifying that data itself has no meaning;
- Describe what is meant by the term *information*;
- Describe what is meant by the term *knowledge*;
- Understand the importance of information and data within an organisation and how the use of information and data will affect the solution to a problem;
- Investigate and understand the differing types of software which may be used to solve problems within an organisation;
- Understand how a solution to a problem may have an impact on other parts of the organisation;
- Appreciate the need for planning, decision making and control when solving problems in organisations.

Candidates will produce, for a familiar context:

- The identification and explanation of the problem to be solved with the benefits of the solution to the organisation;
- A proposed solution to the problem;
- An explanation of the information, including the inputs and outputs, which will be used by the proposed solution including an explanation of the levels at which the information will be used;
- An explanation, providing examples, of the differing types of software which are used in an organisation, how they are used and the levels at which they are used;
- An identification and explanation of the quality procedures which could to be used when developing the proposed solution;
- An identification and explanation, to include diagrams, of the system boundaries, environments and other systems which will be affected by the proposed solution;
- An evaluation of the proposed solution and their performance in solving the problem.

Information

Information has a range of definitions which candidates need to know about. These include:

- The meaning of information extracted by people;
- Semantic and syntactic aspects of information;
- Different methods of representing information to convey meaning, e.g. Symbols.

Different information used within an organisation will be used at different levels within the organisation. There are **three** main levels found within any organisation. These are:

- Operational information;
- Tactical information;
- Strategic information.

Operational Information lies at the bottom of the information-gathering process. Typical information used at this level will be the number of units sold of any item in a shop or the overtime hours worked by staff in a given department.

Tactical Information is used in the day-to-day running of an organisation and the decisions which have to be made by middle management. These decisions will be based upon information which comes up through an organisation, as well as information which comes into the organisation from outside sources.

Strategic Information is used by top-level management in making decisions which will affect the whole organisation and its future. These decisions tend to be long-term and involve high levels of expenditure. The decisions may include issues like investment, foreign trade and expansion of the organisation. Strategic information is very closely linked with strategic planning.

Information can also be classified in relation to the time-frame in which it will be used. Information may be categorised into historical, current or future usage. When solving problems, it is important that past information is considered as well as how the information is currently used. If a problem is to be solved with a long-term success, then the way in which information is to be used in the future also needs to be considered to ensure that the solution to the problem is to be long-term.

The quality of information may also be affected by many factors. Candidates need to learn about the following factors and how they affect the quality of information:

- Accuracy;
- Relevance;
- Age;
- Completeness;
- Presentation;
- Level of detail.

There are many other characteristics of information which candidates need to know about when developing a solution to a problem. Different organisations will use information in different ways.

Candidates need to identify the different characteristics of information and how they will use the different characteristics of information to solve the problem. They will have already seen that information can be used at different levels within an organisation and how the time-frame of the information is important. The other characteristics candidates need to identify are:

- Source:
  – internal;
  – external;
  – secondary;
  – primary;
- Nature:
  – qualitative;
  – quantitative;
  – formal;
  – informal;
- Frequency:
  – real-time;
  – scheduled;
  – ad-hoc;
- Use:
  – planning;
  – control;
  – decision;
- Form:
  – written;
  – visual;
  – formal;
- Type:
  – disaggregated;
  – aggregated;
  – sampled.

Software

Candidates need to know about the different types of software that an organisation could use, including:

- General-office software;
- MIS (management-information system);
- Expert systems;
- KBS (knowledge-based system);
- Profiling systems;
- EIS (executive-information system);
- DSS (decision-support system).

Each level of information will be processed using differing types of software. Before any problem within an organisation is solved, it is important that the level at which the information is to be used, and the software which is used at that level, is determined.

At *operational* level, the software which is most likely to be used will be standard office software such as word-processing, databases and spreadsheets. At *tactical* level, the software most likely to be used will be management-information systems (MIS), expert systems, knowledge-based systems (KBS) and profiling systems. At *strategic* level, software used will include decision-support systems (DSS) and executive-information systems (EIS).

Candidates need to identify and explain the purpose of the type of software which needs to be used to solve any problem based on the level at which the problem occurs. Candidates also need to know that the raw data for processing is the information produced by the lower level.

Quality procedures

When developing a solution to a problem, it is very important that the aims, goals and objectives of the problem and solution are detailed. If the aims, goals and objectives are defined at the beginning of the problem-solving process, then they can be referred back to at any point during the process. By doing this, it is possible to ensure that the solution stays 'on track' and, at completion, solves the organisation's problem. When the aims, goals and objectives are being developed, it is an opportunity for the organisation to be consulted to ensure that the problem has been defined correctly and that the proposed solution is acceptable.

There are many tools which can be used during problem-solving to ensure that the quality of the solution is acceptable. Total quality management (TQM) is the most popular tool used. Candidates need to investigate TQM and explain how it can be used during the problem-solving process, paying particular attention to the aims, goals and objectives.

Systems

A problem within an organisation may only affect **one** system or sub-system within the organisation. Candidates need to identify and establish the boundaries of the system in order to solve fully the organisation's problem. It is sometimes difficult to identify clearly the boundaries between systems within the organisation, especially when the same information is used by more than **one** system or sub-system. If the organisation has a very closely integrated system then it may be very difficult to identify clearly where the solution to the problem will have the most impact. However, a clearly-defined boundary will help to determine the functional area in which the solution will fully solve the problem. Diagrams may be used to demonstrate the system boundaries and to show interaction with other systems within the organisation.

There are many systems' environments which need to be taken into account when solving a problem. Candidates need to investigate the environments and properties to enable the appropriate selection when developing a solution.

Candidates need to understand:

- Systems;
- Subsystems.

Candidates need to:

- Draw system-boundary diagrams;
- Identify the environment affected by the system.

Evaluation of the solution

It is very important that the effectiveness of a solution is clearly analysed once it has been developed. The solution needs to fully solve the organisation's problem and satisfy all the information requirements of the system or subsystem within the organisation. At this point the aims, goals and objectives which were developed at the beginning of the problem-solving process need to be referred to so as to ensure these are fully met.

3.6 AS Unit G045: *Software development – design*

This unit helps candidates to:

- Understand and apply strategies to investigate computer solutions;
- Analyse a system prior to designing a solution;
- Design a solution.

Before a computer solution can be designed, it is important to understand why, how and where the solution will be used and by whom. In order for a computerised solution to fully meet the needs of the end-user, it is important to follow a plan and to investigate the current system fully.

The main strategy used when investigating, analysing and designing computer solutions is systems analysis. It is important to understand the system life-cycle which is followed when developing a complete solution to a problem.

The system life-cycle has various stages which need to be completed in order. The stages which make up the system's life-cycle are:

- Feasibility;
- Investigation;
- Analysis;
- Design;
- Implementation;
- Maintenance.

This unit will help candidates to have an understanding of the tools and techniques which are used in the first **four** stages, to understand why they are used and the benefits of each one.

This unit has links with Unit G054: *Software development.* In order to make a judgement or a solution, candidates should have completed Unit G042: *ICT solutions for individuals and society* and Unit G043: *System specification and configuration*.

Candidates will produce a design for a solution to a given problem, in a familiar context, which includes:

- The identification and explanation of the tools and techniques used in the analysis stage;
- The identification and explanation of the tools and techniques used in the design stage;
- The investigation methods used when designing solutions;
- A report documenting feasibility and proposed solutions;
- Designs for input and output requirements to meet the defined needs of the end-user;
- Data-flow modelling and associated documentation;
- Entity-relationship diagrams and associated documentation;
- A conclusion and evaluation of the proposed solution and their performance in solving the problem.

Feasibility studies

The initial stages of investigation, analysis and design are very important, as it is at these stages that the needs and requirements of the end-user are identified. If the requirements and needs of the end-user are not identified correctly, then a solution may be designed which does not fulfill their needs and requirements. If this is the case then the solution may not be used.

Before a system can be analysed and designed, a feasibility stage needs to be undertaken. The feasibility stage determines if the required solution is possible. The main questions which need to be answered at this stage are:

- Will the solution fulfill all the needs and requirements of the end-users?
- Will the solution have a positive impact on the end-users?
- Can the solution be designed and implemented within the time-scale allocated and within the budget?

If the system life-cycle is to progress to the next stage then all the answers to these questions need to be 'yes'.

The investigation stage

The investigation stage is very important as this is where all the initial information required to design the solution is gathered. The investigation needs to be collected and recorded and the information also needs to be saved as candidates may need to refer to it at a later stage.

There are various techniques which can be used when investigating the requirements of a solution. These techniques include:

- Interviews;
- Questionnaires;
- Meetings;
- Observations;
- Document analysis.

Candidates need to research these techniques and identify when it would be appropriate to use each one. There are benefits and disadvantages to each method used for investigation and candidates need to explain these.

Structured analysis

The next stage is to analyse the current system and to suggest a number of options for the solution. There are a number of tools and techniques which could be used when analysing a system. These include data-flow modelling and ERDs (entity-relationship diagrams).

Data-flow modelling includes techniques and tools such as:

- Simple data-flow diagrams (DFDs);
- Informal diagrams such as 'rich picture'.

Candidates need to develop **two** levels of DFDs for the system for which they are designing a solution.

A Level 0 DFD (context diagram) shows the general overview of the system and its relationship with external entities which are outside the system boundary. The context diagram will show the flows of data between the system for which candidates are designing a solution and the external entities with which it needs to interact.

A Level 1 DFD then shows an overview of what is happening within the system for which candidates are designing a solution. This includes:

- The type of information being passed within the system;
- The documents used;
- How the information is stored;
- The processes which occur within the system.

Standard symbols are used for data-flow diagrams. There are many different sets of symbols which can be used and candidates need to research, identify and select a set of symbols to use. Once candidates have selected the set of symbols which they are going to use then they need to be used consistently.

Candidates also need to develop the documentation which accompanies the diagrams. Documentation which could be used in data-flow modelling includes:

- External-entity descriptions;
- Input/output descriptions.

This documentation is used to clarify the diagrams candidates have produced and to stop any confusion occurring. Each process candidates have used in their Level 1 DFD needs to have an associated process description to identify the activities or operations which take place within that process.

Input/output descriptions provide textual descriptions of the data flows which connect the internal processes and entities to the external entities of the system.

Candidates need to learn about, and create, entity-relationship diagrams (ERDs) and need to understand and identify different types of relationships, including:

- One-to-one;
- Many-to-one;
- One-to-many;
- Many-to-many.

ERDs provide a detailed graphical representation of the information used within the system and identify the relationships that exist between data items. As with data-flow modelling, there is a set of tools and techniques which candidates need to use.

Candidates also need to develop the documentation which accompanies the diagrams. Documentation includes:

- Entity descriptions;
- Attribute lists.

Every entity which candidates have used needs to have an entity description which details the:

- Name of the entity and a description;
- The entity attributes;
- The relationships and links.

Candidates also need to learn about, and develop for their solution:

- Decision tables;
- Flowcharts;
- Structured English/pseudo-code.

Decision tables provide a very simple way of showing actions which take place under certain rules. The advantage of a decision table is that all combinations of the rules have to be considered and it is easy to see if all the rules have been identified. There is a standard layout for decision tables which means that all the information included in the table can be understood by the end-users.

Flowcharts are a method of representing the processes of a system in a pictorial form using different shaped boxes to represent different types of actions. Flowcharts help break down a complex process into small steps and are easy to understand. However, flowcharts do not convert into program code very easily and can, in some cases, become very complex, making them hard to follow. Flowcharts are, therefore, best used to give an overview of the functions of a process with decision tables or structured English used to describe the detail.

Structured English is the mid-step between program code and normal English. It is used to describe the steps in a process without being concerned about the programming syntax. Structured English is also known as pseudo-code. When using structured English to define a process candidates need to use constructs such as:

- IF…THEN…ELSE;
- WHILE…DO;
- SELECT CASE…END CASE;
- REPEAT…UNTIL.

Design of forms and layouts

The next stage is to design:

- the data-input forms;
- Screen layouts;
- Screen-report layouts;
- Printed-report layouts.

For each screen or printed report required for the new system, it is necessary to produce the following information:

- Type:
  – screen display;
  – printing;
  – screen display with an option to print displayed data;
- Purpose:
  – for whom;
  – for what it is to be used;
- Data required:
  – the attributes to be shown;
  – any calculated data items to be displayed;
  – any processes required, e.g. sorting or grouping of data (and which attributes need to be used for these processes).

Production of a conclusion

In producing a conclusion, candidates need to have an understanding of the resources needed for the new system and the impact the new system will have. This needs to include a discussion of:

- Alternative solutions available in terms of hardware and software;
- The benefits of developing a new system.

3.7 AS Unit G046: *Communicating using computers*

The use of the internet and intranets has expanded rapidly over the last few years. Recently, there has been an increase in the need for people with the skills for setting up and managing websites. This unit will help candidates to develop these valuable skills.

This unit will help candidates to:

- Develop an understanding of how the internet and intranets are used by organisations;
- Know how the internet is organised and about standards and protocols;
- Explain the different bandwidths that exist and different connection methods and equipment required;
- Understand the different services that can be provided by the internet and intranets;
- Understand the software and hardware requirements for a web server that can support a website;
- Know about a range of internet tools and understand the purpose of the tools and select the appropriate tool for a specific task;
- Know and understand the different costs involved in connecting to and accessing the internet;
- Understand the technical terms relating to the internet and communication services and know about data compression and communication logs;
- Set up and configure an e-mail system for a single computer;
- Understand the principles of working safely and of recording faults found and repaired.

This unit has links with Unit G055: *Networking solutions*.

Candidates will produce:

- A report on an organisation detailing how they make use of an intranet and the internet;
- A report on an existing website;
- A report on setting up a planned website for a specific purpose;
- A web page from the planned website and hosted online;
- Evidence of configuring a single computer for internet and e-mail access.

Acronyms and technical terms used in communicating using computers

Candidates need to understand the meaning of acronyms and technical terms used in communicating using computers, including:

- Internet service provider (ISP);
- Point of presence (POP);
- World Wide Web (WWW);
- Universal resource locator (URL);
- Domain-naming system (DNS) and registration;
- Sub-domain naming;
- URL and e-mail redirection services;
- Search engine;
- Hypertext mark-up language (HTML);
- Dynamic HTML;
- Hypertext transfer protocol (http);
- File transfer protocol (ftp);
- Public domain software and shareware;
- Internet relay chat (IRC);
- Personal digital assistant (PDA);
- Assymetric digital subscriber line (ADSL);
- Integrated services digital network (ISDN);
- Transmission control protocol/internet protocol (TCP/IP);
- Hard disk drive (HDD);
- Random access memory (RAM).

The internet and intranets

In an organisation, information sources are identified as being either external or internal. Candidates need to understand how the internet, intranets and extranets are used by organisations by:

- Identifying current usage;
- Describing the advantages and disadvantages of the current usage;
- Describing areas where the use of the internet and intranet could be improved.

There are many services available through the internet. Candidates need to learn about a range of services and their purposes, including:

- E-mail;
- WWW;
- IRC, conferencing;
- Newsgroups, Newsnet, bulletin boards;
- File transfer;
- Telnet.

Candidates need to know about the organisation of the internet, including:

- Domains and DNS;
- Mode of access to the internet, ISP, POP and internet services;
- International standards and protocols.

Candidates need to explain the effects of different bandwidths and baud rates on the time taken to download web pages.

Candidates need to know about different methods of connection to the internet, including:

- Data-connecting equipment (modem) and data-terminating equipment (computer), connectors and cables;
- Wireless connections including those from mobile phones and PDAs;
- Analogue telephone lines, digital telephone lines, cable and leased lines;
- Satellite, ADSL, ISDN.

The internet and communications systems

The internet offers access to a wide range of information and communications services. Candidates need to access and use the internet. Use of the internet allows candidates to find information using search and retrieval techniques.

Candidates need to understand the costs involved in connecting to the internet:

- ISP subscriptions;
- Domain name registration fees;
- Telephone charges.

Web server requirements

Candidates need to understand the hardware and software requirements for setting up a website on a server, including:

- The operating system;
- Web server software;
- Protocols, e.g. TCP/IP;
- Internet naming (DNS) and addressing systems;
- Security (firewalls, gateways);
- Proxy servers;
- Network card;
- Router;
- Components of a server:
  – number, type and speed of processor;
  – number, type and capacity of HDD;
  – number and type of RAM;
  – speed and type of network card.

Candidates also need to identify the costs involved in setting up a website.

Internet tools

Candidates need to understand the purpose of internet tools so that they can select appropriate tools to carry out a specific task. The tools candidates need to use are:

- Browser software, bookmarks and search engines for accessing and searching the internet;
- FTP tools for uploading and downloading files;
- Web-editing software for creating and editing web pages.

Candidates need to:

- Access and search the internet to view existing websites to obtain ideas on layout;
- Download graphics and information;
- Set IP address, domain name, address of the start-up home page and e-mail address for own use;
- Identify the technical requirements for a website;
- Create and test a website;
- Access their own website.

Internet websites

Candidates need to understand the different technologies used to create a website and the reasons for the use of those technologies, such as:

- PHP (Hyper-Text Pre-Processor);
- ASP (Active Server Pages);
- CGI (Common Gateway Interface);
- Java;
- DHTML (Dynamic HTML).

Candidates need to analyse a website, determine its purpose and produce a diagrammatic structure of the website.

Candidates need to identify and explain basic script commands.

Setting up a computer system for use on the internet

Candidates need to:

- Install and configure a modem or network connection;
- Install required software – browser, ftp, e-mail, virus checker, compression software.

E-mail is an important method of communication. Candidates need to use both a LAN and the internet to:

- Send, receive and reply to e-mail messages;
- Send and receive attachments;
- Maintain an e-mail address book;
- File e-mail appropriately;
- Virus check e-mail and attachments as necessary.

The web browser allows the user to view pages. Candidates need to:

- Add pages to favourites/bookmarks;
- Configure the home page;
- Alter settings such as display and security.

3.8 AS Unit G047: *Introduction to programming*

This unit introduces candidates to a variety of programming languages. It will help candidates to:

- Understand that there are different types of programming language, each having its own features and purposes;
- Recognise the differences between programming languages and the similarities between these languages;
- Understand the way in which programs are structured using different programming languages.

In this unit candidates will:

- Investigate the structure of programs written in a variety of languages and identify commonalities and differences between them;
- Develop simple programs, from given designs, using a programming language of their choice.

Candidates will produce evidence for **two** different programming languages:

- An annotated program listing for a working program, *that the candidate has been given,* and written in a different language from the one they use to write programs;
- Annotated program listings for a number of working programs, *that the candidate has written*, to implement designs *that the candidate has been given*;
- A report describing the different types of programming and the purpose of particular languages, analysing the choice of languages they have used to annotate and write programs and describing their performance in annotating the given program and writing the working programs.

Programming languages

Candidates need to understand why there is a need for programming languages to be used.

Candidates need to know about the different *levels* of languages (low level, intermediate level, imperative high level, declarative high level). Candidates also need to know about the different *types of software* for which each level of language is appropriate (low level for operating systems and hardware specific applications, intermediate level for operating systems and network operating systems, high level for a wide variety of non-machine specific applications).

Candidates need to know that there are different languages for different purposes:

- Different low level languages for each type of processor;
- Languages for embedded systems, e.g. Ada;
- General purpose intermediate level languages, e.g. C;
- Languages for knowledge based systems, e.g. Prolog, Lisp;
- Object-oriented languages, e.g. C++, SmallTalk, Java, VB.NET;
- Languages for mathematical and scientific applications, e.g. Fortran;
- Visual languages for event-driven user interfaces, e.g. Visual BASIC, Delphi, Visual C++;
- Web scripting languages, e.g. HTML, and web application languages, e.g. JavaScript;
- Database query languages, e.g. SQL;

- Languages for writing application macros, e.g. VBA;
- Languages developed for learning, e.g. Pascal, BASIC.

Candidates need to understand the difference between *imperative* and *declarative* languages and need to know the features of each type of language, i.e. that *imperative* languages are procedural and contain data declarations, function declarations and program constructs, and that *declarative* languages are non-procedural and contain facts and rules.

Candidates also need to know that some features are common to most programming languages, e.g. most are able to deal with constant and variable data and subroutines, and that some languages, though they may be different in structure and features, have a common purpose.

Program structure

Candidates need to know how programs written in different languages are structured. Candidates need to identify features such as how constants and variables are identified and how subroutines are declared and called.

Candidates need to identify and use the following program constructs:

- Sequence;
- Selection;
- Repetition (count-controlled, test on entry, test on exit).

Candidates need to identify and use the following to store and manipulate data:

- Data types – number (integer, floating point), character, Boolean;
- Data structures – string, array, record, file;
- Operators – arithmetic, relational, logical;
- Data manipulation processes – concatenation of strings, file handling, input, output.

Candidates need to identify and use the following to produce a modular program:

- Subroutines;
- Local and global variables.

Candidates need to develop an understanding of the need for good programming techniques and how programs are written to make them easier to read and maintain. Candidates need to identify and use the following techniques to make programs easier to read and maintain:

- Comments;
- Meaningful variable names;
- Use of appropriate subroutines;
- Meaningful subroutine and program names;
- Indentation.

Candidates need to develop a range of programs using a chosen programming language. The candidates' programs must, between them, include all program constructs, storage and manipulation of data. They must be modular and must show the use of techniques that make them easier to read and maintain.

Candidates need to identify constructs, storage and manipulation of data and modularity in programs written in at least **one** other programming language. Candidates need to understand how to annotate program code to identify these features.

3.9 A2 Unit G048: *Working to a brief*

This unit helps candidates to improve their performance and working relationships through the planning, implementation, management and evaluation of an ICT project. Assessment is intended to allow candidates to demonstrate the development of their skills and knowledge in relevant areas of ICT, as well as in their ability to work with others. Candidates are asked to find the solution to a brief chosen from a list. The briefs are set by OCR and may be completed by candidates as an individual or as part of a team.

Candidates will produce:

- A preparatory report into current working practice;
- A project plan in response to the set brief;
- A diary or log of work completed;
- Support materials for use with the project;
- A summative report on the project, some of which will be informed by client and user feedback.

This unit has synoptic assessment which involves candidates bringing together, and making connections between, the areas of knowledge, skills and understanding covered within other units of the specification.

Candidates need to produce a body of work as evidence for this unit that demonstrates that they can work to a set task, and in doing so, develop their own skills for working with others. There will be a range of tasks from which candidates may choose, and these will be structured so as to be applicable to a range of different situations and learning environments. The response may be a group project, allowing candidates to work with others in their group to reach a common solution to a brief. Alternatively candidates may work as an individual with others who are clients or users of the developed system. The final written work needs to make it clear what contribution the candidate, as an individual, made to the overall success of the project. Where candidates choose to work as a team, it must be clear from their work which tasks they individually have created. Candidates will only be awarded marks for those tasks they create.

Understand a set brief and plan to meet the requirements of the brief

A brief will usually include a description of what is to be included and why. Briefs may also include a clear explanation of the needs of the target audience and, where applicable, the client.

When working to a brief, there are a number of considerations. Candidates need to ensure that their work:

- Meets the technical and resource constraints;
- Is fit for purpose;
- Allows them to satisfy the requirements of the unit.

Identification of skills

When working from a set brief, candidates need to demonstrate that they have identified strengths in their work and areas in which they have been successful. These areas may include:

- Skills and techniques;
- Use of new software;
- Skills for working with others;
- The degree to which their work meets professional standards.

Working with others

Candidates need to know about the skills needed when working with others, either as a member of a team delivering a common project or with clients of the service being provided.

The skills needed when working with others will depend on the role of the person/ people that candidates are working with. These could include:

- Experts;
- Users;
- Team members;
- Project supervisors.

The skills needed to work with others may be broken into **four** groups. These groups are:

- Interpersonal skills – e.g. co-operation, exchange of information, clarification of responsibility/working relationship, leadership, enthusiasm and adaptability;
- Technical skills – e.g. knowledge of specific software or hardware, ICT skills in general, giving/taking advice or support;
- Effort skills – e.g. volume of work, the quality of work, ability to meet deadlines;
- Economic skills – e.g. identification of physical resources/time needed, efficient use of physical resources/time.

Candidates need to apply these skills to the project they develop. As the project progresses, candidates need to be aware that their skills in this area will also increase. Candidates need to keep a record of the development of their skills as part of the continual evaluation of their work.

Planning, development and delivery of a project

In order to successfully meet the demands of the brief, candidates need to use project management tools to plan and develop their project. These tools include:

- Gantt charts;
- PERT charts;
- Critical path analysis;
- CASE tools.

As well as these formal planning tools, candidates need to carry out further research to ensure that their project is successful.

Further tasks to consider include:

- Reviewing current practice;
- Assessing their ICT skills, leading to the identification of skills areas that need further development;
- The drafting of initial ideas, to include a timescale for implementation or setting up of the project;
- Negotiating with others to decide upon a final structure for the project;
- Allowing time for a review of the effectiveness of the plan upon completion of the project.

Reviewing current practice would include research into how the task that is the subject of the project is carried out. This may be a study into a process that is to be replaced by the outcome of the project or may be how a similar task is completed. If the brief candidates are completing covers a process or product that is not currently in existence, then research into how similar tasks are completed would be acceptable.

At all times, candidates should remember that this research into current working practice is intended to provide an insight into those issues candidates need to include in their final product. This insight could include pitfalls that candidates would need to avoid when planning the project or even tasks that they should ensure are covered. Similarly, candidates may discover hints and tips that need to be included or avoided when they are implementing their product. These hints and tips may refer to techniques or design considerations.

Once candidates have completed the planning process, they need to carry out the project in line with both the initial brief and their subsequent negotiations. As part of the project, candidates will be expected to keep a log or diary of work completed. This log or diary will allow candidates to assess the development of their skills and needs to include:

- A full list of all tasks undertaken as part of the delivery of the project;
- An assessment of their contribution to the success of the task;
- The skills used in meeting the requirement of the task;
- An assessment of how their skills needed to extend to meet the needs of the task – discussion of candidates' skills needs to include their use of working with others as well as ICT skills.

Continual evaluation of work

The process of self-evaluation is an important aspect of this unit. As part of this process, candidates need to ask the following questions:

- How has the work of others influenced the development of my work?
- How have I supported the work of others?
- How were important decisions made and how were others informed of those decisions?
- How did I deal with differences of opinion?
- How effective are the processes and techniques I developed in order for me to meet the demands of the brief?
- How well did my project meet the user's needs?
- In what ways would I alter my project if I did it again?

Candidates' ability to answer these questions will allow them to discuss their work with their teachers and peer group and thereby come to a meaningful conclusion about the effectiveness of both the project itself, and their ability to work with others.

Production of a summative project

In response to the external assessment, candidates need to provide a body of work as evidence for this unit. This work needs to include:

- An initial discussion of the requirements of the brief and an analysis of the current level of both candidates' ICT and project management skills;
- Preparatory research and investigation into current working practices leading to a clear analysis of the specific requirements of the brief within the particular learning environment;
- A diary or log that candidates complete as they progress from the initial research into current working practice through to completion of the project
- Full evidence of high quality support materials produced in response to the brief, with clear indication of authorship;
- Final evaluation of the quality of candidates' planning, implementation and the overall standard of their response to the brief.

3.10 A2 Unit G049: *Numerical modelling using spreadsheets*

This unit helps candidates to:

- Understand and apply the principles of numerical modelling using spreadsheets;
- Design spreadsheets that process numerical data and present required information;
- Prepare standard spreadsheets that others can use to solve problems with new data;
- Learn and apply good design and test principles.

Candidates will create a spreadsheet to meet specified requirements. The specified requirements will require the use of some of the more specialist and complex spreadsheet facilities associated with aspects of numerical modelling.

This unit applies the knowledge and skills gained from Unit G040: *Using ICT to communicate* and Unit G042: *ICT solutions for individuals and society*.

Candidates will produce:

- An analysis of a suitable user problem and a design specification that describes how they will solve it by numerical modelling;
- Evidence of implementing their solution using suitable entry aids and processing facilities;
- A record of how they overcame their problems;
- A specification for testing their spreadsheet, and evidence of the results of these tests;
- Technical documentation that explains how their spreadsheet works, and user documentation that explains how it is used;
- An evaluation of the effectiveness of their solution and their personal performance.

Development of a working specification

Candidates need to create spreadsheets that meet specified requirements. The user of their spreadsheet will want to enter data, and the spreadsheet needs to process the data to produce the required output. Output will be in the form of numerical values or charts.

Candidates need to learn how to analyse user requirements to determine:

- What output information they want;
- How they currently obtain that information (if at all);
- Where the data to be input is to come from;
- What numerical processing needs to be done to get the required output;
- What aids can be provided to assist with data input or processing;
- How the output information needs to be presented.

Candidates need to use the answers to these questions to produce a detailed design specification for the spreadsheet. Candidates will find it helpful to discuss with others the user's requirements and how they may be met. A good design specification states the user's needs in such a way that there is no doubt about the scope of the task and the work that has to be done. Candidates and the user need to agree the design specification before they begin work on the spreadsheet design.

Use of spreadsheet facilities

When using spreadsheet facilities, there are a number of activities that need to be done regularly. Candidates need to learn to carry out these activities without help, including:

- Selecting and setting cell formats to match the data format;
- Selecting and using suitable cell-presentation formats;
- Using and processing numerical spreadsheet data;
- Using cell-referencing facilities appropriately;
- Correctly applying and using operators and formulae;
- Using built-in spreadsheet functions appropriately.

Candidates need to learn how to:

- Set appropriate cell formats to match the data format, including:
  – decimal number;
  – integer number;
  – percentage;
  – date;
  – fraction;
  – text or character;
  – currency;
  – scientific;
  – custom or special;
- Set appropriate cell-presentation formats, including:
  – horizontal alignment;
  – colour;
  – vertical alignment;
  – shading;
  – fonts;
  – borders;
- Use and manipulate the spreadsheet to:
  – find data;
  – go to a specified cell;
  – search and replace data;
  – cut, copy, paste, move;
  – clear cell formats/contents;
  – use paste special;
- Make appropriate use of cell-referencing facilities, including:
  – relative referencing;
  – cell ranges;
  – absolute cell referencing;
  – multi-sheet referencing;
  – mixed cell referencing;
- Effectively apply the following common operators in formulae:
  – arithmetic operators, such as +, -, *, /, %, ^;
  – relational operators, such as =, <, >, >=, <=, <>;
  – the logical value FALSE, TRUE;
  – the use of parentheses ( );

- Effectively apply common built-in spreadsheet functions, including:
  – SUM;
  – RAND;
  – DATE;
  – AVERAGE;
  – IF;
  – COUNTIF;
  – MAX;
  – INT;
  – COUNT;
  – MIN;
  – VLOOKUP
  – HLOOKUP

- Selectively apply specialised built-in spreadsheet functions, such as the following, (or from functions with similar degrees of complexity). Candidates should know what these functions do so that they can select and use those that are appropriate to the models they create:
  – iterative problem-solving or rounding features and functions, such as:
    goal seek,
    floor,
    solver,
    ceiling,
  – financial functions, such as:
    interest rates,
    future value,
    loan payments,
    rates of return,
    net present value,
    asset depreciation,
  – mathematic and trigonometric functions, such as:
    cosine,
    floor,
    ceiling,
    power,
    combinations,
    product,
  – statistical functions, such as:
    forecast,
    rank correlation coefficient,
    frequency,
    confidence intervals,
    standard deviation,
    rank,
    binomial distribution probability,
    variance,
  –referencing functions, such as:
    row,
    transpose,
    match,
    offset,

Design and development of spreadsheets

The design of the spreadsheet needs to make it easy to use. In creating a spreadsheet for users, candidates need to provide simple but effective ways of entering data, including:

- Creating sheets that have the appearance of a form;
- Using data entry forms.

Candidates need to provide users with helpful prompts, including:

- Providing data entry messages;
- Using data validation and associated messages.

Candidates need to present results in appropriate ways, which may include good use of:

- Cell formatting, such as colour and borders;
- Drawing tools and graphic images;
- Charts and line graphs.

Candidates need to make good use of macros to simplify the use of the spreadsheet, including macros that:

- Replace multiple key depressions for a required action;
- Enable or simplify data input;
- Produce printed or screen reports.

Candidates need to use some of the more complex spreadsheet facilities, including:

- Lists and tables – sorting, lookup tables, subtotals and totals;
- List boxes and drop-down boxes to select data for entry;
- Styles to create a customised cell format;
- Named cells and ranges for use in formulae;
- Auto-fill lists, for lists of dates or days of the week;
- Validation – restricting data input to acceptable data values;
- Templates – creating standard spreadsheet layouts for repeated use;
- Protecting cells by hiding and locking cells;
- Control buttons, to initiate macros;
- Multiple sheets with links between them;
- Multiple views or windows.

Implementation of a spreadsheet solution

Candidates need to show that they can plan and follow a strategy to implement their spreadsheet solution. Candidates need to learn to describe this strategy. Candidates are very likely to meet difficulties and problems as they create the solution. Some of these problems may require candidates to consult their end-user before they can solve them successfully. Again, these problems need to be documented in their development records. This process is known as following a *System Life Cycle*.

Presentation of spreadsheet information

The presentation of information in the spreadsheet is very important and candidates need to consider this from the start. Candidates need to apply the principles of presenting information learnt in Unit G040 *Using ICT to communicate* to their spreadsheet. To present results in appropriate ways, on VDU screens and on printed pages, candidates need to make suitable use of cell formats, page layout, charts and line graphs.

Candidates need to create an appropriate page layout, including:

- Margins;
- Headers;
- Footers;
- Page size;
- Page orientation.

Candidates need to present charts and line graphs appropriately, including using:

- Chart or graph title;
- Axis labels;
- Background;
- Legend data series labels;
- Data labels;
- Category labels;
- Axes formats;
- Axis values;
- Gridlines.

Testing of spreadsheets

Candidates need to learn to test their spreadsheets thoroughly. This can be done by asking questions such as:

- Whether the solution meets the agreed specification;
- Whether results agree with manual methods of doing the same problem;
- Whether the spreadsheet can cope with normal, extreme and abnormal data;
- Whether other people can use the solution;
- Whether the spreadsheet is robust or can be made to fail.

Candidates need to create a test specification that defines tests for:

- Acceptable data input values (maximum, minimum and boundary data);
- Unacceptable data values that need to be automatically rejected;
- Checking, independently, that all functions and formulae work correctly;
- Checking that the system meets user requirements.

Documentation of the development

Candidates need to learn to document the development of their customised spreadsheet and create instructions for users.

Technical documentation is for specialists. It records the design and development of the spreadsheet and should include:

- A copy of the agreed design specification;
- Details of the hardware, software and other resources required;
- Instructions for opening and configuring the spreadsheet;
- Details of all numerical processing, including calculations, formulae and functions used;
- Details of validation and verification procedures;
- Details of all input and output screens and printed designs.

User documentation helps others to use a custom spreadsheet. Candidates need to learn to write user instructions that are simple to understand. Instructions should include:

- How to start the spreadsheet program;
- Routes through the spreadsheet menus;
- Examples of screens and data entry forms;
- Instructions about data entry;
- Advice on how to respond to common error messages;
- Examples of data output screens and printed copy.

Candidates' evaluation of the effectiveness of their solution and performance

Candidates need to learn how to evaluate their ICT solution and their own performance in arriving at a solution. These evaluations need to:

- Provide a critical analysis of the effectiveness of their solution;
- Identify strengths and weaknesses of their solution;
- Suggest improvements to their solution;
- Enable candidates to refine their solution;
- Take account of user feedback;
- Reflect on their own actions and performance;
- Review their own strengths and weaknesses in solving an ICT problem from start to finish;
- Identify areas of personal performance that could be improved upon.

3.11 A2 Unit G050: *Interactive multimedia products*

Interactive multimedia products can play an important role in entertainment, education and in providing information.

This unit helps candidates to:

- Be critical of commercially-produced interactive multimedia products;
- Appreciate what is involved in the design and creation of interactive multimedia products.

In this unit candidates need to:

- Research into interactive multimedia products;
- Produce elements of interactive multimedia products;
- Design and build an interactive multimedia product to meet a client's requirements;
- Review their interactive multimedia product for its effectiveness in meeting the clients' requirements.

Candidates will produce:

- A review of **two** non web-based commercially-produced interactive multimedia products, showing how their design influenced the design of the interactive multimedia product that they produce;
- Detailed designs, of which one is chosen as the design for the final product;
- A multimedia product to meet the client's requirements;
- A detailed test plan;
- A detailed user guide;
- A review of both the interactive multimedia product that they produced and their personal performance.

Review and evaluation of interactive multimedia products

There are a large number of commercially-produced interactive multimedia products available, for a range of different purposes, e.g. training, entertainment, giving information. There are also web-based resources that perform the same function. Candidates need to describe:

- What makes a good interactive multimedia product;
- What makes a *bad* interactive multimedia product.

Candidates need to learn to:

- Identify the intended audience of any interactive multimedia product, e.g. children, teenagers, parents;
- Decide the overall impact on the audience, e.g. to inform, to shock, to amuse;
- Recognise any tactics being used, e.g. in multimedia products the author may use music to create an atmosphere, the pace of animations, the colours and font style used;
- Decide whether the interactive multimedia product being reviewed and evaluated is appropriate and effective in communicating its message and in encouraging the viewer to remember the message.
-

In deciding whether any interactive multimedia product is effective in communicating its message, candidates need to take into account other considerations, such as:

- The content and presentation of the material presented – if the content changes automatically, whether there is enough time to take in the message and whether the product flows;
- How easy it is for the user to interact with the system – the navigational tools used.

Design considerations

Candidates need to learn the meaning of the technical terms used in the construction of multimedia products:

- Compression;
- Resolution;
- Frames per second;
- Colour depth.

Candidates need to know how interactive multimedia products are structured, including:

- Linear;
- Hierarchical;
- Web or mesh.

Having investigated commercially-produced interactive multimedia products, candidates will apply the principles they have learnt to specifying, designing and creating their own interactive multimedia product.

Design of an interactive multimedia product

Good interactive multimedia products of any nature need to be designed carefully. Candidates need to learn how to:

- Write a script for their product;
- Produce structure diagrams;
- Use design methods like storyboards or flowcharts;
- Produce a task list or action plan for development;
- Incorporate a structure to enable alternative paths through their product;
- Design suitable screen layouts;
- Incorporate appropriate navigational tools.

Creation of elements of an interactive multimedia product

An interactive multimedia product consists of a number of elements – video, sound, images, animation, drawings, diagrams, charts and/or text. Candidates will be given a commission to produce material for a client. As part of that commission, candidates need to learn to:

- Create, format and edit text;
- Create drawings, diagrams and charts;
- Take digital pictures, scan images and retrieve clip art;
- Edit images, including clip art;
- Import and convert text and graphics files;
- Create animation;
- Record and edit sounds;
- Record and edit video clips.

When candidates incorporate material they have not created, they need to know about copyright restrictions and know how to obtain any necessary permission.

Authoring an interactive multimedia product

Having created the elements of an interactive multimedia product, candidates need to learn how to build these elements into a multimedia product using an authoring package. Candidates also need to learn how to incorporate interaction between the user and the product by:

- Utilising buttons/hotspots/links/hypertext links;
- Utilising transitions;
- Utilising frames;
- Using drag and drop features;
- Allowing text/numeric input;
- Creating interactive images;
- Having start/stop procedures controlled by the user.

Testing and documentation

It is unlikely that the interactive multimedia product that candidates produce will work exactly as planned straight away. Candidates need to carry out tests and edit the product including:

- Testing all links and pathways;
- Proof-reading text;
- Checking layout and alignment of elements to ensure a professional quality product.

Documentation is provided to give users information about all aspects of an interactive multimedia product. Candidates need to be able produce documentation that includes:

- The purpose of the product;
- The system requirements;
- How to install and use the product.

Review final product

In the investigation of commercially-produced interactive multimedia products, candidates learnt what makes a product good or bad. Candidates need to apply these principles to review their own interactive multimedia product and suggest how it might be improved.

Candidates need to ask others to use and comment on their interactive multimedia product and documentation.

3.12 A2 Unit G051: *Publishing*

This unit helps candidates to:

- Appreciate the uses of desktop publishing (DTP), and word processing packages and their capabilities, and apply them to a variety of tasks;
- Recognise the variety of documents produced using DTP facilities and the range of hardware and software available for this purpose;
- Sample the kind of work undertaken by designers, illustrators, newspaper artists and draughtspersons.

In this unit candidates need to:

- Work alongside a client whose needs they must meet;
- Research a brief, plan a response and produce a quality solution;
- Produce information that communicates effectively and accurately, taking into account the needs of the audience; the document will be fit for purpose;
- Extend previous DTP work;
- Combine information of different types to create complex documents;
- Produce draft documents for approval;
- Use customising and automating tools and techniques to produce professional-looking, complex documents, e.g. newsletters, journals, complex reports.

Candidates will produce:

- Notes taken during an initial, and any subsequent, meeting with a client, negotiating and amending a brief for the production of a publishable version of a document;
- Evidence of the drafting and production of a publishable version of their final document to meet the brief and, in doing so, will show that they can create and capture images, as well as import material from other packages, utilise object libraries such as clip art, and select and further develop images to meet the style and content of the final copy, as negotiated with the client;
- A publishable version of a document, of approximately **ten** A4 pages or the equivalent, that combines different types of information presented to the client for approval, together with a letter which correctly describes the final production stage and external factors which may affect completion of the final published document;
- An evaluation of both the layout and content of their final copy and their performance.

Document types and presentation styles

Candidates need to learn how publishing techniques are applied to create a variety of presentation styles for the following document types:

- Billboards and posters;
- Books and manuals;
- Brochures/leaflets and newsletters;
- Forms and mailshots;
- Magazines and newspapers;
- Reports;
- Suites of stationery.

Combining information

Candidates need to combine information of various types using different file types, including:

- Image files;
- Word processed files;
- Text files;
- Databases;
- Chart and graph files;
- Compressed files.

Candidates need to convert files to a suitable format where necessary.
You need to effectively use the appropriate editing and formatting tools and techniques in documents, including:

- Headings, sub-headings;
- Body text;
- Footnotes, endnotes;
- Bullets, lists;
- Tabs;
- Drawing more complex shapes using grouping, layers, filters;
- Figure captions, figure numbers;
- Headers, footers;
- Tables.

You need to edit your document and use editing tools for:

- Setting margins (top, bottom, left, right);
- Formatting (setting attributes, fonts, case);
- Justification (centre, left/unjustified, right, full/justified);
- Tabulation, columns, gutters;
- Leading, kerning;
- Alignment (vertical, horizontal, indentation);
- Pagination, avoiding widows/orphans;
- Grammar check, spell check, hyphenation control.

You need to apply the following text attributes into documents:

- Bold, underline, italics;
- Superscript, subscript;
- Overscore;
- Case (upper, lower);
- Font size and style.

You need to understand page layout techniques and apply them in your work, including:

- Design of appropriate structures and styles for sections of a document;
- Techniques for text boxes;
- Layering;
- Borders;
- Shading;
- Headers/footers;
- Indexes, tables of contents, cross references;
- Watermarks.

Research into a brief, planning a response and presentation of solutions

The publishing industry has set procedures that are used when planning and presenting a document. Candidates need to learn about:

- The drafts/design stage;
- The enhancement of presentation of text;
- The final production stages;
- Procedures for coping with external factors.

When candidates are producing their own documents, they also need to follow these procedures. For the drafts/design stage, this will include:

- Following house-styles;
- Creating master page layouts;
- Presenting page proofs for reading;
- The use of white space;
- Producing artwork sketches;
- Setting text orientation;
- Creating style sheets.

For the enhancement of presentation of text, candidates need to know about and, where appropriate, use:

- Watermarks;
- 'Greeking' and 'latining';
- Repeating elements;
- Special characters, such as Greek characters used in mathematical material, en-rules used for dashes and ellipses used to indicate omissions;
- Ruler grid lines;
- Callouts/labels;
- Automatic generation, e.g. of notes, an index and a contents list.

Candidates need to understand and use correctly, the terms that describe the final production stages:

- Colours of print, e.g. CMYK separation, and paper;
- Paper weights and sizes, e.g. 80 gsm, A4;
- Publishable version / CRC (camera ready copy) – the final layout of a page, looking exactly as it should appear when it is published;
- Binding/folding;
- Proof reading;
- Printing devices and services;
- Proof reading symbols according to BS 5261 Part 2 (1976).

External factors may also affect the production process. Candidates need to learn about the effect these factors have and how to cope with them, including:

- Problems that may arise, such as meeting deadlines, and working within a team of freelancers;
- Legislation (copyright) and how to obtain permissions for use of copyright material.

Candidates will be given a commission to produce material for a client and need to:

- Negotiate a brief with the client;
- Consider ICT tools available;
- Choose a suitable solution to match the intended audience and to meet the needs of their client;
- Plan their presentation of their portfolio of ideas to their client;
- Get product approval from their client.

Final printed output

Candidates need to know what range of effects can be achieved by printing on different types of printer (laser, ink-jet, colour, monochrome) and on different media (different colours and qualities of paper, fabrics, acetate).

Candidates need to understand the effect of printer resolution on the quality of the final image.

3.13 A2 Unit G052: *Artwork and imaging*

This unit helps candidates to:

- Develop skills needed when producing artwork for inclusion in publications;
- Improve their skills in creating and modifying artwork and images for display;
- Understand the kind of work undertaken by designers, illustrators, newspaper artists and draughtspersons;
- Understand the laws and guidelines that relate to the use of ICT.

In this unit candidates will:

- Extend previous ICT graphics work;
- Cover the skills and techniques used in the creation of more complex artwork and images, such as editing photos;
- Work alongside a client whose needs must be met;
- Research a brief, plan a response, and produce a quality solution.

The unit builds on Unit G040 *Using ICT to communicate*. It has links with Unit G050: *Interactive multimedia products*, Unit G051: *Publishing* and Unit G053: *Developing and creating websites*. It could also complement GCE A/AS level work in Art and in Design and Technology.

This unit may be useful if candidates want to use their artistic skills along with their ICT skills in their career.

Candidates will produce:

- A portfolio of artwork samples produced to demonstrate a range of artwork skills;
- Evidence of the development of computer artwork, using a variety of graphics software, following negotiation of a brief from a client, from initial ideas to final product accepted by the client, to include:
  – notes taken during the negotiation of a brief, together with a range of initial proposals in response to a complex problem;
  – an analysis of their design proposals to select the one they will develop
  – development of a final product, showing editing techniques and choice of printer type, media and resolution
  – development of ICT skills required by their solution;
  – a substantial artwork product that meets the requirements of the brief;
- An evaluation of both the final product, including consideration of the hardware and software used, and their performance.

Development of artwork and images

Images may be created freehand or taken from existing sources. Candidates need to learn how to capture images from different sources, such as:

- Digital cameras;
- Video cameras and players;
- Scanners;
- On-line information systems.

Candidates then need to develop images by:

- Drawing basic shapes;
- Creating artwork by combining text, pictures and basic shapes;
- Choosing the most appropriate software tools and techniques for creating artwork and images, for example:
  – use layers for different components;
  – include the features of object overlay;
  – use different styles (text, line, fill);
  – apply shading and rendering;
  – import images;
  – add borders;
  – control grid spacing and snap to grid;
  – use appropriate scaling;
  – include polygons;
  – utilise object libraries, including clip art;
  – sharpening;
  – removing scratches/blemishes;
  – darkening/lightening shadows (dodge/burn);
  – control page size and orientation;
  – use tools to cut and paste, copy, crop and mask;
  – colour correction (loading);
  – use colour (hue, tint and saturation), colour inversion and key colour;
  – apply colour separation and balance (CMYK, RBG);
  – repeat a pattern (full, half drop);
  – understand technical terms, for example, washing, dithering, pixellation, posterisation, edge-finding and distortion, and apply them appropriately;
  – take account of the image resolution and method of output e.g. screen, hardcopy.

Editing artwork and images

Candidates need to edit artwork and images by:

- Using basic tools and techniques that are appropriate, such as:
  – transform, scale, rotate, distort filters, effects, colour balance, levels and curves, masks and layers;
  – layering, grouping, 3D objects and tracing;
  (candidates will have already used some of these software tools and techniques while developing artwork and images)
- Changing the resolution, colour depth and file formats to suit different users;
- Adjusting images to ensure compatibility between different software and operating systems.

File formats

Candidates need to know:

- How to save files:
  – in digital picture format , e.g. jpeg, psd;
  – as bitmaps, bmp;
  – as vector graphics, e.g. syg, eps;
- Which file formats:
  – take up more/less space;
  – are suitable for websites;
  – are application specific;
  – are more generic, e.g. psd, html;
- The concepts and limitations of different image file formats;
- The impact on file size and image quality of:
  – file format;
  – compression technique;
  – image resolution;
  – colour depth;
- How to save files efficiently and effectively for the intended use.

Final printed output

Candidates need to know what range of effects can be achieved by printing on different types of printer (laser, bubble-jet, colour, monochrome) and on different media (different colours and qualities of paper, fabrics, acetate).

Candidates need to understand:

- The effect of printer resolution on the quality of the final image;
- The processes that are used by commercial business to print images.

Laws and guidelines

Candidates need know what guidelines and laws affect the day-to-day use of ICT, for example:

- Data Protection Act;
- Equal Opportunities;
- Disability;
- Health and Safety;
- Copyright.

Research into a brief, planning a response and presentation of solutions

Before a client will consider candidates for a commission, they need to prove the quality of the work they can do. For this, candidates need to produce a portfolio of work, in which they need to show that they are able to offer a range of styles. This portfolio may include:

- Simple line drawings with a consistent labelling style;
- Simple statistical charts, e.g. pie charts, bar charts and graphs, all suitably labelled and with effective use of space and colour;
- Boxed charts showing a sequence of events or activities, with the boxes appropriately linked and suitably labelled, and demonstrating effective use of line styles;
- A variety of icons to punctuate a text, e.g. to show which keys are to be depressed, to identify an activity is needed at this point, or to enclose an important fact;
- Different background styles, e.g. using a graph paper style for graphs, presenting charts on a background as it may appear in the workbook, presenting newspaper articles to look like extracts from a newspaper, making a shopping list look hand-written on a notepad;
- Scientific and mathematical material, e.g. chemical formulae, or mathematical diagrams including common shapes with angles marked appropriately, or complex diagrams (such as of the construction of the eye or ear in Biology, or soil composition in Geography, and so on) all suitably laid out and labelled;
- Hand-drawn cartoons or sketches to illustrate a point;
- A variety of styles to meet the needs of different audiences, e.g. for very young children, for college candidates, or for those interested in a particular hobby.

Candidates will be given a commission to produce material for a client and they need to:

- Negotiate a brief with the client;
- Consider ICT tools available;
- Choose a suitable solution to meet the needs of their client;
- Plan the presentation of their portfolio of ideas to their client;
- Get product approval from their client.

3.14 A2 Unit G053: *Developing and creating websites*

This unit helps candidates to understand:

- The requirements for setting up a website;
- Terminology relating to the internet;
- The differences in the range of web programming languages available for developing web pages and components within them;
- The differences between internet and intranet sites, and the network security implications of running web servers.

In this unit candidates need to use software to develop web pages to convey relevant information to website visitors.

The use of the internet and intranets has expanded rapidly over the last few years. Recently, there has been an increase in the need for people with the skills for planning, building and maintaining websites. This unit should help candidates to develop these valuable skills.

Candidates will produce:

- An evaluation of commercial websites that have been downloaded;
- Analysis and design notes for a website that has at least **three** pages, together with detailed plans for publishing their website;
- Annotated print outs of their own web pages in WYSIWYG (What You See Is What You Get) format identifying the features and techniques used in the web page;
- Annotated printouts of their own web pages in HTML format identifying edits to script commands to change page layout; documentation of website testing;
- Documentation of website testing;
- An evaluation of both their website and the components used to produce it, and their own performance.

Web server requirements

Candidates need to understand and explain the hardware and software requirements for setting up a website on a server including:

- The operating system;
- Web server software;
- Protocols (TCP/IP) (transfer control protocol/internet protocol);
- Internet naming (DNS - domain naming system) and addressing systems;
- Security (firewalls, gateways);
- Proxy servers.

Planning a website

Candidates need to:

- Access and search the internet to review existing websites, to obtain ideas on design and the use of both multimedia and interactive features;
- Consider the benefits and drawbacks of different features for both the user and the website owner;
- Consider the strategies used to increase the number of site 'hits', e.g. use of metatags;
- Download graphics and information.

When candidates plan their website, they need to be clear about the purpose of the site and the audience that it is aimed at. The website needs to be well-structured and communicate effectively with the intended audience.

Candidates need to know how websites are structured, including:

- Linear;
- Hierarchical;
- Web or mesh.

Candidates need to understand the need for planning and designing websites. Candidates need to understand and consider:

- Layout of page;
- Consistency of design between pages;
- Use of text;
- Use of graphics;
- Use of navigational aids;
- Use of hyperlinks;
- Style of font;
- Use of colour;
- Use of interactive features such as guest books, message boards, feedback forms, sending a message.

Designing and documenting a website

It is important that websites contain up-to-date information. To ensure that this is the case, candidates need to appreciate the requirement for documentation, including:

- structure diagrams;
- a storyboard;
- an index of pages in the site;
- a task list or action plan for development.

Candidates need to choose a domain name and decide whether to host the site internally (in which case, hardware and security issues need to be dealt with) or with an Internet Service Provider or web hosting service.

Creating a website

Candidates need to understand the purpose of internet tools so that they can select appropriate tools to carry out a specific task. A lot of website creation can be done using wizards. Candidates need to appreciate the usefulness of wizards and use WYSIWYG and other features to make the creation of the website simpler. Candidates also need to use basic tools. The tools candidates need to learn about are:

- web programming languages, such as HTML (hypertext markup language), Java, JavaScript, VBScript, ActiveX, Perl and VRML (virtual reality markup language) for the creation of web pages or components of pages;
- web page development software for the creation of web pages;
- graphic software for editing graphics and converting file formats to internet standards of JPEG and GIF;
- the creation of animation using GIFs;
- the use of video and audio standards, such as AVI, MPEG, WAV, MP3, real audio and video.

Candidates need to use web page development software to create, edit and present web pages with:

- text, graphics, numbers;
- background and foreground features;
- cascading style sheets;
- templates and colour schemes;
- tables, forms, interactive features, e.g. full text search, table of contents and other components, e.g. ActiveX, Java applet, CGI script;
- hyperlinks (text and graphic) within a web page, to another page at the same website, to an external WWW (world wide web) site, to e-mail, to an FTP server document.

Candidates need to:

- use graphics software to edit graphics;
- convert files to a required file format, to insert in own web pages;
- identify the HTML script used to create features on web pages;
- edit a script to change the page layout.

Candidates need know that some users may have difficulties viewing some websites, e.g. some users may have a slow link to the internet and will have difficulty viewing pages with a lot of graphics. Candidates may wish to create alternative text-only sites for these users.

Candidates need to set domain name, address of the start-up home page and e-mail address set for own use.

Testing a website

Candidates need to understand the need to test a website, including:

- whether the website works with different hardware/software specifications;
- checking that the structure, style and formatting help understanding of the content;
- testing that all pages can be accessed in the correct order;
- testing that all elements on each web page can be viewed and accessed – this will involve consideration of colour depth and file formats;
- proof reading of the pages to ensure that there are no spelling or grammatical errors.

Uploading a website

Candidates need to understand the process and considerations involved in uploading a website, such as:

- domain name registering;
- file and folder names and organisation;
- use of a file exchange program, such as ftp or http, to publish the website.

Evaluation

Candidates need to evaluate the pages in their website, giving reasons for the components included, analysing their strengths and weaknesses taking into account any comments received from visitors to their website, and suggesting and justifying improvements that they could make to their storyboard and its implementation. Candidates need to consider whether their website:

- meets the original list of intentions;
- attracts the intended audience;
- puts the right information across;
- is easy to use.

Additionally, candidates need to:

- identify the good and bad features of the website;
- describe any difficulties with the software that was used.

Laws and guidelines

Candidates need to know of the laws and guidelines that affect the use of ICT as stated in Unit G040: *Using* ICT *to communicate*.

3.15 A2 Unit G054: *Software development*

This unit helps candidates to:

- understand the principles of software development;
- apply the principles of software development to design a software system to meet the needs of an end-user and to provide a solution;
- apply the principles of software development to develop and test a software system to meet the needs of an end-user and to provide a solution.

The process of developing software has various stages which need to be completed to ensure that the final product meets the needs of the end-user. There are many different methodologies which can be used when developing software but all of them have pre-defined stages which need to be completed. In this unit candidates need to develop a software system to meet the needs of an end-user.

A case study and tasks will be released before the external assessment. Candidates need to examine the case study and complete the tasks and take them into the test with them. In the test candidates will be asked questions on what they have produced and on other aspects that they have studied.

Initial/feasibility study

The feasibility study is the initial stage in any methodology, in which the existing information processing system is investigated, to decide how feasible it will be to develop the software system. This may be the upgrading of an existing software system, or computerising a manual system. There are a number of approaches to this:

- software can be bought off-the-shelf;
- software can be bought off-the-shelf and then be customised to suit the user;
- software can be written especially for the user (bespoke/tailor-made software).

Candidates need to investigate a system and produce a feasibility report that includes:

- the purpose of the system;
- functional and non-functional requirements;
- process constraints;
- a list of deficiencies of the current system;
- the user requirements of the new system;
- recommendations for the development of the new system;

In order to produce a feasibility study, candidates have to investigate the system. There are various methods which can be used. Candidates need to research the differing methods of investigation and identify the most appropriate method(s) for the investigation of the system. The methods which can be used include:

- interviews;
- observations;
- shadowing;
- questionnaires;

- document analysis;
- record/document inspection.

Candidates need to identify the benefits and limitations of each of the methods so as to make an informed choice as to the method they are going to use.

During the investigation of the current system, candidates need to collect information about the following:

- flow of information;
- types of data;
- sources of data;
- decisions taken;
- data capture methods;
- documents used;
- types of processing;
- storage methods;
- personnel involved;
- manual operations;
- types of output;
- automated operations.

By investigating these components candidates will gather the information to help develop the new software system. If the information collected at this point is full and complete then the information can be used in later stages of the development methodology.

Analysis and design

Once candidates have collected all the information and completed the feasibility study, then it is possible to move onto the next stage in the development methodology. In this stage, data models need to be completed as part of the design stage. If the information candidates collected during the investigation and feasibility stage was complete then all the information they need to complete this stage should be available.

There are various techniques which can be used during this stage, all of which will enable a system to be developed which fully meets the needs of the end-user. The techniques and tools which candidates may use are:

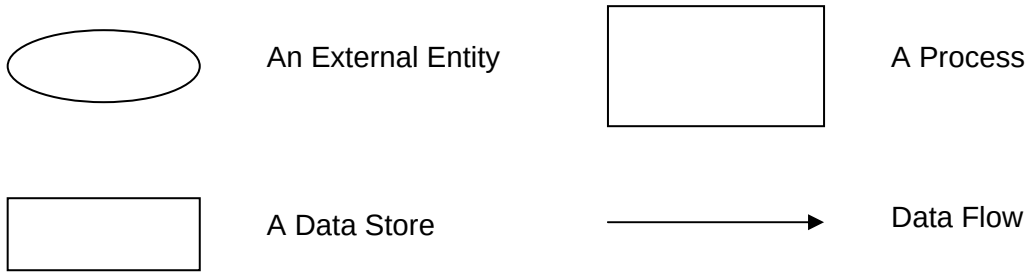
- Data Flow Diagrams (DFD);
- storyboards;
- rich pictures;
- system flowcharts;
- entity-relationship diagrams;
- data dictionary;
- decision trees/tables;
- structured English;

- flowcharts.

The choice of tools and techniques used will depend upon the type of system being developed, e.g. if a website were to be developed then it would be appropriate to use a storyboard to develop the user-interface of the system. If for example the website is to be used for on-line booking or shopping, then it may be appropriate to use a DFD to show the flow of data which occurs during these processes which are not seen by the end-user.

Candidates need to ensure that the tools and techniques they select are appropriate to the system being developed.

A Data Flow Diagram (DFD) of the current system needs to be constructed. There are **two** levels of Data Flow Diagram which are required: a Level 0 (Context Diagram) and a Level 1. There are many different symbols which could be used to develop the DFD; an example of a set of symbols is given below:



A context diagram (Level 0) is a DFD which shows the entire system as a single process, with data flowing between it and the outside world represented by external entities. The main purpose of a Level 0 DFD is to help fix the boundaries of the system and to show its interaction with external entities.

To develop a context diagram, the following activities need to be carried out:

- identify all sources and recipients of data from the system (the external entities);
- identify the main data flows to and from the external entities;
- convert each source or recipient into an external entity symbol;
- add the data flows between each external entity and a single box representing the whole system.

Once candidates have developed the context diagram, this needs to be expanded to develop a Level 1 DFD. The Level 1 DFD breaks down the actual processes which occur within the current system. The information which candidates collected during the investigation and feasibility stage should help when they are developing the Level 1 DFD.

When candidates have developed the DFDs (Level 0 and Level 1) for the system they need to develop an entity relationship model (ERM) for the new system. Candidates need to ensure that the entity model is resolved to 1NF (first normal form) and that there are no instances of M:M (many-to-many) relationships between any of the entities.

There is a relationship between the Level 1 DFD and the ERM, in that candidates need to identify the entities to be used in the new system from the entities and data stores used in the DFD.

Candidates need to analyse the data collected during their investigation to identify the attributes that form the entities. To define the relationships between entities and their attributes candidates need to use logical data modelling techniques.

Logical data modelling for software development uses specific terms to describe the data

structures. Candidates need to understand, and apply correctly, the data modelling terms:

- entity;
- attribute;
- primary key;
- foreign key;
- relationship;
- entity relationship diagram.

An entity relationship diagram (ERD) is a graphical way of showing the entities and the relationships between them in a system.

Candidates need to know how to create an ERD. Candidates need to understand and identify different types of relationship, including:

- one-to-one;
- many-to-one;
- one-to-many;
- many-to-many.

Candidates need to develop a Data Dictionary. A Data Dictionary is simply a record of data about data. It is necessary to hold Data Dictionary entries about data elements, data structures, data flows, data stores and processes. The structure of each of the Data Dictionaries for each of these elements will vary. Generally the following elements need to be incorporated into a Data Dictionary:

- name;
- description;
- aliases;
- type;
- format;
- values;
- security;
- editing;
- comments.

For any process required in the new system, candidates need to produce a process specification using a suitable method. Candidates need to understand, and use correctly, various methods for defining a process, including:

- structured English;
- decision table/tree;
- flow chart.

When using structured English to define a process, candidates need to use common English verbs with suitable constructs, such as:

- IF...THEN...ELSE...;

- WHILE...DO...;
- SELECT CASE...END SELECT;
- REPEAT...UNTIL...;

In producing process specifications, candidates need to understand and use correctly the relational operators =, <, >, <=, >=, < >.

Candidates also need to understand and use correctly the logic operators AND, OR and NOT.

Structured English is a tool which is best used whenever the problem involved combines sequences of actions with decisions and loops. Once candidates have developed the structured English, they need to test or dry run the routine to ensure that the procedure works and that it fulfils the needs and requirements of the end-user. Structured English is sometimes referred to as pseudo-code.

Decision tables provide a very simple way of showing actions which take place under certain rules. The advantage of a decision table is that all combinations of the rules will have to be considered, and it is easy to see if all the rules have been identified. There is a standard layout for decision tables which means that all the information included in the table can be understood by the end-users. It is easier to write the structured English once the decision table has been developed as, by referring to the decision table, candidates are less likely to omit any possible combinations of actions and rules.

Flowcharts are a method of representing the processes of a system in a pictorial form using different shaped boxes to represent different types of actions. Flowcharts help break down a complex process into small steps and are easy to understand. However, flowcharts do not convert into program code very easily and can, in some cases, become very complex, making them hard to follow. Flowcharts are, therefore, best used to give an overview of the functions of a process with decision tables or structured English used to describe the detail.

A physical design specification then needs to be developed. Candidates need to consider the following:

- hardware specification;
- software specification;
- input specification;
- output specification.

Candidates need to produce a *hardware specification* that defines in detail:

- memory capacity;
- storage devices;
- peripheral specifications;
- data capture equipment;
- communication equipment.

Candidates need to produce a *software specification* that defines in detail:

- outline program specifications;
- a system flowchart;
- file organisation;

- access methods;
- error messages;
- screen and report layouts.

Candidates need to produce an *input specification* that defines in detail:

- data sources;
- methods of data capture;
- validation methods;
- data input form or screen layouts;
- verification methods used.

Candidates need to produce an *output specification* that defines in detail:

- data required for output;
- screen report layouts;
- methods of data output;
- printed report layouts.

Implementation and maintenance

Once the system has been developed, implementation and maintenance procedures need to be detailed for the end-user. Candidates need to identify the implementation method which they are going to use. The options are:

- parallel;
- phased;
- pilot;
- direct/big bang.

Candidates need to identify the benefits and limitations of each of these implementation methods and identify the most appropriate method for the end-user.

Candidates will also need to provide details of legislation that the end-user will need to be aware of.

The legislation candidates need to consider will not only cover the information held by the system they have developed but also the users of the system. This will mean that more than one piece of legislation may need to be considered for the system being implemented.

The legislation candidates will need to consider may include:

- Data Protection Act (1998)
- Computer Misuse Act (1990)
- Copyright, Designs and Patents Act (1988)
- Electronic Communications Act (2000)
- Regulation of Investigatory powers Act (2000)
- Health and Safety at Work Act (1974)

- EU Health and Safety Directives

Candidates will need to identify the legislation, explain the implications and what will need to be done to comply with the legislation. Candidates will also need to be aware of any updates to the legislation detailed above to ensure that the details they provide are up-to-date.

Over the life of a system, it may be necessary to perform maintenance. There are many reasons for maintenance and different types of maintenance strategies. Candidates need to know about and explain the different types of maintenance strategies which are used. These include:

- adaptive;
- perfective;
- corrective;
- preventive.

The end-users of the system need to be trained to use the system. There are various options available for training and candidates need to research these options and identify the benefits and limitations of each training method they have identified.

Once the system has been implemented, it is essential that documentation is passed to the end-user. The documentation, *which needs to be passed to the end-user*, comprises:

- detailed program specifications;
- recovery procedures;
- operating procedures;
- user manuals;
- test plans, data and logs;
- security details;
- version details.

Candidates need to identify *why* each of these pieces of documentation needs to be given to the end-user and explain how they may be used at a future time in the life of the system.

3.16 A2 Unit G055: *Networking solutions*

This unit helps candidates to:

- understand the advantages and disadvantages of computer networks;
- understand the difference between peer-to-peer and client-server networks;
- know the differences between LAN and WAN;
- design a network using the correct components and topologies.

This unit has links with Unit G046: *Communicating using computers*.

This unit may be helpful if candidates plan to pursue a career in network management or customer support services.

A case study and tasks will be released before the external assessment. Candidates need to examine the case study and complete the tasks and take them into the test. In the test candidates will be asked questions on what they have produced and on other aspects that they have studied.

Computer networks

A computer network is a number of computers that are linked together for some data-processing purpose. Examples of computer networks are:

- the point-of-sale terminals in a computerised store;
- an office with **three** computers connected together to share data;
- a large company with many interconnected computers sharing resources and security systems.

A computer network offers various benefits over the use of stand-alone computers. Candidates need to understand the advantages of computer networks, including:

- sharing hardware resources;
- sharing software resources;
- sharing common data;
- potential intranet provision;
- e-mail communication between users;
- centralised management services.

There are some disadvantages to networking computers. Candidates need to learn about problems such as:

- potential loss of security;
- loss of speed;
- cost of purchase and set-up;
- maintenance and supervision costs.

Candidates need to learn the difference between peer-to-peer and client-server networks. Peer-to-peer networks are usually very small and often connect only **three** or **four** computers together. Extensive use of shared resources on peer-to-peer networks may result in a reduction in performance. They are also less secure than server-based networks.

Candidates need to learn that:

- client computers use, but do not provide, network services;
- peer computers both use and provide network services;
- servers only provide network services.

Candidates need to understand the differences between these **two** types of network and the factors that affect the choice of type of network, including:

- size of the network;
- level of security required;
- level of administration support available;
- amount of network traffic;
- cost.

A local area network (LAN) is a computer network that covers a local geographical area, such as **one** building or **one** site. A LAN can be subdivided into virtual local area networks – logical segments on a physical network.

A wide area network (WAN) is a computer network that operates over wide geographical areas, such as town to town or country to country.

Virtual private networks are LANs that are linked together by WAN communication methods.

Candidates need to know:

- the different types of LAN and WAN that exist, such as VLAN, WLAN and VPN;
- the characteristics of each;
- the advantages and disadvantages of each;
- the equipment – both hardware and software required to install, configure and run each type of network;
- situations where the use of each type of network is appropriate.

A WAN provides various additional services. Candidates need to explain the purpose of such services and how they work, including:

- e-mail;
- video- and tele-conferencing;
- access to the World Wide Web (WWW);
- access to public domain software;
- data file exchange (file attachment and FTP);
- commercial transactions (e-commerce);
- access to newsgroups and discussion boards;
- web-based marketing and advertising;

- extranets.

Candidates need to explain different methods of connecting a LAN to a WAN and the advantages and disadvantages of each method. Methods can include:

- dial-up modem;
- broadband.

Candidates need to explain the equipment required to make the connection and the different types of each method.

Network design

Candidates need to describe and sketch the following network topologies:

- bus;
- ring;
- star;
- tree;
- mesh.

For each topology, candidates need to know:

- advantages and disadvantages;
- what features make it useful;
- what features make it vulnerable to hardware failure.

Candidates need to understand the difference between a *physical* and a *logical* topology.

Candidates need to learn how to design a simple computer network. To design a network candidates need to select and justify:

- a suitable topology;
- the cables and connectors;
- any servers required;
- a suitable Network Interface Card (NIC);
- switches, hubs, gateways, bridges, routers, repeaters and patch panels;
- the network client software;
- the required communication protocols;
- the network services.

Candidates need to learn how to specify these resources and how to use graphic images to indicate clearly the layout and construction of the computer network.

There are many technical terms used to describe the operation and construction of computer networks. Candidates need to understand the technical terms outlined below and how they affect specifications and configuration:

- terms relating to signals and types of signal:
  – analogue;
  – digital;
  – modulation (and demodulation);

- terms relating to transmission media and connectors, including:
  – cables (including STP, UTP, Fibre Optic);
  – connectors (including ScTP, RJ45, ST/SC);
  – wireless transmission;
  – fibre transmission;
  – data packets;
  – bandwidth (including data transfer calculations: Estimated Time = $\frac{\text{Size of File}}{\text{Bandwidth}}$);

- terms related to LAN technologies:
  – ethernet;
  – token ring;
  – fibre distributed data interface (FDDI).

When **two** or more computers are connected together they need an agreed way of communicating with one another. Candidates need to understand the meaning and use of a variety of protocols, including:

- NetBIOS – Network basic input/output system;
- IPX/SPX – internet packet exchange/sequenced packet exchange;
- NetBEUI – NetBIOS extended user interface;
- FTP – File Transport Protocol;
- HTTP – Hypertext Transfer Protocol;
- SMTP – Simple Mail Transfer Protocol.

The most popular implementation of a hierarchical network addressing scheme is the Internet Protocol (IP). IP is the protocol that the internet uses.

Candidates need to understand the Internet Protocol including:

- contents of the IP header;
- IP address classes;
- converting IP addresses to binary equivalents;
- converting binary IP addresses to decimal equivalents;
- IP addressing and subnet addressing.

LAN and WAN communications systems make use of particular types of hardware. Candidates need to understand the purpose of:

- computers as file servers;
- computers as print servers;
- computers as application servers;
- computers as proxy servers;
- network interface cards;
- active and passive hubs, switches and repeaters;
- transmission media and connectors;
- modems;
- Uninterruptible Power Supply (UPS);
- firewalls;
- bridges and gateways.

Network software

LAN and WAN communication systems use various types of software. Some operating systems have network client software available within the operating system. Others require the installation of network operating software.

Candidates need to understand the purposes of the different types of software and the functions each perform, including:

- standard operating system (OS) – often includes provision for network client software;
- a dedicated network operating system;
- network adapter software to configure the network interface card;
- network client software to act as, or interact with, a network operating system;
- protocol software for network communications;
- network service software, such as file or printer-sharing facilities;
- connection software to connect to the internet via an ISP (including permanent and dial-up connections);
- web browser software;
- ftp software;
- HTML and web page editors.

Candidates need to know how to set up a connection from a computer to the internet and install and use web browsing software and ftp software. This will require candidates to:

- document all the settings used;
- change the default configuration settings of the software;
- produce a report on the installation.

Safety and security

Candidates need to work safely and take precautions to avoid hurting themselves or others. In setting up a network or communication system, candidates need to understand proper safety procedures, including those which involve:

- cables (to ensure that they do not obstruct and are electrically safe);
- ergonomic and physical stress considerations.

Candidates also need to understand the necessity for proper security procedures and how they can be implemented, including those that ensure that:

- data and software backup is maintained;
- confidential information is protected;
- passwords are used;
- virus checking is undertaken;
- copyright is protected;
- theft is avoided (data, software, equipment).

If a problem occurs, it is useful to refer to a communications log to help with the diagnosis of the problem and to spot any recurring patterns. Candidates need to understand that such a log needs to contain:

- date and time of communication;
- duration of communication;
- connection used;
- protocols used;
- source, destination, size and file type of data transferred.

If a problem has occurred, it is useful to have it documented along with the solution. Problem logs need to be filed in such a way that they can be effectively retrieved and used to solve the same problem in the future. Candidates need to understand the need for:

- an easily understandable file-naming system;
- suitable directory structure for the problem logs;
- access rights to be applied to those files and directories.

3.17 A2 Unit G056: *Program design, production and testing*

This unit helps candidates to:

- understand how to analyse problems to define program requirements;
- develop program designs from initial requirements specifications;
- understand the stages involved in program production;
- build on their programming skills;
- plan and carry out program testing;
- produce technical documentation.

In this unit candidates need to:

- analyse given programming problems;
- define program requirements;
- use structured program design methods;
- use programming tools and techniques to produce programs in a language of their choice;
- design test strategies;
- carry out testing procedures to show how well their program works;
- write technical documentation.

Candidates will produce a working program with complete documentation to meet a given user requirement. Evidence will include:

- a program specification to meet the given requirement and a description of how their specification meets the program requirements and how they have considered the user's needs;
- a program design arising from their specification and an analysis of the design methods they have used;
- an annotated modular program to realise the design, which must include at least one data structure, all data types, all control structures and all appropriate operators listed in the programming section;
- test documentation including a test plan with valid, invalid and boundary data, expected results, actual results and changes identified as a result of testing;
- a program review and evaluation report including an evaluation of their performance.

Program specification

Programming problems often arise from systems analysis. When analysing a programming problem candidates need to learn to consider:

- inputs (what they are, what form they take, input file descriptions);
- processing required;
- outputs (what they are and what form they need to take, output file descriptions).

Candidates need to define input, processing and output requirements in a specification of program requirements. Candidates need to reflect on their definitions and compare them against the original requirements.

Program design

Candidates need to learn to produce a program design to meet the definition of requirements given in the specification. Candidates need to select and use structured design methods including:

- top-down;
- bottom-up;
- object-based;
- data driven;
- process driven;
- event driven.

Candidates need to use structured methods to design:

- inputs (method of data capture, input screen design, verification and validation);
- outputs (design of screen and printed output);
- processes (specifications using structured English, decision tables, flowchart, action charts, event sequence diagrams);
- data structures;
- file structure and organisation (serial, sequential, indexed, random).

Programming

Candidates need to learn the major features of a selected programming language. Candidates need to learn to use modularity in program production.

While writing their program, candidates need to include routines using appropriate tools, techniques and constructs for:

- input (screen layouts, controlling an input event such as a mouse click, keyboard entry or sensor);
- output (screen display, hardcopy, disc);
- processing – concatenation, operations (arithmetic, logical, relational, string manipulation), logging, file handling (creating, opening, reading, writing, closing), file maintenance (add, delete and edit records), file updating, events, objects;
- on-screen help and error handling, including validation, verification and program run-time errors;

- annotating their programme by including comments to simplify understanding for future maintenance.

Candidates need to use data structures including:

- simple variables;
- arrays;
- records;
- files.

Candidates need to also use data types, variables and constants including:

- number (real, integer);
- character and string;
- Boolean.

Candidates need to make appropriate use of control structures (sequence, selection, iteration).

Candidates need to understand how to use operators including:

- arithmetic (+, -, *, /, ( ));
- relational (=, <, >, <=, >=, <>);
- logical (AND, OR, NOT);
- string manipulation, e.g. LEN, TRIM$, LEFT$.

Candidates need to learn to use development tools that are appropriate to the chosen programming language, including:

- project builders;
- CASE tools;
- editors;
- debuggers;
- data-entry form generators;
- report generators;
- program translators (compilers, interpreters).

Candidates need to understand how to choose and use appropriate routines for input, output and file handling.

Planning a test strategy

Candidates need to understand the need for thorough testing to ensure that programs meet the explicit and implicit requirements of the specification.

Candidates need to learn to plan the testing process so that all paths through the program and all user operations are tested. Candidates need to identify valid, invalid and boundary data and state the expected results.

Testing

Candidates need to learn to implement their test plan and record the actual results. Candidates need to identify and correct errors.

Candidates need to:

- identify, develop and document a test strategy for the design;
- select suitable test data for the design;
- test the solution, illustrating how the solution evolves;
- produce detailed output from the testing, cross-referencing as appropriate the test plan.

Technical documentation

Candidates need to learn about the importance of good technical documentation to enable easy and effective maintenance of the final program. All stages of program specification, design, production and testing will result in the production of documentation that will form part of the final technical documentation.

Candidates need to collect together this documentation, co-ordinate it, and supplement it to produce detailed and accurate technical documentation that will include:

- data dictionary;
- annotated program listings;
- data structure diagrams;
- program structure diagrams.

Program evaluation and review

Candidates need to learn to review their program in response to their testing, to identify problems that require correction.

Candidates need to learn to evaluate, in terms of the final outcome, the methods they used to design the program, and to suggest ways in which the program could be improved by the use of different methods, different techniques or different logic.

3.18 A2 Unit G057: *Database design*

This unit helps candidates to:

- explore how record-structured databases are used in organisations;
- explore how information is structured for database storage and processing;
- understand and use logical data modelling;
- learn and apply the principles of relational database design;
- design, implement and test a relational database to meet a given specification;
- produce user documentation;
- develop good practice in their use of ICT.

Candidates need to produce a relational database and design notes, technical documentation and user instructions.

This unit applies the knowledge and skills gained from Unit G042: *ICT solutions for individuals and society*, Unit G044: *Problem solving using ICT* and Unit G045: *Software development - design.*

Candidates will produce a relational database to meet a given specification requiring at least three related tables, supported by design and analysis notes, technical and user documentation and an evaluation of the database produced. Evidence will include:

- analysis and design notes;
- normalisation of the data model to 3rd normal form (NF) with documentation;
- a user interface, including data input forms and methods of obtaining output;
- a working relational database;
- user and technical documentation;
- test plans and the results of the testing of the database;
- an evaluation of the effectiveness of their solution and own performance.

Database concepts

In this unit candidates need to learn about the use and application of record-structured relational databases. Candidates need to investigate various manual and computerised systems, how they work and the types of information (data) that they process.

The investigation could include databases in areas such as:

- health (doctors, patients, appointments);
- employment (name, pay, department);
- agencies (clients, services, reservations);
- sale of goods (orders, goods, invoices);
- libraries (books, loans, members);
- police (offenders, crime, officers).

These databases will have **two** or more tables. Candidates need to understand that a single table can have relationships with other tables. An example of this would be a hospital appointments table, which will have a relationship to the other tables because each appointment involves a

patient and a doctor.

When investigating databases, candidates need to consider:

- ways in which the user interacts with the database, such as data input forms, menus, buttons;
- the data that is input;
- the form and content of the output produced;
- how the output is generated;
- the database structure, such as the tables used, the relationships between them.

Many types of data are used when presenting information in databases. Candidates need to identify and use the following data types:

- text (string);
- date;
- number;
- time;
- currency;
- logical (true or false).

Many data types have various formats. Candidates need to understand and use the different formats correctly, including:

- text (string), e.g. limited length, unlimited length, memo;
- number, e.g. integer, auto record number, long;
- date, e.g. dd/mm/yy, dd month, 24-hr clock;
- currency, e.g. pound (£), dollar ($);
- logic, e.g. true and false, Y and N.

To avoid incorrect data entry, candidates need to validate data, including checking:

- data type;
- number range;
- the text or case;
- date range;
- format;
- length of data.

Logical data modelling

Logical data modelling makes use of specific terms to describe the data structures as a first step towards designing a database. Candidates need to understand and apply correctly, the data modelling terms:

- entity;
- attribute;
- relationship;
- primary key;
- foreign key;
- composite key.

An entity is any object of the real world, e.g. a person, a company, a course, a customer or a country.

An attribute is **one** of the elements that define an entity, e.g. the entity 'customer' could have attributes such as name, address and telephone number. When attributes need not be broken down any further they are said to be atomic. Thus candidates would avoid placing the attribute 'John Smith' in **one** field. To make this attribute atomic, **two** fields would be used, with 'John' in **one** field and 'Smith' in the other. This would, for example, allow searching by last name or sorting by last name then first name.

A key is a database field that has a particular significance. Relational database software makes use of different types of key. A relational database dictates that each row (record) of the table be unique. Uniqueness is guaranteed by designating **one** column (field) to be the primary key. This column needs to contain unique values for every row. All columns that contain unique values for every row are called candidate keys. The primary key needs to be selected from the candidate keys. All remaining candidate keys are called alternate keys.

Keys may be simple or composite. A composite key is one that is made up of **two** or more columns (fields). A primary key may be a composite key. Candidates need to identify and use composite keys to sort data in a table, e.g. using last name and first name to sort a list of people. There may even be a need to have a third field such as 'date of birth' in the key to ensure that it is unique.

When the primary key in **one** table is related to a field in a second table, the field in the second table is known as a foreign key. Candidates need to identify a suitable foreign key when relating two tables.

From an outline specification, candidates need to explore the system to create an initial logical data model. In such a model, candidates need to:

- identify all the entities;
- define the entities in terms of attributes;
- ensure that attributes are atomic (cannot be broken down into further attributes);
- define relationships between entities;
- define the model diagrammatically using an initial entity-relationship diagram (ERD).

Candidates need to analyse the initial data model to resolve:

- many-to-many relationships;
- which data attributes or combinations of attributes provide the keys.

Normalisation

A database needs to have integrity. This means that it needs to be consistent, accurate and reliable. Candidates need to learn that to ensure integrity in a database:

- there must be no repeating groups of data in a table;
- all attributes in a table need to be atomic;
- all primary keys need to remain unique;
- every foreign key needs to have a matching primary key in its related table.

Normalisation is a process that reduces errors due to badly designed data structures (entities, attributes, and relationships). Normalisation can be carried out at various levels of complexity. Candidates need to understand the purpose of, and the methods used to normalise, an initial data model to:

- first normal form (no repeating groups of attributes and atomic data items);
- second normal form (all attributes depend only on the primary key);
- third normal form (all attributes are mutually independent of one another).

Candidates need to analyse and change a database structure or logical model, as necessary, to make it meet the first **three** forms of normalisation. Following normalisation, candidates need to build a definitive logical data model comprising an entity-relationship diagram (ERD) and a Data Dictionary (DD).

Relational database structures

Relational database software provides various design facilities. Candidates need to understand and use these to create suitable database structures. There is a wide variety of software available and many use different terminology to describe database design. Candidates need to understand and use terms that have the same or very similar meaning, including:

- table, relation, entity (note that a relation is different from a relationship);
- record, row, tuple, unique entity instance;
- field, column, entity attribute.

In creating a database structure candidates need to:

- identify the tables (entities) to form the structure;
- identify the fields (attributes) for each table;
- normalise the tables (a re-iterative process);
- define suitable field names;
- define the data type for each field;
- define the size (length) of each data field;
- identify which field(s) are primary keys;
- identify which field(s) are foreign keys (the relationships between tables).

Relational database construction

Relational database software allows candidates to build a database to meet the needs of the normalised data model. Candidates need to understand how to:

- construct tables defining the entities;
- define the fields in each table;
- define primary and foreign keys;
- define relationships between tables;
- include calculations in reports;
- use wizards effectively;
- create data entry forms;
- create report forms;
- create queries (single and multiple field);
- use relational logic in queries;
- integrate queries and reports.

Data entry in most databases requires the user to enter the data into screen-based forms using the keyboard. Candidates need to understand and use the software to create screen data entry forms that:

- enable the entry of data into a single table;
- enable the entry of data into multiple tables;
- have appropriate entry form field lengths;
- provide clear labeling of entry form fields;
- provide instruction fields where necessary;
- include validation checks on field entries as appropriate;
- enable the selection and entry of data from built-in lists (constructed from other tables);
- comply with the data dictionary;
- include calculation (formula) fields;
- make use of automated number fields (counter fields);
- use date and time fields.

Various types of reports are used for computer databases. Examples of printed reports are invoices, statements, price lists and stock lists. Examples of screen reports are those used by travel agents and rail information staff. Candidates need to understand and create database report forms that:

- produce printed reports;
- produce screen reports;
- have suitable headers and footers;
- have sorted data grouping;
- include calculations and total fields;

- meet specified interrogation needs;
- include specified queries, such as SQL (structured query language) and QBE (query by example).

How the user will interact with the database is important. Most users will not need access to the underlying database or understand its functions. Candidates need to learn how to hide the underlying database from the user by customising the user interface. This may involve the creation of menu screens with macro controlled buttons to navigate the database and select the output required.

Testing

Candidates need to learn to test their database solutions. Candidates could ask the following questions:

- Does my solution meet the specification agreed with the user?
- Does my database accept all the data for which it was designed, including normal, extreme and abnormal data?
- Do users find my database easy to operate?
- Is my database robust or can it be made to crash?

Candidates need to create a test specification that defines tests for:

- acceptable data input values (including maximum and minimum values);
- unacceptable data values that need to be automatically rejected;
- inputs, such as mouse or key depressions, that require a specific response;
- inputs, such as mouse or key depressions, to which the system should not respond;
- checking every facility provided in the database, e.g. data entry, queries, reports;
- checking, independently, that all functions and/or formulae work correctly;
- checking that the system meets user requirements.

Documentation

Candidates need to learn to document the development of their database and create instructions for users. Technical documentation is for specialists. It records the design and development of the database. Candidates need to learn to record their work. Records may include:

- a copy of the specification agreed with the user;
- details of the hardware, software and other resources required;
- a detailed entity-relationship diagram;
- a detailed data dictionary;
- details of any program code;
- details of validation and verification procedures;
- details of all input and output screens and printed reports;
- copies of the test specification.

User documentation helps others to use the database. Candidates need to learn to write user instructions that are simple to understand. Instructions could include:

- how to start the database;
- how to append, delete and edit records;
- examples of screens and data entry forms;
- instructions about using queries and producing reports;
- advice about how to respond to error messages;
- examples of data output screens and printed copy.

3.19 A2 Unit G058: *Developing and maintaining ICT systems for users*

This unit helps candidates to

- understand the roles of the hardware components of a microcomputer system and how they interact;
- recognise the characteristics and functions of different components and their suitability for particular tasks;
- understand the need for the different components of a microcomputer system to be compatible with each other and the user's requirements;
- select suitable components to specify microcomputer systems for particular purposes;
- advise a user on the most appropriate system to meet their needs;
- select components and upgrade systems;
- use troubleshooting procedures to identify and replace faulty components.

Candidates will produce records of specifying, upgrading and repairing ICT systems, to include:

- records of interviews with **two** different users to identify their key requirements;
- detailed specifications for an ICT system for each user, along with explanations of the reasons for selecting particular components, in non-technical language;
- records of carrying out an upgrade involving selecting and adding a new component to a system;
- records of carrying out an upgrade by replacing a component in a system;
- records of troubleshooting procedures carried out to identify faulty components;
- an evaluation of the information sources used to find information on components;
- an evaluation of the specifications and approaches taken to specifying, upgrading and repairing systems.

Components of microcomputer systems

Suppliers' catalogues and websites list a wide range of components that can be used to build microcomputer systems. These components have different functions and characteristics. The components chosen for a particular system will depend on what the system is required to do.

In order to specify components for a system, candidates need to learn about the functions and characteristics of components, including microprocessors, storage and peripheral devices.

Most software packages have particular memory, storage and other requirements to run efficiently. Candidates need to understand that these represent the absolute minimum that the software manufacturer recommends. Candidates need to learn how the software needed for a task helps to determine their choice of hardware components.
Candidates need to have a thorough understanding of the meaning of all technical terms and acronyms used in this section so that they are able to explain them to a user who has little knowledge of computers.

Microprocessors

Candidates need to learn about the characteristics and performance of different types of

microprocessors and the instruction sets that they support, including:

- simple processors and co-processors;
- multiple core processors;
- multiprocessors;
- the amount and levels of cache memory and its impact on performance.

Motherboards

Candidates need to know the characteristics and performance of a range of motherboards, including:

- the type of motherboard (including the socket or slot type) and the clock speeds of the buses supported;
- the number of memory slots and the amount and type of memory supported;
- the number and types of device controllers, ports and expansion slots;
- the motherboard BIOS and its functions;

Candidates need to also know about the different bus types, e.g. ISA, PCI, PCI-e, USB, Firewire, AGP.

Memory

Candidates need to know about different types of memory and their characteristics, including:

- random access memory (RAM), e.g. SDRAM, DDR and RAMBUS (RIMM);
- read only memory (ROM), e.g. PROM and EPROM.

Candidates need to learn how memory is used and allocated, including:

- non-volatile ROM for boot settings;
- physical and virtual memory.

Candidates also need to know the characteristics of these types of memory, including their:

- size and speed;
- volatility and parity.

Storage devices

Candidates need to know about a wide range of storage devices, including:

magnetic disc systems, e.g. hard;

- magnetic tape systems, e.g. Travan, Digital Audio Tape (DAT), Advanced Intelligent Tape (AIT);
- optical disc systems, e.g. CD-ROM, CD-RW, DVD-ROM, DVD-RW and DVD-RAM;
- USB flash drives, memory cards/readers.

Candidates need to know their properties, including their:

- connection type, e.g. SCSI, IDE/ATA, Serial ATA;

- connectivity, e.g. master/slave/cable select, primary/secondary, devices per channel;
- physical size, data capacity, access and transfer speeds;
- purpose;
- compatibility and portability between systems.

Expansion cards and device controllers

Candidates need to know the characteristics and purpose of the different types of expansion cards and device controllers available, some of which may be integrated on the motherboard, including:

- sound and graphics cards and controllers and video-imaging cards;
- card modem, PCMCIA cards, and network cards and controllers;
- SCSI controllers and cards, IDE controllers and cards, RAID controllers and cards.

Computer cases

Computer cases are available in a range of shapes and sizes to suit different purposes. The case chosen will affect the components that can be fitted into it. Candidates need to know about the different types of cases, including:

- desktops, mini-towers, midi-towers and full towers, home theatre cases (HTC);
- 'barebones' cases (with integrated motherboards and controllers).

Candidates need to know the different facilities offered by the different cases:

- size (how much desk space is required, what vertical clearance is needed);
- number of expansion slots;
- type and rating (watts) of power supply;
- number and size of drive bays.

Display systems

Candidates need to learn about different display systems and know which characteristics affect their performance and use. These include:

- for visual display units (VDU):
  – the type of screen, e.g. LCD and Plasma;
  – the physical and viewable screen size and screen area capability;
  – the dot pitch and refresh rate;
- for display adapters:
  – the size of the memory and processor speed;
  – the colour resolution and screen area capability.

Peripheral devices

Microprocessors are of little use without the ability to input data and output results. Candidates need to learn about the different types of devices that can be used. These include:

- input devices:
  – keyboards, e.g. QWERTY, overlay, ergonomic;
  – pointing devices, e.g. mouse, joystick, touch screen;
  – image capture devices, e.g. scanner, camera, digitiser;
  – other input devices, e.g. barcode reader, microphone, MIDI keyboard;
- output devices:

– printers;
– plotters;
– sound production devices, e.g. loudspeaker, voice synthesiser.

For each of these, candidates need to know:

- the different types available;
- the way they operate and what they are used for;
- how they are connected to the system, e.g. to a parallel port, to a USB port, using an interface card;
- particular characteristics, e.g. speed, quality, ease of use, size.

Compatibility and other factors

A microcomputer system will not work if its components are not compatible. Candidates need to know about the factors which affect compatibility, including:

- physical factors, e.g. size and type of connector;
- transfer speeds;
- bus type;
- trade-off between components, e.g. reduced processor speed vs. increased memory size.

Candidates need to know about other factors that may affect the choice of components, including:

- cost;
- availability;
- future proofing, e.g. ability to enhance/upgrade.

Meeting a user's needs

Candidates need to identify from discussions with a user, or from information supplied, what specification of computer system meets the needs of the user. Candidates need to take into account the key requirements of the user. A key requirement may be to:

- provide an order processing system for a small business;
- provide computing facilities for a candidate on a ICT course;
- communicate with clients by e-mail, fax and video conference;
- produce DTP documents with high resolution graphics;
- provide an information system for visitors, accessed via the screen;
- produce and edit promotional videos;
- edit and enhance photographs and print them at high quality.

Candidates then need to take into account other factors, for example:

- equipment already purchased by the user;
- software which the user wants to install and use on the new computer system;
- the importance of availability of the system;
- the volume of information that may need to be processed and stored on the computer system;

- cost constraints.

Candidates need to suggest a configuration that meets the user's needs and will provide a usable system at an acceptable cost, with the option for expansion at a later date.

Upgrading

When a user wishes to upgrade a system, candidates also need to identify from discussions with them, or from information supplied, what additional or replacement components meet the needs of that user.

In the case of replacing components as a result of system problems or failure, candidates need to identify the potential cause of the failure and recommend appropriate procedures and/or components to rectify the situation.

When adding or replacing components, candidates also need to identify any changes that are required to the operating system configuration, e.g. loading appropriate device drivers, or changing IRQ settings.

Additions to existing systems

An upgrade requiring the addition of components will usually be the easier of the above requirements. However, candidates need to select an appropriate component that does not compromise the existing system, e.g. selecting a 1 GB memory module when the motherboard maximum is 512 MB.

In addition, candidates need to identify any limitations of the existing system that may cause problems in the upgrade, e.g. insufficient additional expansion slots, insufficient memory slots or simply insufficient physical space or power provision in the existing case.

Candidates also need to identify that some additions to existing systems may themselves require additional components and/or re-configuration of the system, e.g. the addition of an IDE storage device may require it to be set as master or slave on an existing connection, or may even require an additional channel on an expansion card.

Candidates also need to recognise that some additions require the BIOS to be re-set, e.g. enabling USB ports on the motherboard, or changing the mode of a parallel port.

Replacing components in existing systems

When an upgrade requires the replacement of selected parts, candidates need to apply their knowledge of components to select those that are compatible with all elements of the existing system.

Candidates need to recognise that a simple upgrade request may require the replacement of more than one component, e.g. to upgrade the processor on an older system may also require the replacement of the motherboard, the memory or even the case and power supply.

Candidates also need to recognise that some replacements will also require the BIOS to be re-set or even upgraded, e.g. changing hard-drive parameters or acquiring a BIOS upgrade to recognise a newer model of CPU.

Troubleshooting components in existing systems

When system problems occur, candidates need to identify the components that may be causing this, e.g. no output on a display screen could be caused by failure of the actual display screen, failure of the graphics controller card, or even failure of a slot on the motherboard.

Candidates need to know how to find the meaning of any hardware error messages and BIOS beep-codes, e.g. using the appropriate hardware manual or using appropriate sites on the internet.

Candidates need to apply testing tools and procedures to identify any component that has failed, e.g. disc scanners and memory testers.

In the case of total system failure, candidates need to decide whether to test the components that may be causing the failure by trying replacement components in the existing system, or by removing suspect components and testing them on a working system. For example, a disk boot failure will require the disk to be tested on another system, while a total boot failure will normally require testing by replacing components in the existing system.

Many of the previous statements in *Compatibility and other factors* and *Meeting a user's needs* also apply when upgrading or replacing components in existing systems.

Simple hardware faults

Some hardware problems can be diagnosed either by observation, by questioning, or by simple diagnostic tests. Candidates need to learn when it is best to use each method.

Candidates then need to solve the problem by:

- checking the external electrical supply, e.g. by checking it is switched on;
- checking and replacing leads;
- replacing paper, ribbons, ink cartridges or toner cartridges, and clearing paper jams in printers;
- adjusting the display of visual display units (VDUs);
- replacing faulty peripheral devices such as mice, printers, or keyboards.

Candidates must not attempt to dismantle equipment unless instructed to do so by the teacher/supervisor. When working with hardware, it is important to follow the rules and regulations relating to electrical equipment and health and safety guidelines.

3.20 A2 Unit G059: *ICT solutions for people with individual needs*

Special and individual needs covered are likely to include:

- sensory impairments;
- speech impairments;
- motor disabilities;
- learning difficulties;
- temporary limitations, e.g. from a fractured wrist;
- limitations from age and infirmity.

Candidates need to see that anyone may, at some stage in life, have individual needs which can be assisted and alleviated by the careful use of technology.

This unit helps candidates to:

- understand about disabilities and impairments;
- understand how technology can be used to alleviate the limitations of disabilities and impairments;
- explore how ICT improves the quality of life for some people;
- evaluate the effectiveness of ICT solutions;
- consider how ICT may be further used to help individuals.

Candidates will study individuals' use of ICT to enable them to achieve equality and independence, and how they use technology to convert communication into a useable form (to sense and control) in order that disabilities, impairments and difficulties can be overcome.

This unit may be useful for a career in the caring field, using ICT skills.

Candidates will produce a report or presentation for ICT solutions which assesses the needs, defines ICT solutions and evaluates the solutions in response to **three** case studies. Each of the individuals in these case studies will have different needs and candidates need to include **one** case study that relates to an individual who has sensory needs.

Candidates' evidence will:

- Show an understanding of legislation and the rights of each of the individuals in connection with their ICT solutions;
- Show a clear understanding of the disabilities or limiting factors, and resultant needs, identify and show suitable items of equipment and software as appropriate;
- Evaluate the viability and effectiveness of their proposed solutions, indicating how the solutions will enhance the quality of life for each individual;
- Present their reports or presentations in a way that is suitable for the needs of the individuals outlined in each case study, or for a carer if the case study is that of a young child or a person with very limited understanding
- For at least **one** case study, provide a specification for a complete system, to include configuration and customisation of software and equipment as appropriate and demonstrate that they can customise the available operating system and applications, evaluating their actions and role in solving this problem.

Types of disability

There are many terms used in relation to individual and special needs. The terms 'disability', 'impairment' and 'handicap' need to be explored and understood.

Before candidates can look at ICT solutions, they need to gain an understanding of the limitations caused by a number of disabilities, impairments and other limiting factors that affect individuals. From this candidates will understand ways in which technology can be used to enhance quality of life.

Types of need

Candidates need to explore a range of needs that should include:

- blindness and visual impairment;
- deafness and hearing impairment;
- speech impairment;
- motor disabilities that impede or disable mobility;
- dyslexia;
- learning difficulties;
- temporary limitations – perhaps during recovery from accident.

An individual or special need is a person's particular requirement that needs to be met in order for them to achieve something which they might otherwise find difficult due to their individual circumstances.

Candidates need to understand the differences between those who were born with a disability, those who have acquired a permanent disability and those who are temporarily disabled. Candidates need to explore how this will affect individuals' attitudes and understanding. Candidates need to learn about the aspirations of individuals to achieve independence and quality of life.

ICT usage

Candidates need to learn about and understand the types of ICT usage that can be required by people with individual and special needs. This can be general use of technology for business, learning and leisure. It can also include specialised use such as:

- speech synthesis;
- speech recognition;
- conversion between speech and text;
- enlarged text;
- Braille output;
- control of devices, e.g. ventilation, heating, access to building.

There may be a combination of uses needed by the individual.

Equipment

Candidates need to explore the range of specially constructed or modified equipment that is available, how it is used and in what circumstances it would be used. Candidates need to look at special input and output devices plus modification to existing standard equipment. The list is not exhaustive but could include:

- special keyboards;
- mouse alternatives;
- touch screens;
- Braille output devices and printers;
- extra large screens;
- control interfaces.

Candidates need to consider other aspects of technology, such as vibrating alarm clocks, speaking scales, text phones, mobile phones and fax machines, when exploring advantageous equipment. Look also at how existing items may be modified to make their usage easier for an individual. Examples here include tactile markers on home keys and other important keys to help a blind user, or a key guard to help a person with limited hand movement.

Candidates need to learn about the cost and availability of special items of equipment.

Software

Candidates need to learn about the range of software available and what special features are incorporated to meet special and individual needs. This includes:

- control software;
- voice recognition;
- Optical Character Reader (OCR) packages;
- speech synthesis;
- screen reading software.

Candidates need to understand the benefits and limitations of these packages. Candidates need to learn about the cost and availability of special items of software.

Customisation of software

Candidates need to consider how existing operating systems and application software can be customised to meet individual needs. Some applications software, for example, includes features that may be advantageous to many users. Examples include the facility to set up the system for single touch use of 'Shift' or to reverse the mouse buttons for a left-handed user. Candidates need to learn how to customise the operating system, web browser and applications such as word processing to meet a variety of individual needs.

Legislation

Candidates also need to understand how current legislation affects the rights of people with individual needs. Candidates need to look at:

- Chronically Sick and Disabled Persons' Act (CSDPA) (1970);
- Disability Discrimination Act (DDA) (1995);
- Special Educational Needs and Disabilities Act (SENDA) (2001)
- Telecommunications Act (2003);
- Equal Opportunities Policies;
- European Legislation relating to equal opportunities and human rights (eEurope Action Plan (2002), Web Accessibility Initiative (WAI) guidelines).

Candidates need to know of any updates to this legislation.

4 Schemes of Assessment

4.1 AS GCE Scheme of Assessment

AS GCE in Applied ICT (H115)	
AS Unit G040: *Using ICT to communicate*	
33% of the total AS GCE Coursework 50 marks	This unit is assessed through portfolio work This unit is internally assessed **Assessment Criteria**: Please refer to Appendix B at the back of this specification.
AS Unit G041: *How organisations use ICT*	
33% of the total AS GCE 1 hr 30 mins written paper 100 marks	This unit is externally assessed
AS Unit G042: *ICT solutions for individuals and society*	
33% of the total AS GCE Coursework 50 marks	This unit is assessed through portfolio work This unit is internally assessed **Assessment Criteria**: Please refer to Appendix B at the back of this specification.

4.2 AS GCE (Double Award) Scheme of Assessment

AS GCE (Double Award) Applied ICT (H315)	
AS Units G040 – G042 as above, each being worth 16.67% of the AS GCE (Double Award). Candidates also take Unit G043, and choose two of the following optional units (G044 – G047)	
AS Unit G043: *System specifications and configuration*	
16.67% of the total AS GCE (Double Award) Coursework 50 marks	This unit is assessed through portfolio work This unit is internally assessed **Assessment Criteria**: Please refer to Appendix B at the back of this specification.
AS Unit G044: *Problem solving using ICT*	
16.67% of the total AS GCE (Double Award) Coursework 50 marks	This unit is assessed through portfolio work This unit is an optional part of the double award only and is internally assessed **Assessment Criteria**: Please refer to Appendix B at the back of this specification.

AS Unit G045: *Software development - design*	
16.67% of the total AS GCE (Double Award) Coursework 50 marks	This unit is assessed through portfolio work This unit is an optional part of the double award only and is internally assessed **Assessment Criteria**: Please refer to Appendix B at the back of this specification.
AS Unit G046: *Communicating using computers*	
16.67% of the total AS GCE (Double Award) Coursework 50 marks	This unit is assessed through portfolio work This unit is an optional part of the double award only and is internally assessed **Assessment Criteria**: Please refer to Appendix B at the back of this specification.
AS Unit G047: *Introduction to programming*	
16.67% of the total AS GCE (Double Award) Coursework 50 marks	This unit is assessed through portfolio work This unit is an optional part of the double award only and is internally assessed **Assessment Criteria**: Please refer to Appendix B at the back of this specification.

4.3 Advanced GCE Scheme of Assessment

Advanced GCE in Applied ICT (H515)	
AS Units G040 – G042 as above, all units being 16.67% of the Advanced GCE marks.	
A2 Unit G048: *Working to a brief*	
16.67% of the total Advanced GCE Specimen research and development task 50 marks	This unit is externally set and internally assessed. **Assessment Criteria**: Please refer to Appendix B at the back of this specification.
Candidates choose two of the following optional units.	
A2 Unit G049: *Numerical modelling using spreadsheets*	
16.67% of the total Advanced GCE Coursework 50 marks	This unit is assessed through portfolio work This unit is optional and is internally assessed **Assessment Criteria**: Please refer to Appendix B at the back of this specification.
A2 Unit G050: *Interactive multimedia products*	
16.67% of the total Advanced GCE Coursework 100 marks	This unit is assessed through portfolio work This unit is optional and is internally assessed **Assessment Criteria**: Please refer to Appendix B at the back of this specification.

A2 Unit G051: *Publishing*	
16.67% of the total Advanced GCE Coursework 50 marks	This unit is assessed through portfolio work This unit is optional and is internally assessed **Assessment Criteria**: Please refer to Appendix B at the back of this specification.
A2 Unit G052: *Artwork and imaging*	
16.67% of the total Advanced GCE Coursework 50 marks	This unit is assessed through portfolio work This unit is optional and is internally assessed **Assessment Criteria**: Please refer to Appendix B at the back of this specification.
A2 Unit G053: *Developing and creating websites*	
16.67% of the total Advanced GCE Coursework 50 marks	This unit is assessed through portfolio work This unit is optional and is internally assessed **Assessment Criteria**: Please refer to Appendix B at the back of this specification.

4.4 Advanced GCE Scheme of Assessment (Double Award)

Advanced GCE (Double Award) Applied ICT (H715)	
AS and A2 Units as above, all units being 8.3% of the Advanced GCE (Double Award) marks. Candidates must take AS units G040 – G043 *and* A2 unit G048. Candidates must choose two AS units from Units G044 - G047, two A2 units from Units G049 – G053, either Unit G054 or G055, and two A2 units from Units G056 - G059.	
A2 Unit G054: *Software development*	
8.3% of the total Advanced GCE 1 hr 30 mins written paper 100 marks	This unit is externally assessed.
A2 Unit G055: *Networking solutions*	
8.3% of the total Advanced GCE 1 hr 30 mins written paper 100 marks	This unit is externally assessed.
A2 Unit G056: *Program design, production and testing*	
8.3% of the total Advanced GCE Coursework 50 marks	This unit is assessed through portfolio work This unit is optional and is internally assessed **Assessment Criteria**: Please refer to Appendix B at the back of this specification.

A2 Unit G057: *Database design*	
8.3% of the total Advanced GCE Coursework 50 marks	This unit is assessed through portfolio work This unit is optional and is internally assessed **Assessment Criteria**: Please refer to Appendix B at the back of this specification.

A2 Unit G058: *Developing and maintaining ICT systems for users*	
8.3% of the total Advanced GCE Coursework 50 marks	This unit is assessed through portfolio work This unit is optional and is internally assessed **Assessment Criteria**: Please refer to Appendix B at the back of this specification.

A2 Unit G059: *ICT solutions for people with individual needs*	
8.3% of the total Advanced GCE Coursework 50 marks	This unit is assessed through portfolio work This unit is optional and is internally assessed **Assessment Criteria**: Please refer to Appendix B at the back of this specification.

For the Advanced Subsidiary GCE **two** units will be assessed internally, through a teacher-assessed portfolio (see Section 7) and **one** unit will be assessed externally with the assessment set and marked by OCR. These **three** units will be equally sized and equally weighted.

For the Advanced Subsidiary GCE (Double Award) **five** units will be assessed internally, through a teacher-assessed portfolio (see Section 7) and **one** unit will be assessed externally with the assessment set and marked by OCR. These **six** units will be equally sized and equally weighted.

For the Advanced GCE **four** units will be assessed internally, through a teacher-assessed portfolio (see Section 7) and **two** units will be assessed externally with the assessment set and marked by OCR. These **six** units will be equally sized and equally weighted.

For the Advanced GCE (Double Award) **nine** units will be assessed internally, through a teacher-assessed portfolio (see Section 7) and **three** units will be assessed externally with the assessment set and marked by OCR. These **twelve** units will be equally sized and equally weighted.

The assessment will be conducted in accordance with the GCE Code of Practice.

4.5 External Assessment

External assessment forms at least 16.7% of each qualification:

Advanced Subsidiary GCE:	Candidates take **one** unit of external assessment.
Advanced Subsidiary GCE (Double Award):	Candidates take **one** unit of external assessment.
Advanced GCE:	Candidates take **two** units of external assessment.
Advanced GCE (Double Award):	Candidates take **three** units of external assessment.

External assessments are 90 minutes and have pre-released case-study material which will be available to centres (once they have made their *provisional* candidate entries) approximately **six** weeks prior to the examination date, except for Unit G048: W*orking to a brief* which will be available to centres at the start of the course.

The externally assessed units will be marked by OCR. The maximum raw score will be stated on the front cover of the question paper.

4.6 Portfolio Assessment

Internal assessment forms at most 83.3% of each qualification. Internally assessed units take the form of a portfolio of work designed to enable the candidate to demonstrate understanding of the content of the unit. Each internal assessment is set by the centre to OCR guidelines, is internally marked and externally moderated by OCR.

4.7 Unit Order

Units may be taken in any order, though centres are strongly advised to cover AS Units G040, G041 and G042 early in the course, since they form a core on which other units are based.

The normal order in which the unit assessments are designed to be taken is AS Units in the first year of a **two** year course, leading to an AS GCE award, then A2 Units are designed to be taken in the second year leading to the Advanced GCE award. However, the unit assessments may be taken in any order.

Alternatively, candidates may take a valid combination of unit assessments at the end of their AS GCE or Advanced GCE course in a 'linear' fashion.

Suggested schemes of assessment will be provided as part of the teacher resource material. Centres should also ensure all authentication documentation for every candidate is completed and kept securely with the work until moderation takes place.

4.8 Unit Options (at AS/A2)

There are no optional units in the AS GCE specification; for AS GCE in Applied ICT candidates must take AS Units G040, G041 and G042.

There are optional units in the AS GCE (Double Award) specification; for AS GCE (Double Award) Applied ICT candidates must take AS Units G040 - G043, and choose two Units from AS Units G044 – G047.

There are optional units in the Advanced GCE specification; for Advanced GCE in Applied ICT candidates take AS Units G040, G041 and G042 *and* A2 Unit G048, and choose two Units from A2 Units G049 – G053.

There are optional units in the Advanced GCE (Double Award) specification; for Advanced GCE (Double Award) Applied ICT candidates must take AS Units G040 - G043 *and* A2 Unit G048. Candidates choose two units from AS Units G044 – G047, two units from A2 Units G049 – G053, either G054 or G055, and two units from Units G056 – G059.

4.9 Synoptic Assessment (A Level GCE)

Synoptic assessment at Advanced GCE is designed to ensure that candidates have a good understanding of the subject as a whole and are able to address issues within the subject from a range of perspectives and in an integrated way. The emphasis is on strategic understanding and on the ability to draw evidence together from any relevant areas of the specifications. Assessment focuses on the breadth, depth and quality of the candidate's analysis and evaluation and will be drawn from across the specifications and will involve candidates bringing together, and making connections between, the areas of knowledge, skills and understanding covered within the specifications and applying this when responding to the set requirements.

Synoptic assessment will be assessed through the work completed for Unit G048: *Working to a brief.*

4.10 Assessment Availability

There are two examination series each year, in January and June.

4.11 Assessment Objectives

Candidates are expected to demonstrate the following in a range of work related contexts:

AO1 ICT capability

- Candidates demonstrate practical capability in applying ICT.

AO2 Knowledge and understanding

- Candidates demonstrate knowledge and understanding of ICT systems and their roles in organisations and society.

AO3 ICT problem solving

- Candidates apply knowledge, skills and understanding to produce solutions and solve ICT problems.

AO4 Evaluation

- Candidates evaluate:
  - ICT solutions
  - Their own performance.

The assessment objectives are weighted as follows:

	AS Units	A2 Units	GCE and GCE (Double Award)
AO1	20-30%	20-30%	20-30%
AO2	20-30%	10-20%	15-25%
AO3	20-30%	20-30%	20-30%
AO4	10-20%	30-40%	20-30%

4.12 AO weightings

The relationship between assessment objectives and the units of assessment is shown in the grids below.

AO weightings in AS GCE

Unit of Assessment	Mandatory or Optional	Level	Percentages				Total
			AO1	AO2	AO3	AO4	
G040	m	AS	40	26	20	14	100
G041	m	AS	-	40	40	20	100
G042	m	AS	50	14	20	16	100
		Total	**90**	**80**	**80**	**50**	**300**

AO weightings in AS GCE (Double Award)

Unit of Assessment	Mandatory or Optional	Level	Percentages				Total
			AO1	AO2	AO3	AO4	
G040	m	AS	40	26	20	14	100
G041	m	AS	-	40	40	20	100
G042	m	AS	50	14	20	16	100
G043	m	AS	30	24	30	16	100
Two from G044	o	AS	30	26	30	14	100
G045	o	AS	30	24	32	14	100
G046	o	AS	30	24	30	16	100
G047	o	AS	30	26	30	14	100
		Total	**180**	**152/ 154/ 156**	**170/172**	**94/96**	**600**

AO weightings in Advanced GCE

Unit of Assessment	Mandatory or Optional	Level	Percentages				Total
			AO1	AO2	AO3	AO4	
G040	m	AS	40	26	20	14	100
G041	m	AS	-	40	40	20	100
G042	m	AS	50	14	20	16	100
G048	m	A2	20	18	26	36	100
One of G049-G053	o	A2	30	16	24	30	100
One of G049-G053	o	A2	30	16	24	30	100
		Total	**170**	**130**	**154**	**146**	**600**

AO weightings in Advanced GCE (Double Award)

Unit of Assessment	Mandatory or Optional	Level	Percentages				Total
			AO1	AO2	AO3	AO4	
G040	m	AS	40	26	20	14	100
G041	m	AS	-	40	40	20	100
G042	m	AS	50	14	20	16	100
G043	m	AS	30	24	30	16	100
Two from G044	o	AS	30	26	30	14	100
G045	o	AS	30	24	32	14	100
G046	o	AS	30	24	30	16	100
G047	o	AS	30	26	30	14	100
G048	m	A2	20	18	26	36	100
One of G049-G053	o	A2	30	16	24	30	100
One of G049-G053	o	A2	30	16	24	30	100
One of G054-G055	o	A2	15	30	35	20	100
One of G056-G059	o	A2	30	16	24	30	100
One of G056-G059	o	A2	30	16	24	30	100
		Total	**335**	**264/ 266/ 268**	**327/ 329**	**270/ 272**	**1200**

4.13 Quality of Written Communication

Quality of written communication is assessed in all units where candidates are required to produce extended written material and credit may be restricted if communication is unclear.

Candidates will:

- Ensure that text is legible and that spelling, punctuation and grammar are accurate so that meaning is clear
- Select and use a form and style of writing appropriate to purpose and to complex subject matter
- Organise information clearly and coherently, using specialist vocabulary when appropriate.

5 Technical Information

5.1 Making Unit Entries

Please note that 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. Final entries for units (including internally assessed units) are made in October for January units and in March for June units. It is important that entries are received by the deadline date – late entries cause major problems for OCR and attract a substantial late entry fee to reflect this. Centres must have made an entry for a unit in order for OCR to supply the appropriate forms or moderator details for coursework.

It is essential that unit entry codes are quoted in all correspondence with OCR. See Sections 4.1 – 4.4 for these unit entry codes.

To enter for certification, candidates must have a valid combination of unencashed units for that qualification.

For units G040, G042, G043, G044, G045, G046, G047, G048, G049, G050, G051, G052, G053, G056, G057, G058 and G059 candidates must be entered for either component 01 or 02. Centres must enter all of their candidates for ONE of these components. It is not possible for centres to offer both components within the same series.

Unit Entry code	Component code	Submission method	Unit titles
G040	01	OCR Repository	Using ICT to communicate
	02	Postal moderation	
G041	01	-	How organisations use ICT
G042	01	OCR Repository	ICT solutions for individuals and society
	02	Postal moderation	
G043	01	OCR Repository	System specification and configuration
	02	Postal moderation	
G044	01	OCR Repository	Problem solving using ICT
	02	Postal moderation	
G045	01	OCR Repository	Software development – design
	02	Postal moderation	
G046	01	OCR Repository	Communicating using computers
	02	Postal moderation	
G047	01	OCR Repository	Introduction to programming
	02	Postal moderation	
G048	01	OCR Repository	Working to a brief
	02	Postal moderation	

Unit Entry code	Component code	Submission method	Unit titles
G049	01	OCR Repository	Numerical modelling using spreadsheets
	02	Postal moderation	
G050	01	OCR Repository	Interactive multimedia products
	02	Postal moderation	
G051	01	OCR Repository	Publishing
	02	Postal moderation	
G052	01	OCR Repository	Artwork and imaging
	02	Postal moderation	
G053	01	OCR Repository	Developing and creating websites
	02	Postal moderation	
G054	01	-	Software development
G055	01		Networking solutions
G056	01	OCR Repository	Program design, production and testing
	02	Postal moderation	
G057	01	OCR Repository	Database design
	02	Postal moderation	
G058	01	OCR Repository	Developing and maintaining ICT systems for users
	02	Postal moderation	
G059	01	OCR Repository	ICT solutions for people with individual needs
	02	Postal moderation	

5.2 Making Qualification Entries

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

Candidates may enter for:

- AS GCE certification (H115).
- AS GCE (Double Award) certification (H315)
- Advanced GCE certification (H515).
- Advanced GCE (Double Award) certification (H715)

A candidate who has completed all the units required for the qualification may enter for certification either in the same examination series (within a specified period after publication of results) or at a later series. A candidate who has completed all the required units but who has not entered for

certification may do so in the same examination series within a specified period after the publication of results.

Candidates following a course over a number of examination series have a variety of options open to them that allow them to certificate part-way through their course. All three- and six-unit qualifications are automatically 'banked' by OCR to enable the candidate to use them towards larger qualifications at a later date.

Candidates may enter for:

- Advanced Subsidiary GCE aggregation
- Advanced Subsidiary GCE aggregation, bank the result, and complete the Advanced Subsidiary GCE (Double Award) assessment at a later date
- Advanced Subsidiary GCE aggregation, bank the result, and complete the A2 assessment at a later date for either an Advanced GCE or an Advanced GCE (Double Award)
- Advanced Subsidiary GCE (Double Award) aggregation
- Advanced Subsidiary GCE (Double Award) aggregation, bank the result, and complete the A2 assessment at a later date for either an Advanced GCE or an Advanced GCE (Double Award)
- Advanced GCE aggregation
- Advanced GCE aggregation, bank the result, and complete the Advanced GCE (Double Award) assessment at a later date
- Advanced GCE (Double Award) aggregation.

Candidates must enter the appropriate Advanced Subsidiary units to qualify for the Advanced Subsidiary GCE (Double Award).

Candidates must enter the appropriate AS and A2 units to qualify for the Advanced (Single or Double Award) GCE.

These specifications will be shown on the certificate as:

OCR Advanced Subsidiary GCE in Applied ICT
OCR Advanced Subsidiary GCE in Applied ICT (Double Award)
OCR Advanced GCE in Applied ICT
OCR Advanced GCE in Applied ICT (Double Award).

5.3 Issue of Results

Individual unit Statements of Results will be issued in March for January entries and in August for June entries for all units (both portfolio units and external units). Statements of Results will include, for each unit, the unit title, the unit UMS mark, the grade and the date the unit was taken.

Certification is **not** an automatic process, since OCR is unable to determine at which point a candidate wishes to complete their course. Candidates **must** be entered for the appropriate certification code (see Section 5.2) to claim their overall grade.

Entry for unit will *not* generate a final certificate – a separate certification entry must be made at the appropriate time. If it is not, there will be a delay in issuing the candidate's final grade.

5.4 Grading

All GCE units are awarded A to E. The Advanced Subsidiary GCE is awarded on the scale A to E. The Advanced GCE is awarded on the scale A to E with access to an A*. To be awarded an A*, candidates will need to achieve a grade A on their full A Level qualification and an A* on the aggregate of their A2 units. Grades are reported on certificates. Results for candidates who fail to achieve the minimum grade (E or e) will be recorded as *unclassified* (U or u) and this is **not** certificated.

A Uniform Mark Scale (UMS) enables aggregation of candidates' best performance across units and series to determine the qualification grade. The three-unit AS GCE has a total of 300 *uniform* marks and the six-unit Advanced Subsidiary (Double Award) GCE has a total of 600 *uniform* marks. The six-unit Advanced GCE has a total of 600 *uniform* marks and the twelve-unit Advanced (Double Award) GCE has a total of 1200 *uniform* marks.

OCR converts the candidate's *raw* mark for each unit to a *uniform* mark. The maximum *uniform* mark for any unit depends on that unit's weighting in the specification. In these Applied ICT specifications, all the units have equal UMS weightings with a *uniform* mark total of 100 for each unit. Each unit's *raw* mark grade boundary equates to the *uniform* mark boundary at the same grade. Intermediate marks are converted on a pro-rata basis.

Uniform marks correspond to *unit* grades as follows:

(Advanced GCE) Unit Weighting	Maximum Unit Uniform Mark	Unit Grade					
		a	b	c	d	e	u
16.67%	100	100-80	79-70	69-60	59-50	49-40	39-0

OCR adds together the unit *uniform* marks and compares these to pre-set boundaries (see the table below) to arrive at *qualification* grades.

Qualification	Qualification Grade					
	A	B	C	D	E	U
AS GCE	300-240	239-210	209-180	179-150	149-120	119-0
Advanced GCE	600-480	479-420	419-360	359-300	299-240	239-0

Qualification	Qualification Grade									
	AA	AB	BB	BC	CC	CD	DD	DE	EE	U
AS GCE (Double Award)	600-480	479-450	449-420	419-390	389-360	359-330	329-300	299-270	269-240	239-0
Advanced GCE (Double Award)	1200-960	959-900	899-840	839-780	779-720	719-660	659-600	599-540	539-480	479-0

Candidates who fail to achieve the standard for a grade EE will be awarded a Uniform Mark in the range 0-239 for the Advanced Subsidiary GCE (Double Award) and 0-479 for the Advanced GCE (Double Award) and will be recorded as U (unclassified). This does not lead to a certificate.

5.5 Enquiries about Results

Under certain circumstances, a centre may wish to query the result issued to one or more candidates. Enquiries about Results for GCE 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 *OCR 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.

5.6 Shelf-Life of Units

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

5.7 Unit and Qualification Re-sits

There is no restriction on the number of times a candidate may re-sit each unit before entering for certification for an AS GCE or Advanced GCE.

Candidates may enter for the full qualifications an unlimited number of times.

5.8 Guided Learning Hours

Each unit requires 60 guided learning hours.

AS GCE in Applied ICT requires **180** guided learning hours in total.
AS GCE in Applied ICT (Double Award) requires **360** guided learning hours in total.
Advanced GCE in Applied ICT requires **360** guided learning hours in total.
Advanced GCE in Applied ICT (Double Award) requires **720** guided learning hours in total.

5.9 Code of Practice/Subject Criteria/Common Criteria Requirements

These specifications comply in all respects with the revised *GCSE, GCE, and AEA Code of Practice* as available from the QCA website, the subject criteria for GCE in Applied ICT and *The Statutory Regulation of External Qualifications 2004*.

5.10 Disability Discrimination Act Information Relating to this Specification

GCEs 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 revised GCE qualifications and subject criteria were reviewed to identify whether any of the competences required by the subject presented a potential barrier to any disabled candidates. If this was the case, the situation was reviewed again to ensure that such competences were included only where essential to the subject. The findings of this process were discussed with disability groups and with disabled people.

Reasonable adjustments are made for disabled candidates in order to enable them to access the assessments and to demonstrate what they know and can do. For this reason, very few candidates 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 www.jcq.org.uk.

Candidates who are unable to access part of the assessment, even after exploring all possibilities through reasonable adjustments, may still be able to receive an award based on the parts of the assessment they have taken. However, as this specification tests practical ICT skills, some candidates may have difficulties accessing the full qualification.

5.11 Arrangements for Candidates with Particular Requirements

For candidates who are unable to complete the full assessment or whose performance may be adversely affected through no fault of their own, teachers should consult the *Access Arrangements, Reasonable Adjustments and Special Consideration*. In such cases advice should be sought from OCR as early as possible during the course.

5.12 Classification Code

Every specification is assigned to a national classification code indicating the subject area to which it belongs. The classification code for these specifications is 0010.

Centres should be aware that candidates who enter for more than one GCE 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 GCEs. The same view may be taken if candidates take two GCE specifications that have different classification codes but have significant overlap of content. Candidates who have any doubts about their subject combinations should seek advice, for example from their centre or the institution to which they wish to progress.

6 Coursework Administration/Regulations

6.1 Supervision and Authentication

As with all coursework, teachers must be able to verify that the work submitted for assessment is the candidate's own work. Sufficient work must be carried out under direct supervision to allow the teacher to authenticate the coursework marks with confidence.

OCR expects teachers to supervise and guide candidates who are producing portfolios. The degree of teacher guidance in candidates' work will vary according to the kind of work being undertaken. However, it should be remembered that candidates are required to reach their own judgements and conclusions.

When supervising candidates, teachers are expected to:

- Offer candidates advice about how best to approach their tasks
- Exercise continuing supervision of work in order to monitor progress and to prevent plagiarism
- 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.

Work on portfolios may be undertaken outside the centre and in the course of normal curriculum time. As with all internally assessed work, the teacher must be satisfied that the work submitted for assessment is the candidate's own work. This does not prevent groups of candidates working together in the initial stages, but it is important to ensure that the individual work of a candidate is clearly identified separately from that of any group in which they work.

Throughout the course, the teacher should encourage the candidate to focus on achieving the criteria listed in the *Assessment Evidence Grids.*

Once the mark for the unit portfolio has been submitted to OCR, no further work may take place. However, the portfolio can be improved and resubmitted under the re-sit rule (Section 5.7)

Teachers may comment on a candidate's unit portfolio and return it for redrafting without limit until the deadline for the submission of marks to OCR.

Teachers must record details of any assistance given and this must be taken into account when assessing candidates' work.

Teachers must complete and sign the *Centre Authentication Form* to confirm that the work submitted for moderation was produced by the candidates concerned. Once completed this form must be sent to the moderator along with candidates' work.

6.2 Avoiding Plagiarism

Plagiarism in coursework is the equivalent of cheating in written examinations.

Candidates should be taught how to present material taken directly from other sources and must observe the following when producing portfolios:

- Any copied material must be suitably acknowledged
- Quotations must be clearly marked and a reference provided wherever possible.

6.3 Submitting marks to OCR

Centres must have made an entry for a unit in order for OCR to supply the appropriate forms or moderator details for coursework. Coursework administration documents are sent to centres on the basis of estimated entries. Marks may be submitted to OCR either via Interchange, on the computer-printed Coursework Mark Sheets (MS1) provided by OCR (sending the top copy to OCR and the second copy to their allocated moderator) or by EDI (centres using EDI are asked to print a copy of their file and sign it before sending to their allocated moderator).

Teachers may set internal deadlines for candidates submitting work to them. However, should candidates fail to meet this deadline, they may only be penalised if they fail to achieve one or more of the criteria in the *Assessment Evidence* Grid for that unit. A candidate whose work is submitted so late that the teacher is unable to meet OCR's deadline for receipt of marks should be warned by the teacher that failure to submit marks by this deadline may result in OCR failing to issue grades on the agreed date. OCR will supply centres with MS1 Internal Assessment Mark Sheets to record the marks and instructions for completion. It is essential that centres send the top copy of these completed forms to OCR, the second copy to the Moderator and keep the third copy for their own records.

The deadlines for the receipt of coursework marks are published on the OCR website.

The awarding body must require centres to obtain from each candidate a signed declaration that authenticates the coursework they produce as their own. For regulations governing coursework, centres should consult the OCR *Admin Guide: 14-19 Qualifications*. Further copies of the coursework administration documents are available on the OCR website (www.ocr.org.uk).

6.4 The Assessment Evidence Grids

Centres are required to carry out internal assessment of portfolios using the *Assessment Evidence Grids* in accordance with OCR procedures. Candidates' marks are recorded on these grids. **One** grid should be completed for each candidate's **unit** portfolio. The information on each of these grids should eventually be transferred onto a *Unit Recording Sheet* and attached to the front of the candidate's portfolio for the unit for inspection by the Moderator when the moderation process takes place.

When candidates are given their assignments, they should also be issued with a reference copy of the appropriate *Assessment Evidence Grid*.

Candidates' portfolios must be clearly annotated to demonstrate where, and to what level, criteria have been achieved. This will help in the moderation process. On completion of a unit, the teacher must complete the *Assessment Evidence Grid* and award a mark out of **50** for the unit.

6.5 Standardisation and Moderation

All internally-assessed coursework is marked by the teacher and internally standardised by the centre. Marks must be submitted to OCR by the agreed date, after which moderation takes place in accordance with OCR procedures.

Internal standardisation 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 a preliminary meeting 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.

The purpose of moderation is to ensure that the standard for the award of marks in internally-assessed coursework is the same for each centre, and that each teacher has applied the standards appropriately across the range of candidates within the centre.

Work submitted for moderation must be marked with the:

- Centre number
- Centre name
- Candidate number
- Candidate name
- Specification code and title
- Unit code.

For each (portfolio) unit, centres must complete the appropriate *Unit Recording Sheet* sent out annually by OCR and downloadable from the OCR website (www.ocr.org.uk).

Work submitted on paper for moderation or marking must be secured by treasury tags. Work submitted in digital format (CD or online) must be in a suitable file structure as detailed in Appendix C.

6.6 Centre accreditation

If your centre demonstrates accurate marking of internally assessed units, your centre may be offered accredited status (by specification and level). This means that there is **no** requirement to submit work for moderation for those specifications.

Eligibility for accreditation is offered to a Programme Leader (nominated by the centre), who is responsible for the standardisation of internal assessment and must be personally involved in the assessment of candidates' work.

In each examination series, a number of accredited centres will be randomly selected for moderation as part of the control procedure. Every accredited centre will be 'sampled' at least once in every period of accreditation.

The standard accreditation period lasts for the remainder of the academic year in which it is granted and the following two academic years although the period of accreditation may be altered on the basis of the results of the random sampling. Centres will be informed of any changes to their accreditation status before each series.

Centres must ensure that:

- The Head of Centre provides the Programme Leader details and initially accepts accreditation for each level
- OCR is informed if the Programme Leader leaves the post or their responsibilities change with respect to the specification(s)
- All marks are submitted to OCR by the published deadlines
- Centre Authentication forms for accredited units with entries are completed and submitted to OCR Data Capture each series.

However, centres must have work available in case they receive requests for work required for awarding purposes.

6.7 Minimum Coursework Required

If a candidate submits no work for a unit, then the candidate should be indicated as being absent from that unit on the coursework mark sheets submitted to OCR. If a candidate completes any work at all for that unit then the work should be assessed according to the criteria and marking instructions and the appropriate mark awarded, which may be zero.

6.8 Instructions for Marking

Sources of Guidance

The starting point in assessing portfolios is the *Assessment Evidence Grid* within each unit. These contain levels of criteria for the skills, knowledge and understanding that the candidate is required to demonstrate. The *Guidance for Teachers* within the unit expands on these criteria and clarifies the level of achievement the assessor should be looking for when awarding marks.

OCR will hold training meetings on portfolio assessment led by senior GCE moderators. Details of these are in the OCR INSET booklets which are sent to centres in the summer term or they may be obtained from the Training and Customer Support Division (tel. 01223 552950). They are also published on the OCR website (www.ocr.org.uk).

OCR also operates a network of Portfolio Consultants. Centres can obtain advice on assessment of portfolios from an OCR Portfolio Consultant. These are both subject specialists and senior moderators. Details may be obtained from the OCR Qualification Manager.

Determining a candidate's mark

It must be stressed that teachers determine only the *mark* for a candidate's portfolio evidence and not the *grade* which will be determined by OCR.

Regular, early and constructive feedback to candidates on their performance is essential and crucial. Help with planning and structuring their portfolio work in a logical manner throughout the course will lead to better understanding of their work and is likely to achieve higher grades.

Giving candidates deadlines for the completion of various sections of their work, and encouraging them to adhere to them, is also essential if candidates are not going to rush to complete and possibly finish up with grades below their potential.

Each portfolio should be marked by the teacher according to the assessment objectives and content requirements in the *Assessment Evidence Grid* within each portfolio unit (a sample of which follows).

Each row in the *grid* comprises a strand showing the development of an assessment objective, each row corresponding to an assessment objective descriptor in the banner (the top section of the *grid*).

The maximum mark for each strand is shown in the far right hand column of the *grid* and this maximum mark is further broken down into a number of mark bands across each row with a range of descriptors.

Teachers use their professional judgement to determine which descriptor in a strand best suits the candidate's work and from the range of marks available within that particular mark band, they circle the mark that best fits the work. They then record this mark in the column headed *Mark.*

Teachers should use the full range of marks available to them. Teachers must award full marks in any strand of work which fully meets the criteria. This is work which is the best one could expect from candidates working at AS or A2 level.

However, for strands which include a quantified element, e.g. **two** care workers or **four** therapies, and where a candidate's evidence includes less than the number specified, or includes the correct number but at varying levels of quality, teachers will use their professional judgement to allocate an appropriate mark. It is the *quality* of the evidence that is paramount rather than the *quantity*, although, in such circumstances, candidates will be unable to access the highest mark band for that strand.

Only **one** mark per strand/row will be entered. The final mark for the candidate is out of a total of **50** and is found by totalling the marks for each strand.

6.9 Administering Portfolio Assessment and Moderation

Portfolio units are internally assessed by centres and externally moderated by OCR. There are **three** key points in the administrative cycle that require action by the teacher:

The centre enters candidates who wish to submit portfolios (October for January examinations, March for June examinations)

The centre sends OCR and the moderator a set of provisional marks by a set deadline.

The moderator contacts the centre on receipt of marks and asks for a sample of work.

OCR will conduct all administration of the GCE through the Examination Officer at the centre. Teachers are strongly advised to liaise with their Examination Officer to ensure that they are aware of key dates in the administrative cycle.

Assessment-recording materials and full details of administrative arrangements for portfolio assessment, will be forwarded to Examination Officers, following receipt of provisional entries. At the same time the materials will be made available within *Portfolio Assessment Packs* and on the OCR website (www.ocr.org.uk). The materials will include master copies of mandatory *Unit Recording Sheets* on which to transfer assessments from each candidate's *Assessment Evidence Grids*. Forms may be photocopied and used as required.

6.10 OCR Repository

The OCR Repository allows centres to submit moderation samples in electronic format.

The OCR GCE in Applied ICT units (G040, G042, G043, G044, G045, G046, G047, G049, G050. G051, G052, G053, G056, G057, G058, G059) can be submitted electronically to the OCR Repository via Interchange: please check section 5.1 for unit entry codes for the OCR Repository.

More information on the OCR Repository can be found in Appendix C: Guidance for the Production of Electronic Coursework Portfolio. Instructions for how to upload files to OCR using the OCR Repository can be found on OCR Interchange.

7 Other Specification Issues

7.1 Overlap with other Qualifications

The units of these qualifications have overlap of content with the OCR GCEs in ICT and Computing, although it is expected that the teaching and assessment methods will be significantly different.

7.2 Progression from these Qualifications

These specifications are designed to give a broad introduction to this sector and aim to prepare candidates for further study in higher education or further training which might be whilst in employment. However, these qualifications are not designed for candidates' direct entry into employment.

Candidates who achieve these qualifications may be prepared to enter a variety of HND or degree level courses in ICT or computing related subjects.

7.3 Key Skills Mapping

These specifications provide opportunities for the development of the Key Skills of *Communication*, *Application of Number*, *Information Technology*, *Working with Others*, I*mproving Own Learning and Performance* and *Problem Solving* at Levels 2 and/or 3. 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 2 and/or 3 for each unit.

Unit	C2				C3				AoN2			AoN3			WwO2			WwO3			IoLP2			IoLP3			PS2			PS3			Unit
	.1a	.1b	.2	.3	.1a	.1b	.2	.3	.1	.2	.3	.1	.2	.3	.1	.2	.3	.1	.2	.3	.1	.2	.3	.1	.2	.3	.1	.2	.3	.1	.2	.3	
G040		F	F	P		F	F	P													P	P	P										G040
G042			F				F		P	P	P	P	P	P																			G042
G043																					P	P	P										G043
G044																											F	F	F	F	F	F	G044
G046																					P	P	P	P	P	P							G046
G047																					P	P	P										G047
G048															F	F	F	F	F	F													G048
G049									P	P	P	P	P	P													F	F	F	F	F	F	G049
G050				P				P													F	F	F	F	F	F							G050
G051				P																	P	P	P										G051
G052																					P	P	P										G052
G055																					P	P	P										G055
G057																											P	P	P				G057
G058	F	F	F	P	F	F	F	P																									G058
G059																					F	F	F	F	F	F							G059
Unit	.1a	.1b	.2	.3	.1a	.1b	.2	.3	.1	.2	.3	.1	.2	.3	.1	.2	.3	.1	.2	.3	.1	.2	.3	.1	.2	.3	.1	.2	.3	.1	.2	.3	Unit
	C2				C3				AoN2			AoN3			WwO2			WwO3			IoLP2			IoLP3			PS2			PS3			

7.4 Spiritual, Moral, Ethical, Social, Legislative, Economic and Cultural Issues

Applied ICT offers a wide range of opportunities for the exploration of spiritual, moral, ethical, social and cultural issues.

These specifications encourage candidates to explore the spiritual, moral, ethical, social and cultural aspects of the introduction of ICT solutions to problems through a study on the effects of ICT on society in Unit G040: *Using ICT to communicate*, Unit G041: *How organisations use ICT* and Unit G042: *ICT solutions for individuals and society*. These units consider such issues as changing leisure and work practices, privacy and confidentiality of data held in systems, opportunities for access to information and environmental issues.

Unit G046: *Communicating using computers* and Unit G055: *Networking solutions* also introduce a global dimension with the study of electronic communications.

Legal and economical issues are addressed in each unit, where appropriate.

7.5 Sustainable Development, Health and Safety Considerations and European Developments

OCR has taken account of the 1988 Resolution of the Council of the European Community and the Report *Environmental Responsibility: An Agenda for Further and Higher Education*, 1993 in preparing this specification and associated specimen assessments.

Candidates are introduced to health and safety issues in the context of this sector and should be made aware of the significance of safe working practices. The specification includes a section on the standard ways of working. This includes information on health and safety which should pervade all teaching.

OCR has taken account of the 1988 Resolution of the Council of the European Community in preparing this specification and associated specimen assessments. European examples should be used where appropriate in the delivery of the subject content. Relevant European legislation is identified within the specification where applicable. Teachers are expected to take appropriate opportunities to consider issues in the European context.

7.6 Avoidance of Bias

OCR has taken great care in preparation of these specifications and assessment materials to avoid bias of any kind.

7.7 Language

These specifications and associated assessment materials are in English only.

7.8 Status in Wales and Northern Ireland

This specification has been approved by DCELLS for use by centres in Wales and by CCEA for use by centres in Northern Ireland.

Candidates in Wales or Northern Ireland should not be disadvantaged by terms, legislation or aspects of government that are different from those in England. Where such situations might occur, including in the external assessment, the terms used have been selected as neutral, so that candidates may apply whatever is appropriate to their own situation.

7.9 Citizenship

This section offers guidance on opportunities for delivering knowledge, skills and understanding of citizenship issues during the course.

To be responsible members of society, candidates must be aware of the ever growing impact of Information and Communication Technology. They will reflect critically on the role of ICT in society to consider its positive and negative effects. The study of ICT supports the development of skills and attitudes that increase candidates' abilities to address the social and ethical issues of technological advancements.

Appendix A: Performance Descriptions

Performance descriptions have been created for all GCE subjects. The performance descriptions for GCE in Applied ICT aim to describe learning outcomes and levels of attainment likely to be shown by a representative candidate performing at the A/B and E/U boundaries for the AS and A2. They illustrate the expectations at these boundaries for the AS and A2 as a whole; they have not been written at a specification or unit level. Each performance description is aligned to **one** assessment objective. An alphabetical system has been used to denote each element of a performance description. There is no hierarchy of elements.

Performance descriptions are designed to assist examiners in exercising their professional judgement at awarding meetings where the grade A/B and E/U boundaries will be set by examiners using professional judgement. This judgement will reflect the quality of the candidates' work, informed by the available technical and statistical evidence. Performance descriptions will be reviewed continually and updated where necessary.

Teachers may find performance descriptions useful in understanding candidates' performance across qualifications as a whole but should use the marking criteria identified in the specification when assessing candidates' work.

	Assessment Objective 1	Assessment Objective 2	Assessment Objective 3	Assessment Objective 4	Quality of Written Communication
Assessment Objectives for both AS GCE and Advanced GCE	Candidates demonstrate practical capability in applying ICT.	Candidates demonstrate knowledge and understanding of ICT systems and their roles in organisations and society.	Candidates apply knowledge, skills and understanding to produce solutions to ICT problems.	Candidates evaluate: • ICT solutions • Their own performance	
AS A/B boundary Performance Descriptions	Candidates: • Demonstrate an ability to use a wide range of ICT tools and techniques in a variety of practical activities.	Candidates*;* • Demonstrate an understanding of components and functions of a range of ICT systems; • Demonstrate an understanding of how the role of ICT helps a range of organisations in different sectors meet their objectives • Demonstrate an understanding of the positive and negative effects of ICT on society and individuals.	Candidates*:* • Demonstrate an ability to apply their knowledge and skills of ICT tools and techniques to produce efficient solutions to a variety of problems arising from familiar contexts.	Candidates*:* • Demonstrate an ability to identify strengths and weaknesses in their initial solution and refine it in relation to the user's needs • Demonstrate an ability to reflect on their experiences in order to improve their own performance.	The candidate has expressed complex ideas clearly and fluently. Sentences and paragraphs follow on from one another smoothly and logically. Arguments will be consistently well structured. There will be few, if any, errors of grammar, punctuation and spelling.
AS E/U boundary Performance Descriptions	Candidates*:* • Demonstrate an ability to use a limited range of ICT tools and techniques in a variety of practical activities.	Candidates*:* • Demonstrate an understanding of components and functions of given ICT systems • Demonstrate an understanding of how the role of ICT helps selected organisations meet their objectives • Demonstrate an understanding of some of the effects of ICT on society and individuals.	Candidates*:* • Demonstrate an ability to apply their knowledge and skills of ICT tools and techniques to produce working solutions to problems arising from familiar contexts.	Candidates*:* • Demonstrate an ability to comment on the effectiveness of their solutions to problems and suggest improvements • Demonstrate an ability to comment on their actions and role in solving problems.	• The candidate has expressed simple ideas clearly, but may express complex and subtle ideas ineffectively. Arguments may be obscurely presented. Errors in grammar, punctuation and spelling may be present.

A2 A/B boundary Performance Descriptions	Candidates*:* • Demonstrate an ability to use their initiative to develop, enhance and extend their range of ICT skills and techniques as required.	Candidates*:* • Demonstrate a detailed knowledge of formal and informal tools and techniques for developing and managing ICT systems • Demonstrate a thorough understanding of the effects of proposed solutions on end users • Demonstrate an understanding of the implications of current relevant legislation.	Candidates*:* • Demonstrate an ability to apply their knowledge and skills of ICT tools and techniques to produce effective solutions to complex problems arising from unfamiliar contexts • Demonstrate an ability to use methodical, analytical and critical approaches to problem solving.	Candidates*:* • Demonstrate an ability to provide a critical analysis of their solutions to ICT problems, identifying strengths and weaknesses in order to refine the solution taking account of user feedback • Demonstrate an ability to reflect on their own strengths and weaknesses and use this review to improve their SKU.	The candidate has expressed complex ideas clearly and fluently. Sentences and paragraphs follow on from one another smoothly and logically. Arguments will be consistently well structured. There will be few, if any, errors of grammar, punctuation and spelling.
A2 E/U boundary Performance Descriptions	Candidates: • Demonstrate an ability to develop and extend their range of ICT skills and techniques as required.	Candidates: • Demonstrate a knowledge of tools and techniques for developing ICT systems • Demonstrate a recognition that their solutions will have effects on end users • Demonstrate a knowledge of current relevant legislation.	Candidates; • Demonstrate an ability to apply their knowledge and skills of ICT tools and techniques to solve straightforward problems arising from unfamiliar contexts.	Candidates: • Demonstrate an ability to comment on the effectiveness of their solution in relation to user needs, suggesting improvements • Demonstrate an ability to comment on their actions and role in solving problems and identify areas for improvement.	The candidate has expressed simple ideas clearly, but may express complex and subtle concepts ineffectively. Arguments may be obscurely presented. Errors in grammar, punctuation and spelling may be present.

Appendix B: Coursework Assessment Evidence Grids

Unit G040- Assessment Evidence Grid

Unit G040 Using ICT to communicate

What candidates need to do:

Evidence needs to include:

a: [AO2] a report comparing **two** types of business document from **each** of **three** organisations [**7**];

b: **six** original communications for different purposes that demonstrate a range of writing and presentation styles and that would be communicated by different methods; the subject of **one** needs to be the different methods of communicating information and the technologies that support them, to include:

- **i** [AO3] information sources, plans and annotated draft copies of documents/communications to show their development to meet their purpose [**10**];
- **ii** [AO1] final versions of documents/communications that meet their purpose [**10**];
- **iii** [AO1] appropriate use of a range of software tools and techniques to achieve the desired impact [**10**];
- **iv** [AO4] an evaluation of the documents/communications produced and the candidate's performance in completing the task [**7**];
- **v** [AO2] explanations of the technologies that support different methods of communication [**6**].

How the candidate will be assessed:

Task	Assessment Objective	Mark Band 1	Mark Band 2	Mark Band 3	Mark Awarded
a	**AO2**	The candidate describes the layout and purpose of each of the **six** collected documents; the candidate compares similar items, identifying good and bad points about the writing and/or presentation styles of each; the candidate makes some comment on their suitability for purpose, use of house style and/or how they could be improved; the report may contain errors in spelling, punctuation and grammar; **[0 1 2 3]**	The candidate describes in detail the layout and purpose of each of the **six** collected documents; the candidate compares similar items, accurately identifying good and bad points about the writing and presentation styles of each; the candidate comments on their suitability for purpose, use of house style and how they could be improved; the report will contain few spelling, punctuation and grammar errors; **[4 5]**	The candidate describes in detail the layout and purpose of each of the **six** collected documents; the candidate provides a critical analysis of the documents, including comparison of the writing and presentation styles of similar items; their suitability for purpose and use of house style; the candidate explains how each could be improved in relation to its purpose; the report will be consistently well structured and there will be few, if any, spelling, punctuation and grammar errors. **[6 7]**	**/7**
b(i)	**AO3**	The candidate produces outline plans for most of their communications and shows, by presenting annotated draft copies, that candidates have checked the accuracy of the layout and content of their work, and proof-read it to ensure that information is placed in appropriate positions and the content is correct and meaningful; the candidate lists their information sources; **[0 1 2 3]**	The candidate produces plans for **all** of their communications, some of which are detailed, and shows, by presenting annotated draft copies, that they have checked the accuracy of the layout and content of their work, and proof-read it to ensure that information is placed in appropriate positions and the content is correct and meaningful; annotations show how the candidate developed **each** communication to achieve a consistent style and organised a variety of different types of information in a coherent and easy-to-read way; the candidate lists all their information sources appropriately; **[4 5 6 7]**	The candidate produces detailed plans for **all** of their communications and show, by presenting annotated draft copies, that they have checked the accuracy of the layout and content of their work, and proof-read it to ensure that information is placed in appropriate positions and the content is correct and meaningful; the candidate's annotations show in detail how they developed **each** communication to achieve a consistent style, made good use of standard formats and organised a variety of different types of information in a coherent and easy-to-read way, the candidate lists all their information sources in a detailed bibliography. **[8 9 10]**	**/10**

Unit G040 Using ICT to communicate (continued)					
Task	**Assessment Objective**	**Mark Band 1**	**Mark Band 2**	**Mark Band 3**	**Mark Awarded**
b(ii)	**AO1**	The candidate creates communications that are clear, easy to understand, at a level that suits the intended recipient, use a suitable style and, where appropriate, common standards for layout; candidates locate and use existing information, combining it with information candidates have created; **[0 1 2 3 4]**	The candidate shows how they have located, used and adapted existing information, combining it with information candidates have created to create coherent, easy-to-read communications of mailable quality; **[5 6 7]**	The candidate shows how they have located, adapted and combined information to create six consistently professional standard communications that are well-designed, coherent and easy to read. **[8 9 10]**	**/10**
b(iii)	**AO1**	The candidate uses a range of software tools and techniques such as: text styles, page layout and paragraph formatting, combining text, graphics (photographs, clip art, line drawings, graphs and charts), tables, borders, shading, sound and video clips, to suit the purpose of each communication and improve its impact; **[0 1 2 3]**	The candidate shows appropriate use of a range of software tools and techniques including: text styles, page layout and paragraph formatting, combining formatted text, graphics (photographs, clip art, line drawings, graphs and charts), tables, borders, shading, sound and video clips, to suit the purpose of each communication and improve its impact, showing appropriate use of software to automate aspects of their communications, such as creating templates for standard layouts; **[4 5 6 7]**	The candidate shows effective use of a wide range of software tools and techniques including: text styles, page layout and paragraph formatting, combining formatted text, graphics (photographs, clip art, line drawings, graphs and charts), tables, borders, shading, sound and video clips, to suit the purpose of each communication and demonstrably improve its impact, showing effective skills in the appropriate use of a range of different software facilities to automate aspects of their communications. **[8 9 10]**	**/10**
b(iv)	**AO4**	The candidate comments on the effectiveness of their communications and suggests improvements; The candidate comments on their actions and role in solving the problem; **[0 1 2]**	The candidate clearly identifies good and not so good features of their communications, suggesting ways they could be improved; The candidate includes an analysis of their experiences while comparing and creating communications in order to improve their own performance; **[3 4]**	The candidate shows that they identified strengths and weaknesses in their initial drafts and explain how candidates refined them to meet the purpose more closely; candidates include an analysis of their experiences while comparing and creating communications and use this to suggest how they might approach a similar task in future. **[5 6 7]**	**/7**
b(v)	**AO2**	The candidate describes at least **four** methods used to communicate information and briefly describes the technologies that support each; **[0 1 2]**	The candidate describes, in detail, at least **six** methods used to communicate information and describes the technologies that support each; **[3 4]**	The candidate describes, in detail, at least **six** methods of communicating information, explaining how each is used and explaining the technologies used to support each. **[5 6]**	**/6**
				Total mark awarded:	**/50**

Amplification of Criteria

The further guidance below amplifies the criteria in the Assessment Evidence Grid and will help to determine the appropriate mark to be awarded for each strand.

Amplification of Criteria			
Task	**AO**	**Mark Band**	**Characteristics of the work one may expect to see at this mark band can be summarised as follows:**
a	**AO2**	**1**	Candidates compare **two** types of document from each of **three** organisations – the inclusion of poor as well as good examples will help candidates fully meet the requirements of this task; Candidates describe the specific purpose of each document and the main features of each, such as font size, margins, use of bullets or numbering, use of paragraphs etc. – they also identify common elements such as sender's and recipient's address, date, reference and subject on business letters; Candidates compare the presentation styles of similar items; those awarded the highest mark will also have made some comparison of writing styles. – writing style refers to the type of language the document uses, e.g. formal, informal, informative, and persuasive, it should not be confused with font styles and sizes, which are presentation styles; some comments will be made on each document about its suitability for purpose, use of house style or how it could be improved, but not all three; comments may reflect the candidates' opinions, rather than accepted standards for the type of document;
		2	Candidates describe the layout of each document in detail and also the particular purpose of each, e.g. a letter from a bank that is trying to persuade the recipient to open a new type of account; Candidates compare the presentation **and** writing styles of similar items; they identify good and bad points about writing style, e.g. the persuasiveness of the text; they also identify good and bad points about presentation style, such as the use of bullets to emphasise points; Candidates will make reasoned comments on each document about its suitability for purpose, house style **and** how it could be improved; such comments will relate to accepted standards for the type of document; Although some errors may be present, these should not be of the type that a spell or grammar checker would identify;
		3	In addition to the evidence generated for Mark Band 2, candidates provide an analysis of all six documents that is well thought out, well structured and critical; consideration of writing and presentation style will be clearly linked to the purpose of each document and will lead to a detailed discussion of the suitability of each for its purpose; the two documents from each organisation will be compared to explain how house style is applied and candidates will explain clearly how any improvements they suggest would improve the documents' suitability for purpose; there will be very few errors in the report.

Task	AO	Mark Band	Characteristics of the work one may expect to see at this mark band can be summarised as follows:
b(i)	AO3	1	Candidates provide some indication of the layout of most of their communication, most likely by means of hand-drawn sketches; there may be little evidence of planning the content; there will be at least one annotated draft copy of each communication, showing any errors identified that need to be corrected in the final version and any items that need to be repositioned to improve the layout; Candidates will simply give the title of a book or the URL of the index page of a website; sources should be listed for each instance where candidates have used existing information; It is not expected that work will be totally error-free – the mark awarded will depend on the accuracy of the final communications;
		2	Candidates produce plans for all six communications; for some of these, there will be detailed plans of both the layout and content, indicating what will be positioned where, the colours, fonts and styles that will be used and how they will find any information required; as part of their planning, candidates may refer to their analysis of documents in task a or may look at existing similar communications for ideas; In addition to the evidence generated for Mark Band 1, candidates need to clearly show by their annotation of drafts how they have developed each of their communications, particularly in relation to consistency and the organisation of different types of information to create a coherent whole; this involves consideration of the appropriateness of information included as well as the accuracy of spelling, grammar and layout; Books should be identified by at least title and author and web pages should be identified by the URL of the specific page where the information was found; all sources used should be listed;
		3	Planning for all six communications will be of the standard described above; there will be two or three drafts copies of each communications that have been thoroughly annotated to show the development from the initial draft through to the final copy, including consideration of standard formats; it is expected that the communications will be almost error free; Candidates provide a formal bibliography; in addition to the evidence generated for Mark Band 2, this should include: * details of what information was found from each source, * the publishers and publication dates of books and other printed sources, as well as the edition and possibly page numbers * the date a web page was accessed, the date it was last updated and the author (if known).
b(ii)	AO1	1	Candidates produce six communications that include information they have created combined with existing information they have found – the language needs to be of an appropriate style, e.g. formal style for a business letter, and at an appropriate level, e.g. using straightforward language when addressing a communication to a younger audience – where there are accepted standards for documents, such as business letters, these need to be followed; Candidates awarded the lowest mark achieve an appropriate style and level for most of their communications but may not fully meet common standards for layout – for the highest mark, all communications include clear and easy to understand information, expressed in a suitable style and at an appropriate level and fully meeting common layout standards;

Task	AO	Mark Band	Characteristics of the work one may expect to see at this mark band can be summarised as follows:
b(ii)	AO1	2	Candidates achieve an appropriate style and level for all of their documents and fully meet common standards for layout; All documents will include clear and easy to understand information, expressed in a suitable style and at an appropriate level; Candidates carry out research and use and adapt the information they find, combining it with their own information to create their communications – adapting information might involve editing a picture or some text, for example, this should be evidenced by listing the sources used (see task b(i)) and providing before and after printouts; the final communications produced will combine the different types of information into a coherent whole and be of a quality that could be used by an organisation for its intended purpose – for example a letter should be of such a standard that it could be mailed to a customer;
		3	In addition to the evidence generated for Mark Band 2, candidates locate, adapt and combine information from a number of sources to produce **six** communications that are of very high quality and coherent in style and content.
b(iii)	AO1	1	The list of tools and techniques should not be treated as a tick list or considered to be exclusive, rather, candidates should use a range of techniques that are appropriate to each of the communications being created, however, the variety of the communications should enable most of the tools and techniques listed, including sound and video clips, to be used appropriately; At Mark Band 1, the range of tools and techniques used may be limited but, even at this level, those used must suit the purpose of each communication and the impact of the communications should be enhanced – for example, the use a fancy text style and clip art images are unlikely to suit the purpose of a business letter and the use of many different transition and automation effects in a slide presentation is more likely to distract the viewer from the content than improve its impact;
		2	Candidates will use a wider range of tools and techniques than those working at Mark Band 1, that will include most, if not all, of those listed or their equivalent – see 'Styles of Presentation' in the Unit Content section of the specification; all tools and techniques used must be appropriate and improve the impact of the communication it is applied to, this includes some use of automated facilities such as creating a template for a letter that will be used frequently, using mail merge to personalise a letter that will be sent to a number of people or using a master slide to create a consistent style for a presentation;
		3	Candidates will use tools and techniques that go beyond those listed in the assessment evidence grid; the tools and techniques used will be well selected to add maximum impact to the communication – there is likely to be a link between the impact achieved and the quality of the communication, as assessed in task b(ii); communications will be created that enable a number of different automated facilities to be used appropriately – in addition to those mentioned in Mark Band 2, this could include a software generated contents table or index, or the use of paragraph and heading styles to achieve consistency; for maximum marks, automated facilities should be used in all appropriate instances

Task	AO	Mark Band	Characteristics of the work one may expect to see at this mark band can be summarised as follows:
b(iv)	AO4	1	Candidates make some comments as to whether the communications fulfill their purpose or not and some straightforward suggestions for improvements; candidates make brief comments on how they went about the task and how easy or difficult they found it – for example, a comment might be included about whether they were able to complete the work by the deadline;
		2	Candidates evaluate the communications critically by identifying good and not so good features and make valid suggestions for improving them; Candidates also identify what went well and what went badly during the process of producing the communications;
		3	Candidates show evidence of evaluation through the refinement of their work as it progresses; Annotation of draft copies identify their strengths and weaknesses, or candidates produce a written evaluation of each draft, and they explain how the communications were refined to meet the purpose more closely; Final evaluations, in addition to evidence generated for Mark Band 2, include consideration of how a more efficient approach might be adopted for similar tasks in future.
b(v)	AO2	1	Candidates describe at least four of the methods of communication listed in 'The Information Age' in the Unit Content and provide some description of at least one technology that supports each method; The descriptions of technologies may lack depth, being restricted to simple statements or bullet points;
		2	Candidates produce descriptions of at least six of the methods of communication listed in 'The Information Age' in the Unit Content in greater depth than for Mark Band 1, they will consider how and why each method is used and the advantages and disadvantages of each; at least one technology that supports each communication will be described, including some technical detail;
		3	In addition to the evidence generated for Mark Band 2, candidates will explain clearly how each communication method is used; accurate technical detail will be included in explanations of the technologies and how they support each communication method.

Unit G042 - Assessment Evidence Grid

Unit G042: ICT solutions for individuals and society

What candidates need to do:

The candidate needs to produce: a presentation of the results of an investigation, including the use of a spreadsheet to analyse numeric data, along with a report on the sources and methods used to find information and a report that explains the impact of the availability of electronic information,

Evidence needs to include:

a: [AO3] the selection and efficient use of search engines to find information required [**10**];
b: [AO1] information accessed from large websites and online databases [**6**]
c: [AO1] the use of a local database to find required information [**4**]
d: [AO1] the use of spreadsheet software to analyse numeric data and present results [**9**]
e: [AO1] different types of information combined to present the results of the investigation [**6**]
f: [AO4] an evaluation of the methods used to find information and present the results [**8**].
g: [AO2] an explanation of the impact of the availability of electronic information on individuals and society [**7**]

How the candidate will be assessed:

Task	Assessment Objective	Mark Band 1	Mark Band 2	Mark Band 3	Mark Awarded
a	**AO3**	The candidate identifies the information required as part of their investigation, selects at least **two** search engine and uses the search facilities of each to locate the required information, including at least **one** search using an advanced search facility; **[0 1 2 3]**	The candidate identifies the information required as part of their investigation, selects at least **three** search engines and uses the search facilities of each to locate the required information; the candidates uses the advanced search facilities of each search engine correctly to refine their searches, accurately comparing the results obtained to select the most appropriate search engine; **[4 5 6 7]**	The candidate identifies the information required as part of their investigation, selects at least **three** search engines and uses the search facilities of each to locate the information; the candidates uses the advanced search facilities of each search engine correctly to refine their searches, providing a detailed and accurate comparison of the results obtained to select and justify the most appropriate search engine; the candidates then uses efficient methods, including the correct use of logical and other operators in search strings, to speed up the process of finding the required information. **[8 9 10]**	**/10**
b	**AO1**	The candidate identifies the information required from a large website and provides evidence of using menus, navigation bars etc. to access information that may not fully meet their requirements; **[0 1 2]**	The candidate identifies the information required from a large website and an online database; the candidate provides evidence of accessing the required information by using menus, navigation bars etc. and by using an internal search engine to carry out simple searches of the online database; **[3 4]**	The candidate identifies the information required from a large website and an online database; the candidate provides evidence of accessing information that demonstrably meets their requirements by using menus, navigation bars etc. and by using an internal search engine to carry out a range of complex searches of the online database. **[5 6]**	**/6**

Unit G042: ICT solutions for individuals and society (continued)					
Task	**Assessment Objective**	**Mark Band 1**	**Mark Band 2**	**Mark Band 3**	**Mark Awarded**
c	**AO1**	The candidate uses complex search criteria involving some relational and logical operators to obtain information from a local database that has been provided and evidences their searches; **[0 1]**	The candidate uses complex search criteria involving a range of relational and logical operators to carry out meaningful searches to obtain information from a local database that has been provided; the candidate evidences their searches and present results as reports; **[2 3]**	The candidate uses complex search criteria involving a wide range of relational, logical and other operators to carry out searches to obtain information from a local database that has been provided that is fully relevant to their investigation; the candidate evidences their searches and present results as well-presented reports. **[4]**	**/4**
d	**AO1**	The candidate creates a suitable spreadsheet layout to carry out simple analysis of numeric data and provides suitable printed or screen output that makes appropriate use of cell formats, charts or graphs, page or screen layout and graphic images; the candidate clearly evidences the functions and formulae used; **[0 1 2 3]**	The candidate creates a suitable spreadsheet layout to carry out analysis of numeric data involving more complex functions and formulae, and provides suitable printed or screen output that makes appropriate use of cell formats, charts or graphs, page or screen layout and graphic images; using macros to speed up the input of data and the production of results; the candidate clearly evidences the functions and formulae used; **[4 5 6]**	The candidate creates a well-designed spreadsheet to carry out analysis of numeric data involving complex functions and formulae, using macros to speed up the input of data and the production of well-designed and meaningful results; the candidate tests the spreadsheet thoroughly to ensure its functionality and the accuracy of the results obtained, and provides clear evidence of testing. **[7 8 9]**	**/9**
e	**AO1**	The candidate presents the results of their investigation by combining at least **three** different types of information from at least **three** sources, listing the sources used; **[0 1 2]**	The candidate presents the results of their investigation effectively by combining at least **five** types of information from at least **five** different sources in a coherent way, listing their information sources in an appropriate form; **[3 4]**	The candidate produces a well-structured presentation that effectively combines at least **five** types of information from at least **five** different sources to present the investigation results clearly and coherently, so that they are easy to follow and understand; listing their information sources in a detailed bibliography. **[5 6]**	**/6**
f	**AO4**	The candidate comments on the effectiveness of the methods they used to find information and present results; **[0 1 2]**	The candidate clearly identifies good and not so good features of the methods they used to find information and present results, providing sensible suggestions on how to improve; **[3 4 5]**	The candidate shows that they identified strengths and weaknesses in both their initial searches and their presentation of results; the candidate will show how they refined them to meet the purpose more closely, suggesting how they might approach a similar task in future. **[6 7 8]**	**/8**

Unit G042: ICT solutions for individuals and society (continued)					
Task	**Assessment Objective**	**Mark Band 1**	**Mark Band 2**	**Mark Band 3**	**Mark Awarded**
g	**AO2**	The candidate describes how the availability of electronic information affects people and situations they are familiar with, such as the candidate and their family; The report may contain errors in spelling, punctuation and grammar; **[0 1 2 3]**	The candidate explains clearly how the availability of electronic information affects people and situations they are familiar with, such as the candidate and their family, and society in general and individuals within it, including people and situations outside their normal experience; The report will contain few spelling, punctuation and grammar errors; **[4 5]**	The candidate explains in detail how the availability of electronic information affects people and situations they are familiar with, such as the candidate and their family, and society in general and individuals within it, including people and situations outside their normal experience, including how organisations now communicate with individuals and society and the effect on those who do not have (or want) access to ICT; The report will be consistently well-structured and there will be few, if any, spelling, punctuation and grammar errors. **[6 7]**	**/7**
				Total mark awarded:	**/50**

The further guidance below clarifies the criteria in the *Assessment Evidence Grid* and will help to determine the appropriate mark to be awarded for each strand of work. All of the evidence, other than for task g, should result from candidates carrying out an investigation of a single topic.

The further guidance below clarifies the criteria in the *Assessment Evidence Grid* and will help to determine the appropriate mark to be awarded for each strand of work. All of the evidence, other than for task g, should result from candidates carrying out an investigation of a single topic.

Amplification of Criteria

Task	AO	Mark Band	Characteristics of the work one may expect to see at this mark band can be summarised as follows:
a	AO3	1	Having identified the information they require for their investigation, candidates use the standard search facilities of at least two search engines to locate it; Candidates make some attempt to refine their searches by attempting at least one search using an advanced search facility; Candidates awarded the lowest mark will use poorly considered search strings, while those awarded the highest mark will use both the standard and advanced search facilities efficiently – annotated screen prints provide suitable evidence of what the candidate has done;
		2	Candidates search for identified information using at least **three** different search engines – they make correct use of the advanced search facilities provided to narrow down the search results – suitably annotated screen prints evidence the searches carried out; Candidates compare the results obtained from the different search engines in terms of the number of hits, relevance, etc. in order to select the one that is most appropriate; The mark awarded depends on the types of different search engines used, the selection and correct use of appropriate advanced search facilities and the quality of the comparisons;
		3	In addition to evidence generated for Mark Band 2, candidates justify their selection of the most appropriate search engine for their investigation; Candidates then enter search strings, involving the correct use of logical and other operators, into the standard search box of their selected search engine – clear annotated screen-print evidence is provided of the search strings entered and the results obtained.
b	AO1	1	Having identified the information they require, candidates access large websites and use the tools available, such as menus, hyperlinks, alphabetic lists etc., to locate and download information, although this may not fully meet their requirements – annotated screen prints provide suitable evidence of what the candidate has done;
		2	In addition to the evidence generated for Mark Band 1, candidates access an online database and use the search engine provided to carry out a number of simple searches – suitably annotated screen prints evidence the searches carried out; The information found from both sources matches their requirements;
		3	In addition to the evidence generated for Mark Band 2, candidates use the advanced search facilities of an online database to carry out a number of complex searches involving more than one criteria– suitably annotated screen prints evidence the searches carried out; They are able to show how the information found from both sources matches their initial requirements.

Task	AO	Mark Band	Characteristics of the work one may expect to see at this mark band can be summarised as follows:
c	AO1	1	Candidates need to be supplied with a local database that relates to their investigation and that will allow them to generate the evidence required by all three mark bands. Candidates obtain information from the database provided by carrying out complex searches involving relational operators and some complex searches using logical operators (AND, OR, NOT) – complex searches may not be well-structured or meaningful; evidence of searches may be through annotated screen shots of the query design;
		2	In addition to the evidence generated for Mark Band 1, candidates use a number of well-structured and meaningful searches of the local database provided to find information that relates to their investigation; Results of searches will be presented as reports, which have been generated by a wizard, with little or no consideration of layout; evidence of searches may be through annotated screen shots of the query design and printouts of the reports generated;
		3	In addition to the evidence generated for Mark Band 2, candidates carry out searches of the local database provided involving parameter queries, wild cards and functions; the information obtained will be fully relevant to their investigation and reports generated will have been edited to improve their layout and ensure they are easy to read and understand; Evidence of searches may be through annotated screen shots of the query design and printouts of the reports generated.
d	AO1	1	Candidates carry out straightforward analysis of numeric data, such as finding the maximum, minimum and average values and comparing these graphically for different data sets – they use appropriate cell and presentation formats, charts or graphs are appropriate to the data being displayed and are suitably titled with the axes labelled and no inappropriate display of a legend; Candidates provide formula printouts of their spreadsheet to show the analysis carried out;
		2	In addition to evidence generated for Mark Band 1, candidates use multiple sheets with 3D referencing in formulae, more complex formulae that include parentheses, relational operators and logical values and functions such as INT, COUNT, IF, SQUARE, MODE, MEDIAN and DATE, as required; They use macros to automate, for example, displaying a particular area of the spreadsheet that shows a chart, opening a form for data input, copying data into a range of cells or to a separate sheet, clearing the content of cells or printing results;
		3	In addition to the evidence generated for Mark Band 2, candidates create spreadsheets layouts that clearly separate the results from the input data, either using different areas of the same sheet or using different sheets in a workbook with macro buttons to move to the relevant area – the results are presented in a way that makes them easy to read and understand; Candidates test all aspects of their spreadsheet including testing **all** formulae and functions used by entering simple values and comparing the results obtained with those obtained manually or by using a calculator – clear screen print evidence of testing is provided.

Task	AO	Mark Band	Characteristics of the work one may expect to see at this mark band can be summarised as follows:
e	AO1	1	Candidates combine at least **three** of the types of information listed in 'Presentation of the Results of an Investigation' in the Unit Content section, such as text, tables and charts, from at least **three** sources, such as **two** websites and their spreadsheet to present the results of their investigation in a suitable form (e.g. a presentation or a report) – information about sources is limited to the URL of the sites visited;
		2	Candidates combine **five** or more of the types of information listed in 'Presentation of the Results of an Investigation' in the Unit Content section, from at least **five** sources to present the results of their investigation – the report or presentation will combine the different types of information effectively and coherently; candidates list the exact URL of the web pages used;
		3	In addition to the evidence generated for Mark Band 2, candidates consider carefully how the information needs to be combined so that it is presented in a logical order and in an appropriate style to make the final presentation coherent, easy to follow and easy to understand, including a suitable conclusion; candidates provide a precise URL for each web page used, along with the date the website was accessed and additional information such as author and date last updated, where available, and the path as well as filename for any local databases – they indicate what information was obtained from each source and provide sufficient detail to allow someone else to find the information.
f	AO4	1	Candidates make brief comments on how effective each method used to find information and present results is and suggest simple improvements to some of them;
		2	Candidates' evaluations consider both good and not so good features of each method used to find information and present results; Candidates provide sensible suggestions as to how each method could be improved;
		3	Candidates show evidence of evaluation through the refinement of their work as it progresses; Candidates identify the strengths and weaknesses in their initial search strategies and explain how these were refined to meet the purpose more closely; They also identify strengths and weaknesses in their initial ideas for presenting the results of their investigation and explain how they refined these ideas to present the results more effectively; Final evaluations include consideration of how a more efficient approach might be adopted for similar tasks in future.
g	AO2	1	Candidates describe the effects of the availability of information in personal terms, such as their ability to access information on this qualification by accessing the OCR website, or the ability of their parents to find train or flight information and book tickets on-line – the report will be made up of examples, with little attempt to explain the effects;
		2	Candidates provide some explanation of the impacts of the availability of electronic information on themselves and their family and then broaden the scope of their explanations to include individuals and situations outside their normal experience – this may include: people with disabilities, people who live in remote locations, early warning systems, earthquake detection systems, introduction of wireless access in Africa, political restrictions on access, etc.; Although some errors may be present, these should not be of the type that a spell or grammar checker would identify;

g	**AO2**	**3**	In addition to evidence generated for Mark Band 2, candidates include in their more detailed explanations the increased use by organisations of e-mail, websites and other ICT to communicate with their customers individually, and with society in general, through ICT-based advertising; They explain in detail the effects of this increased use of electronic communication on those who do not have (or want) access to ICT; There will be very few errors in the report, which will be well-structured with headings and sub-headings and with explanations presented in a logical order.

Unit G043 - Assessment Evidence Grid

Unit G043: System specification and configuration

What candidates need to do:

Candidates need to produce: a specification for an ICT system to meet the needs of a given user, together with a working system on which they have installed and configured software to meet a user's needs, and recommendations for ensuring safety and security, and an explanation of the basics of software development.

Evidence needs to include:

a [AO3] a statement of the user's needs and how these might be met [**6**];
b [AO3] a specification for an ICT system [**9**];
c [AO1] evidence of software installation, configuration, testing and implementation of security procedures [**9**];
d [AO1] evidence that the software has been configured by installing toolbars and setting up macros and templates to meet a user's needs [**6**];
e [AO2] recommendations for safety and security [**8**];
f [AO2] an explanation of the basics of software development [**4**];
g [AO4] an evaluation of the specification the candidate produced and the methods used for installation, configuration and testing [**8**];

How the candidate will be assessed:

Task	Assessment Objective	Mark Band 1	Mark Band 2	Mark Band 3	Mark Awarded
a	**AO3**	The candidate identifies user requirements by identifying the main tasks that the user wants the system to perform, including some of the data that will be input and the type of output required; **[0 1 2]**	The candidate clearly defines the user requirements by describing specific tasks that the user wants the system to perform, including the data that will be input and the type of output required; The candidate identifies the types of software and hardware that would meet some of these needs; **[3 4]**	The candidate clearly defines the user requirements by detailing specific tasks that the user wants the system to perform, identifying all the types of data that will be input and the types of output required. The candidate identifies the types of software and hardware that would meet all of these needs. **[5 6]**	**/6**
b	**AO3**	The candidate produces a specification for an ICT system to meet the identified user requirements, including details of hardware, operating system, applications software and configuration, with some design of toolbar layouts, menus, templates and/or macros; **[0 1 2 3]**	The candidate shows a systematic approach to clearly specifying an ICT system to meet the identified user requirements, including full details of hardware, operating system applications software and configuration, with designs for toolbar layouts, menus, templates and macros to meet user needs; **[4 5 6]**	The candidate shows a systematic approach to clearly specifying an ICT system that fully meets the defined user requirements, including full details of hardware, operating system, applications software and configuration, with detailed designs for toolbar layouts, menus, templates and macros that fully meet user needs and that would improve the efficiency and effectiveness of the user. **[7 8 9]**	**/9**

Unit G043: System specification and configuration (continued)					
Task	**Assessment Objective**	**Mark Band 1**	**Mark Band 2**	**Mark Band 3**	**Mark Awarded**
c	**AO1**	The candidate selects and installs suitable software; The candidate configures the software and operating system to meet the needs of the user; The candidate makes some attempt to implement test procedures to check each task undertaken; The candidate implements suitable security procedures; **[0 1 2 3]**	The candidate selects and installs suitable software; The candidate configures the software and operating system to meet the needs of the user, including setting ROM-BIOS parameters; The candidate clearly defines test procedures in a test plan and implements these procedures to check each task undertaken; The candidate implements suitable security procedures; **[4 5 6]**	The candidate selects and installs suitable software; The candidate configures the software and operating system to meet the needs of the user, including setting ROM-BIOS parameters and carrying out more complex configuration activities such as virus protection and scheduling tasks; The candidate clearly defines test procedures in a detailed test plan and implements these procedures to thoroughly test each task undertaken, showing how they overcame problems found as a result of testing; The candidate implements suitable security procedures. **[7 8 9]**	**/9**
d	**AO1**	The candidate installs and tests at least **two** from: a suitable toolbar layout, menu, template or macro to meet the user requirements; **[0 1 2]**	The candidate installs and tests at least **one** of **each** of: suitable toolbar layouts, menus, templates and macros to meet the user requirements; **[3 4]**	The candidate installs and tests more than **one** of **each** of: toolbar layouts, menus, templates and macros that they have designed that provide the user with facilities to improve their efficiency. **[5 6]**	**/6**
e	**AO2**	The candidate provides limited recommendations for safety and security, including the ergonomics of furniture and the workstation layout or consideration of management issues; the report may contain errors in spelling, punctuation and grammar; **[0 1 2 3]**	The candidate provides recommendations for safety and security that includes consideration of the ergonomics of hardware, software, furniture and the workstation layout and of management issues; the report will contain few spelling, punctuation and grammar errors; **[4 5 6]**	The candidate provides detailed recommendations for safety and security that include a full consideration of both ergonomics and management issues; the report will be consistently well structured and there will be few, if any, spelling, punctuation and grammar errors. **[7 8]**	**/8**
f	**AO2**	The candidate outlines what is needed to develop software and at least **two** aspects that need to be considered when developing software; **[0 1]**	The candidate outlines what is needed to develop software and at least **three** aspects that need to be considered when developing software; **[2 3]**	The candidate explains what is needed to develop software and at least **three** aspects that need to be considered when developing software. **[4]**	**/4**
g	**AO4**	The candidate comments on how well their specification meets the user's requirements and suggest improvements; The candidate comment on the effectiveness of the methods they used for installation, configuration and testing; **[0 1 2 3]**	The candidate clearly identifies good and not so good features of their specification in relation to the user's requirements, suggesting ways it could be improved; The candidate includes an analysis of their experiences while installing, configuring and testing software in order to improve their own performance; **[4 5]**	The candidate shows that they identified strengths and weaknesses in their initial specification and refined it to meet the user's requirements more closely; The candidate includes an analysis of their experiences while installing, configuring and testing software and uses this to suggest how they might approach a similar task in future. **[6 7 8]**	**/8**
				Total mark awarded:	**/50**

The further guidance below clarifies the criteria in the *Assessment Evidence Grid* and will help to determine the appropriate mark to be awarded for each strand of work.

Amplification of Criteria			
Task	**AO**	**Mark Band**	**Characteristics of the work one may expect to see at this mark band can be summarised as follows:**
a	**AO3**	**1**	Candidates use information provided to identify only the main tasks the user wants the system to perform, such as producing letters and other documents, producing multimedia presentations or editing video clips, this will include some identification of the data that will need to be input and the type of output required;
		2	Candidates define user requirements clearly by stating the specific tasks the user wants the system to perform, including the types of input and output required, e.g. candidates might identify that the user wants to input names and addresses of customers to produce a personalised standard letter; They identify some of the hardware and software the user might need to carry out these tasks, e.g. word processing software to produce letters, a keyboard for input and a printer for output;
		3	Candidates define user requirements clearly by describing in detail the specific tasks the user wants the system to perform, including the types of data input and output required – all the types of software, the input and output devices needed are identified;
b	**AO3**	**1**	Candidates gaining maximum marks include details of hardware, such as type, size and speed, as appropriate, of both operating system and applications software, such as type, title and version; and how the system needs to be configured to meet the user requirements, such as the software icons required on the desktop, the directory (folder) structure and settings and the macros, templates, toolbar layouts and menus required – as a minimum, candidates identify all the hardware, software and configuration requirements but their specification lacks detail, – some designs of toolbar layouts, menus, templates or macros are included but these will give limited detail;
		2	Candidates recognise the interdependence of hardware and software components when specifying systems and approach the specification systematically by considering the specific user requirements and the software or hardware essential to meet these as a starting point, Candidates will provide all relevant details of hardware, operating system and applications software, and configuration requirements, including designs for toolbar layouts, menus, templates and macros – there should be sufficient detail for someone else to source, set up and configure the system;
		3	Additionally, the system specified will clearly meet all the needs defined in task a; At this level, they have considered the efficiency and effectiveness of the user and produce clear designs that would demonstrably improve these aspects;
c	**AO1**	**1**	Candidates select and install software to meet specific requirements; They configure the software, e.g. by setting preferences; They configure the operating system by, for example, setting password properties, setting up directory (folder structures), configuring printer, mouse and keyboard, and configuring GUI desktop and display setup including application software icons; Candidates also implement security procedures such as setting and using passwords; There is some evidence of ad hoc testing of the tasks undertaken.

Task	AO	Mark Band	Characteristics of the work one may expect to see at this mark band can be summarised as follows:
c	AO1	2	Additionally, candidates create test procedures to check each task undertaken that include details of the test to be carried out and the expected result; They carry out the tests and compare the actual result obtained with that expected; Where problems are found, candidates keep records of the steps they take to resolve these problems;
		3	Candidates test the facilities created to ensure they work as expected; Candidates further carry out configuration activities that require them to set ROM-BIOS parameters and schedule tasks such as virus checking.
d	AO1	1	Candidates set up and install a toolbar layout, menu, template and macro to meet specific user requirements – these may be examples provided by the software that have been modified by candidates;
		2	Candidates set up and install a toolbar layout, menu, template and macro to meet specific user requirements; Candidates create test procedures to check each task undertaken that include details of the test to be carried out and the expected result; They carry out the tests and compare the actual result obtained with that expected;
		3	Additionally, at this level, candidates use their own designs to create and install toolbar layouts, menus, templates and macros that demonstrably improve the efficiency of the user, e.g. by creating a template that includes macros to input specific data.
e	AO2	1	Candidates provide limited recommendations for safety and security – these may include the use of passwords to prevent theft and protect confidential information and the importance of virus checking; Consideration of ergonomics is limited to furniture and work station layout;
		2	Candidates include the ergonomics of hardware and software in their recommendations; They also consider management issues such as maintaining data and software back-up;
		3	Candidates provide detailed recommendations for all the safety and security issues identified in 'Safety and Security' in the Unit Content section;
f	AO2	1	Candidates provide brief notes that identify the concepts of programming languages and syntax and at least **two** of the aspects that need to be considered when developing software, as listed in 'Basics of Software Development' in the Unit Content section;
		2	Additionally candidates provide brief notes that identify at least **three** of the aspects that need to be considered when developing software;
		3	Candidates explain the concepts of programming languages and syntax and at least **three** of the aspects that need to be considered when developing software, as listed in 'Basics of Software Development' in the Unit Content section with reference to specific examples.

Task	AO	Mark Band	Characteristics of the work one may expect to see at this mark band can be summarised as follows:
g	AO4	1	Candidates make brief comments on how well the quality of their specification meets the user's requirements, as identified in task a, and suggest some simple improvements; They also comment on how effective each method used was for installation, configuration and testing;
		2	Candidates identify features of their specification that meet the user requirements and those that do not fully do so, suggesting valid improvements; Candidates' evaluations consider both good and not so good features of each method used for installation, configuration and testing – they provide sensible suggestions as to how each method could be improved;
		3	Candidates show evidence of evaluation through the refinement of their work as it progresses; Candidates identify the strengths and weaknesses in their initial specification and practical activities and explain how this was refined to meet the users' needs more closely; Final evaluations of practical activities include consideration of how a more efficient approach might be adopted for similar tasks in future.

Unit G044 - Assessment Evidence Grid

Unit G044: Problem solving using ICT

What candidates need to do:

Candidates need to produce, for a familiar context:

a [AO2] the identification and explanation of the problem to be solved with the benefits of the solution to the organisation [**3**];
b [AO3] a proposed solution to the problem [**8**];
c [AO3] an explanation of the information, including the inputs and outputs, which will be used by the proposed solution including an explanation of the levels at which the information will be used [**7**];
d [AO1] an explanation, providing examples, of the differing types of software which are used in an organisation, how they are used and the levels at which they are used [**6**];
e [AO2] an identification and explanation of the quality procedures which could be used when developing the proposed solution [**5**];
f [AO1/2] an identification and explanation, to include diagrams, of the system boundaries, environments and other systems which will be affected by the proposed solution [**14**];
g [AO4] an evaluation of the proposed solution and their performance in solving the problem [**7**].

How the candidate will be assessed:

Task	Assessment Objective	Mark Band 1	Mark Band 2	Mark Band 3	Mark Awarded
a	**AO2**	The candidate identifies the problem to be solved; **[0 1]**	The candidate gives a simple explanation of the problem with some of the benefits to the organisation explained; **[2]**	The candidate gives a detailed explanation with the benefits of the solution to the organisation fully explained. **[3]**	**/3**
b	**AO3**	The candidate produces a simple solution which does not fully solve the problem; **[0 1 2]**	The candidate produces a solution to the problem covering most of the defined requirements; and which is appropriate to the organisation **[3 4 5]**	The candidate produces a detailed solution which fully solves the problem and is appropriate to the organisation. **[6 7 8]**	**/8**
c	**AO3**	The candidate gives an incomplete description of the information which is used by the proposed solution; The candidate considers some of the inputs/outputs of the system and identifies the levels, within the organisation, at which the information will be used; **[0 1 2]**	The candidate gives a description of the information which is used by the proposed solution; The candidate considers most of the inputs/outputs of the system; The candidate describes the levels, within the organisation, at which the information will be used; **[3 4]**	The candidate gives an explanation of the information which is used by the proposed solution; The candidate considers all the inputs/outputs of the system; The candidate explains the levels, within the organisation, at which the information will be used and include a detailed explanation of the use of the information at each level. **[5 6 7]**	**/7**
d	**AO1**	The candidate identifies the differing types of software which are used at the different levels within an organisation; **[0 1 2]**	The candidate identifies and describes, the differing types of software which are used at the different levels within an organisation; The candidate describes how the software could be used; **[3 4]**	The candidate identifies and explains the differing types of software which are used at the different levels within an organisation; The candidate explains how the software could be used. **[5 6]**	**/6**

Unit G044: Problem solving using ICT					
Task	**Assessment Objective**	**Mark Band 1**	**Mark Band 2**	**Mark Band 3**	**Mark Awarded**
e	**AO2**	The candidate identifies and describes the quality procedures which could be used when developing the proposed solution; **[0 1]**	The candidate identifies and provides an explanation, covering advantages or disadvantages of the quality procedures which could be used when developing the proposed solution; **[2 3]**	The candidate identifies and provides an explanation, covering advantages and disadvantages, of the quality procedures which could be used when developing the proposed solution. **[4 5]**	**/5**
f(i)	**AO1**	The candidate produces incomplete system boundary diagrams; The candidate's diagrams do not conform to industry standards and conventions; **[0 1 2 3]**	The candidate produces complete system diagrams showing either the inputs or outputs of the system; The candidate's diagrams follow industry standards and conventions; **[4 5 6]**	The candidate produces detailed system diagrams showing the inputs and outputs of the system; The candidate's diagrams follow industry standards and conventions. **[7 8 9]**	**/9**
f(ii)	**AO2**	The candidate identifies the system boundaries and environment which are affected by the proposed solution; The candidate does not consider how the proposed solution will affect other systems within the organisation; **[0 1]**	The candidate identifies and describes the system boundaries and environment which are affected by the proposed solution; The candidate describes how the proposed solution will affect the other systems within the organisation; **[2 3]**	The candidate identifies and explains the system boundaries and environment which are affected by the proposed solution; The candidate explains how the proposed solution will affect the other systems within the organisation; **[4 5]**	**/5**
g	**AO4**	The candidate produces a simple evaluation of the proposed solution, including a comment on their actions and role in proposing a solution; **[0 1 2]**	The candidate produces an evaluation of the proposed solution discussing the aims, objectives or goals, including comments on their own actions and roles in proposing a solution; **[3 4 5]**	The candidate produces a detailed evaluation of the proposed solution discussing the aims, objectives and goals, including reflection of their experiences to improve their own performance, suggesting how they might approach a similar task in the future. **[6 7]**	**/7**
				Total mark awarded:	**/50**

The further guidance below clarifies the criteria in the *Assessment Evidence Grid* and will help to determine the appropriate mark to be awarded for each strand of work.

The further guidance below clarifies the criteria in the *Assessment Evidence Grid* and will help to determine the appropriate mark to be awarded for each strand of work.

Amplification of Criteria

Task	AO	Mark Band	Characteristics of the work one may expect to see at this mark band can be summarised as follows:
a	AO2	1	Candidates provide a simple identification of the problem to be solved;
		2	Candidates provide a simple explanation of the problem to be solved; They are able to identify and explain some of the benefits of a solution to the organisation;
		3	Candidates provide a detailed explanation of the problem to be solved; They are able to identify and explain all the benefits that this solution will bring to the organisation.
b	AO3	1	Candidates provide a simple solution which does not fully solve the defined problem;
		2	Candidates provide a solution to the defined problem; The solution does solve the defined problem, covers most of the defined requirements and is appropriate for the organisation;
		3	Candidates provide a detailed solution to the defined problem which fully solves the problem and is appropriate for the organisation.
c	AO3	1	Candidates provide an incomplete description of the information which will be used by the proposed solution; There is some consideration of the inputs/outputs of the system and identification of the levels, within the organisation, at which the information will be used;
		2	Candidates provide a description of the information which will be used by the proposed solution; There is consideration of most of the inputs/outputs of the system and description of the levels, within the organisation, at which the information will be used;
		3	Candidates provide an explanation of the information which will be used by the proposed solution; There is full consideration of the inputs/outputs of the system and an explanation of the levels, within the organisation, at which the information will be used and how it will be used.
d	AO1	1	Candidates provide an identification of the differing types of software which are used at different levels within an organisation;
		2	Candidates provide a description of the differing types of software which are used at different levels within an organisation; Candidates describe how each type of software could be used.
		3	Candidates provide an explanation of the differing types of software which are used at different levels within an organisation; Candidates explain how each type of software could be used.

Task	AO	Mark Band	Characteristics of the work one may expect to see at this mark band can be summarised as follows:
e	AO2	1	Candidates provide an identification of the quality procedures which could be used when developing the proposed solution;
		2	Candidates provide an explanation of the quality procedures which could be used when developing the proposed solution; Candidates will provide either the advantages or the disadvantages of each quality procedure;
		3	Candidates provide an explanation of the quality procedures which could be used when developing the proposed solution; Candidates will provide the advantages and disadvantages of each quality procedure.
f(i)	AO1	1	Candidates provide incomplete system boundary diagrams which do not conform to any industry standard conventions;
		2	Candidates provide system boundary diagrams showing either the inputs or outputs from, and the interaction with, any existing systems within the organisation; The system boundary diagram follows industry standards and conventions;
		3	Candidates provide detailed boundary diagrams showing both the inputs and outputs from and the interaction with any existing systems within the organisation; The system boundary diagram follows industry standards and conventions.
f(ii)	AO2	1	Candidates provide an identification of the system boundaries and environment which will be affected by the proposed solution; There is no consideration of how the proposed solution will affect other systems within the organisation;
		2	Candidates provide a description of the system boundaries and environment which will be affected by the proposed solution; There is a description of how the proposed solution will affect the other systems within the organisation;
		3	Candidates provide an explanation of the system boundaries and environment which will be affected by the proposed solution; There is an explanation of how the proposed solution will affect the other systems within the organisation;
g	AO4	1	Candidates provide an incomplete evaluation leading to a simple conclusion for the proposed solution; The impact of the new system is not fully discussed;
		2	Candidates provide an evaluation leading to a conclusion; The benefits or disadvantages of the new system are considered; The impact of the new system is not fully discussed;
		3	Candidates provide a detailed evaluation leading to a justified conclusion; The benefits and disadvantages of the new system are fully discussed; The impact of the proposed solution is fully discussed.

Unit G045 - Assessment Evidence Grid

Unit G045: Software development – design

What candidates need to do:

Candidates need to produce a design for a solution to a given problem, in a familiar context.
Evidence needs to include:

a [AO2] the identification and explanation of the tools and techniques used in the analysis stage [**4**];
b [AO2] the identification and explanation of the tools and techniques used in the design stage [**4**];
c [AO2] the investigation methods used when designing solutions [**4**];
di [AO1] a report documenting feasibility and proposed solutions [**9**];
dii [AO1] designs for input and output requirements to meet the defined needs of the end-user **[6];**
e [AO3] data-flow modelling and associated documentation [**8**];
f [AO3] entity-relationship diagrams and associated documentation [**8**];
g [AO4] a conclusion and evaluation of the proposed solution and their performance in solving the problem [**7**].

How the candidate will be assessed:

Task	Assessment Objective	Mark Band 1	Mark Band 2	Mark Band 3	Mark Awarded
a	**AO2**	The candidate identifies the tools and techniques which are used during the analysis stage; **[0 1 2]**	The candidate gives a simple explanation, including advantages or limitations of the tools and techniques which are used during the analysis stage; **[3]**	The candidate gives a detailed explanation, including advantages and limitations of the tools and techniques which are used during the analysis stage providing examples of when each could be used. **[4]**	**/4**
b	**AO2**	The candidate identifies the tools and techniques which are used during the design stage; **[0 1 2]**	The candidate gives a simple explanation, including advantages or limitations of the tools and techniques which are used during the design stage; **[3]**	The candidate gives a detailed explanation, including advantages and limitations of the tools and techniques which are used during the design stage providing examples of when each could be used. **[4]**	**/4**
c	**AO2**	The candidate identifies investigation methods; **[0 1 2]**	The candidate gives a simple explanation, including advantages or limitations of investigation methods; **[3]**	The candidate gives a detailed explanation, including advantages and limitations of investigation methods providing examples of when each could be used. **[4]**	**/4**
d(i)	**AO1**	The candidate produces a simple report considering some aspects of feasibility and showing a single solution to the given problem; The candidate's report may contain errors in spelling, punctuation and grammar; **[0 1 2 3]**	The candidate produces a detailed report considering all aspects of feasibility and showing alternate solutions to the given problem; The candidate's report contains few spelling, punctuation and grammar errors; **[4 5 6]**	The candidate produces a detailed report considering all aspects of feasibility in detail and showing alternate solutions to the given problem, justifying the chosen solution; The candidate's report is consistently well-structured and there are few, if any, spelling, punctuation and grammar errors. **[7 8 9]**	**/9**

Unit G045: Software development – design					
Task	**Assessment Objective**	**Mark Band 1**	**Mark Band 2**	**Mark Band 3**	**Mark Awarded**
d(ii)	**AO1**	The candidate produces simple or incomplete designs for input/output requirements that do not fully meet the defined requirements of the end-user; The candidate does not consider standard design concepts; **[0 1 2]**	The candidate produces designs for input/output requirements that meet the defined requirements of the end-user; Standard design concepts are taken into account but some areas may not be fully considered; **[3 4]**	The candidate produces designs for input/output requirements, including calculations that are needed, that fully meet the defined requirements of the end-user; All standard design concepts are taken into account. **[5 6]**	**/6**
e	**AO3**	The candidate produces an incomplete data-flow model for the current solution with incomplete documentation; **[0 1 2]**	The candidate produces a data-flow model of the current solution using simple graphical representation with complete documentation; **[3 4 5]**	The candidate produces a complete data-flow model of the current solution, making effective use of formal graphical representation with complete and detailed documentation. **[6 7 8]**	**/8**
f	**AO3**	The candidate produces an incomplete ERD for the proposed solution with incomplete documentation; **[0 1 2]**	The candidate produces a simple ERD of the solution, with complete documentation; **[3 4 5]**	The candidate produces a complete ERD of the solution, with complete and detailed documentation. **[6 7 8]**	**/8**
g	**AO4**	The candidate produces a simple evaluation of the system; The candidate comments on their actions and role in solving the problem; **[0 1 2]**	The candidate evaluates the solution discussing either benefits or disadvantages of the solution; The candidate includes an analysis on their experiences in order to improve their own performance; **[3 4]**	The candidate evaluates the solution discussing both benefits and disadvantages of the solution; The candidate includes an analysis on their experiences, suggesting how they might approach a similar task in the future. **[5 6 7]**	**/7**
				Total mark awarded:	**/50**

The further guidance below clarifies the criteria in the *Assessment Evidence Grid* and will help to determine the appropriate mark to be awarded for each strand.

Amplification of Criteria			
Task	**AO**	**Mark Band**	**Characteristics of the work one may expect to see at this mark band can be summarised as follows:**
a	**AO2**	**1**	Candidates provide an identification of the tools and techniques which could be used during the analysis stage; The tools and techniques identified will be limited;
		2	Candidates identify and provide a simple explanation of the tools and techniques which could be used during the analysis stage; There is a range of tools and techniques identified and explained; Candidates provide either the advantages or limitations of each tool and technique identified;
		3	Candidates identify and provide a detailed explanation of the tools and techniques which could be used during the analysis stage; There is a wide range of tools and techniques explained; Candidates provide the advantages and limitations of each tool and technique identified with appropriate situations of use.
b	**AO2**	**1**	Candidates provide an identification of the tools and techniques which could be used during the design stage; The tools and techniques identified will be limited;
		2	Candidates identify and provide a simple explanation of the tools and techniques which could be used during the design stage; There is a range of tools and techniques identified and explained; Candidates provide either the advantages or limitations of each tool and technique identified;
		3	Candidates identify and provide a detailed explanation of the tools and techniques which could be used during the design stage; There is a wide range of tools and techniques explained; Candidates provide the advantages and limitations of each tool and technique identified, with appropriate situations of use.
c	**AO2**	**1**	Candidates identify investigation methods which could be used; The range of investigation methods identified will be limited;
		2	Candidates identify and provide a simple explanation of the investigation methods which could be used; Candidates provide either the advantages or limitations of each investigation method they have identified;
		3	Candidates identify and provide a detailed explanation of the investigation methods which could be used; Candidates provide the advantages and limitations of each investigation method they have identified, with appropriate situations of use.
d(i)	**AO1**	**1**	Candidates provide a simple report including some consideration of the feasibility of the proposed system, including a proposed solution to the given problem; Candidates only provide **one** proposed solution with no alternate solutions indicated; The proposed solution is incomplete or does not meet the needs of the end-user;
		2	Candidates provide a detailed report including consideration of the technical, economic, legal, operational and schedule feasibility of the proposed system, solutions to the given problem; Candidates provide alternate solutions to the problem; Proposed solutions and designs meet the needs of the end-user;

Task	AO	Mark Band	Characteristics of the work one may expect to see at this mark band can be summarised as follows:
d(i)	**AO1**	**3**	Candidates provide a detailed report including detailed consideration of technical, economic, legal, operational and schedule feasibility of the proposed system, solutions to the given problem; candidates provide alternate solutions to the problem; Candidates provide a preferred solution for the end-user and are able to justify the choice; The proposed solutions meet the needs of the end-user.
d(ii)	**AO1**	**1**	Candidates produce simple or incomplete designs for input/output requirements that do not fully meet the defined requirements of the end-user; The design does not fully consider how the input/output will be displayed, the purpose or data required by the end user/client; The standard design concepts are not fully taken into account, for example the layout may be cramped, the fonts and colours used are inappropriate for the purpose and end users of the input/outputs;
		2	Candidates produce designs for input/output requirements that meet the defined requirements of the end-user; The standard design concepts are taken into account but some areas may not be fully considered – the layout may be cramped, the fonts and colours used may not be consistent;
		3	Candidates produce designs for input/output requirements, including calculations that are needed, that fully meet the defined requirements of the end-user; The standard design concepts are taken into account with the layout being clear, the fonts and colours used are consistent.
e	**AO3**	**1**	Candidates produce an incomplete data flow model with incomplete documentation;
		2	Candidates produce a data flow model using a simple graphical representation method; The documentation is complete, appropriate and relates to the data flow model;
		3	Candidates produce a full and complete data flow model using a formal modelling technique; The detailed documentation is complete, to an appropriate level of detail, and relates to the data flow model produced.
f	**AO3**	**1**	Candidates produce an incomplete ERD with incomplete documentation;
		2	candidates produce an ERD with complete documentation that is, appropriate and relates to the ERD;
		3	Candidates produce a full and complete ERD with detailed documentation that is complete, to an appropriate level of detail, and relates to the ERD produced.
g	**AO4**	**1**	Candidates provide a simple conclusion for the proposed solution; Candidates make brief comments on how they tackled and solved the problem and suggest simple improvements;
		2	Candidates provide an evaluation leading to a conclusion; The benefits or disadvantages of the new system are considered; An alternative solution is identified; Candidates' evaluations consider both good and not so good features of the way they tackled and solved the problem; Candidates provide sensible suggestions as to how each method could be improved;
		3	Candidates provide an evaluation leading to a justified conclusion; The benefits and disadvantages of the new system are fully discussed; Alternative solutions are identified; Candidates show evidence of evaluation through the refinement of their work as it progresses; Candidates identify the strengths and weaknesses in their strategies to solve the problem and explain how these were refined to meet the purpose more closely; Final evaluations include consideration of how a more efficient approach might be adopted for a similar task in future.

Unit G046: Communicating using computers

What candidates need to do:

Evidence needs to include:

a [AO2] a report on an organisation detailing how they make use of an intranet and the internet [**6**];
b [AO2/3] a report on an existing website [**12**];
c [AO3] a report on setting up a planned website for a specific purpose [**9**];
d [AO1/4] a web page from the planned website, hosted online [**14**]**;**
e [AO1] evidence of configuring a single computer for internet and e-mail access [**9**].

How the candidate will be assessed

Task	Assessment Objective	Mark Band 1	Mark Band 2	Mark Band 3	Mark Awarded
a	**AO2**	The candidate identifies how the internet and intranet are currently used and how they help the organisation meet its objectives; The candidate identifies **one** improvement the organisation could make to how it uses the internet or intranet; **[0 1 2]**	The candidate describes how the internet and intranet are currently used, the advantages and disadvantages of the current uses, and how they help the organisation meet its objectives; The candidate describes **several** improvements the organisation could make to how it uses the internet and intranet; **[3 4]**	The candidate explains how the internet and intranet are currently used, the advantages and disadvantages of the current use, and how they help the organisation meet its objectives; The candidate justifies improvements the organisation could make to how it uses the internet and intranet. **[5 6]**	**/6**
b(i)	**AO2**	The candidate identifies the purpose of the nominated website and describe **two** different services provided by the website; The candidate identifies the use of at least **two** internet technologies; **[0 1 2]**	The candidate describes the purpose of the nominated website and describe a range of different services provided by the website; The candidate describes the use of at least **two** internet technologies; **[3 4]**	The candidate describes the purpose of the nominated website and analyse how this is met; The candidate describes the range of different services provided by the website; The candidate explains the use of at least **two** internet technologies. **[5 6]**	**/6**
b(ii)	**AO3**	The candidate produces a diagrammatic structure of the website identifying titles of pages and hyperlinks; The candidate shows some evidence of understanding the code used in web pages by identifying some script commands; **[0 1 2]**	The candidate produces a diagrammatic structure of the website identifying titles of pages and hyperlinks; The candidate demonstrates understanding of the code used in web pages by annotating a range of different script commands; **[3 4]**	The candidate produces a diagrammatic structure of the website identifying titles of pages and hyperlinks; The candidate demonstrates a good understanding of the code used in web pages by annotating a wide range of different script commands to explain how they generate the pages displayed in the browser. **[5 6]**	**/6**

Unit G046: Communicating using computers (continued)					
Task	**Assessment Objective**	**Mark Band 1**	**Mark Band 2**	**Mark Band 3**	**Mark Awarded**
c	**AO3**	The candidate identifies some of the costs, connection methods and hardware/software that need to be considered to create and host their planned website; The candidate considers possible ISPs to host their website; The report may contain errors in spelling, punctuation and grammar; **[0 1 2 3]**	The candidate describes a range of costs, valid connection methods and hardware/software, including bandwidth requirements, that need to be considered to create and host their planned website; The candidate considers a range of possible ISPs for hosting their website and identify **one** that is suitable; The report contains few spelling, punctuation and grammar errors; **[4 5 6]**	The candidate describes a range of costs, valid connection methods and hardware/software, including bandwidth requirements, that need to be considered to create and host their planned website; The candidate considers a range of possible ISPs, identify **one** suitable ISP and justify its suitability for hosting their website in relation to its technical requirements; The report is consistently well-structured and there are few, if any, spelling, punctuation and grammar errors. **[7 8 9]**	**/9**
d(i)	**AO1**	The candidate designs and creates **one** web page from their planned website that demonstrates the use of **one** internet technology; **[0 1 2]**	The candidate designs and creates **one** web page from their planned website that meets its requirements and identify the use of at least **two** internet technologies; **[3 4]**	The candidate designs and creates **one** high quality web page from their planned website that fully meets its requirements and explain the use of at least **two** internet technologies; The candidate will provide evidence that the web page was hosted online. **[5 6]**	**/6**
d(ii)	**AO4**	The candidate comments on their actions and role in designing and creating a web page, and getting it hosted online, if they were able to do so; **[0 1 2 3]**	The candidate includes an analysis of their experiences in designing, creating and hosting a web page in order to improve their own performance; **[4 5]**	The candidate includes an analysis of their experiences in designing, creating and hosting a web page, suggesting how they might approach a similar task in the future.**[6 7 8]**	**/8**
e	**AO1**	The candidate identifies the hardware/ software and information required to set up a computer for internet and e-mail access; The candidate installs at least **one** piece of communication software and identify part of the installation process; The candidate produces evidence of changes to **two** different browser configuration settings; The candidate produces evidence of sending and receiving e-mails; **[0 1 2 3]**	The candidate describes the function of the hardware/software and information required to set up a computer for internet and e-mail access; The candidate documents the installation of at least **one** piece of communication software; The candidate describes and produces evidence of **two** different configuration changes made to a browser; The candidate produces evidence of sending and receiving e-mails, and setting up and using, an appropriate filing structure for e-mails; **[4 5 6]**	The candidate explains the use of a range of hardware/software and information that could be used to set up a computer for internet and e-mail access; The candidate produces full technical documentation for the installation of at least **one** piece of communication software; The candidate fully explains and illustrates **two** different configuration changes made to a browser; The candidate produces evidence of setting up an appropriate filing structure for e-mails, sending and receiving e-mails and setting filters to file received e-mails automatically. **[7 8 9]**	**/9**
				Total mark awarded:	**/50**

The further guidance below clarifies the criteria in the *Assessment Evidence Grid* and will help to determine the appropriate mark to be awarded for each strand of work.

Amplification of Criteria			
Task	**AO**	**Mark Band**	**Characteristics of the work one may expect to see at this mark band can be summarised as follows:**
a	**AO2**	**1**	Candidates investigate how an organisation makes use of the intranet and internet; they identify the current use in relation to the organisation's objectives and identify **one** improvement to either internet or intranet use;
		2	Once candidates have established the current use of the internet and intranet, they describe the advantages and disadvantages of the use in relation to the organisation's objectives; They describe **several** improvements to the organisation's use of both the intranet and internet;
		3	Candidates are able to analyse and explain current use in terms of the organisation's objectives and can make fully justified suggestions for improvement.
b(i)	**AO2**	**1**	Candidates report *on* a website which uses of at least **two** different web technologies as indicated in 'internet Websites' in the Unit Content section; Candidates are able to identify the *purpose* of the website – who the audience is, what the company expects the website to do, why it is there; they are able to describe **two** website services
		2	Candidates add description to their identification of the *purpose* of the website; Candidates describe most appropriate services provided and at least **two** of the technologies used by the website;
		3	Candidates analyse how the website meets its purpose; Candidates describe all appropriate services provided; they cannot just describe the technologies used, rather they explain how the website is making use of at least **two** of those technologies.
b(ii)	**AO3**	**1**	Candidates produce a diagrammatic site map of the website, showing links – titles of pages only are required, detailed diagrams of pages are **not** required; Candidates include sections of the html code and annotate it to identify some commands, such as those to embolden text, determine colour or include a table;
		2	Candidates produce a diagrammatic site map of the website, showing links – titles of pages only are required; Candidates include a number of sections of code that demonstrate different script commands and annotate these to indicate what the code does – a wider range of script commands are annotated than at Mark Band 1, demonstrating an understanding of the code;
		3	Candidates produce a diagrammatic site map of the website, showing links – titles of pages only are required; Candidates include a number of sections of code that demonstrate different script commands, along with screen prints of the pages as they are displayed; they annotate the code to explain the link between the script commands and the features on the displayed page, e.g. code to realise the text attributes, page colours and page layout features (frames, tables, navigation bars etc.).

Task	AO	Mark Band	Characteristics of the work one may expect to see at this mark band can be summarised as follows:
c	AO3	1	Candidates are looking at setting up a website – they are not actually setting up a site – the site they report on is the one they set up in **Task d**; Candidates look at the costs involved, different methods of connection, and the hardware and software requirements, both for hosting the site in-house and remotely; ISPs are investigated but no final decision is reached as to which is suitable;
		2	Candidates are looking at setting up a website – they are not actually setting up a site – the site they report on is the one they set up in **Task d**; Candidates look at the costs involved, different methods of connection, bandwidth requirements and the hardware and software requirements both for hosting the site in-house and remotely; Candidates investigate different ISPs and identify **one** that is suitable for their planned website; Although some errors may be present, these should not be of the type that a spell or grammar checker would identify;
		3	Candidates are looking at setting up internet sites – they are not actually setting up a site – the site they report on is the one they set up in **Task d**; Candidates look at the costs involved, different methods of connection, bandwidth requirements and the hardware and software requirements both for hosting the site in-house and remotely; The connection methods are different and valid for the organisation; The bandwidth requirements cannot just be given – there is some analysis showing how they have been reached; The hardware and software requirements are logical and complete; Candidates investigate a range different ISPs, identify the one that is most suitable for their planned website and provide a technical justification for their choice; There will be very few errors in the report.
d(i)	AO1	1	Candidates design and create a **one** web page that uses **one** internet technology indicated in 'internet Websites' in the Unit Content section as – they may not identify the technology but there must be clear evidence of its use, e.g. by an observation record;
		2	Candidates design and create a web page that meets its requirements and makes use of at least **two** internet technologies – they identify the internet technologies used;
		3	Candidates design and create **one** web page that fully meets its requirements, is of high quality and makes use of at least **two** internet technology – an explanation of the use of each technology is provided; Candidates actually publish the site on the internet and provide evidence of doing so.
d(ii)	AO4	1	Candidates comment on the steps that they went through to design and create a web page, and publish it online, if they were able to do so – candidates should not be penalised here if they are not able to host the site;
		2	Candidates explain the steps that they went through to design and create a web page and host it online, if they were able to do so, and include an analysis; Candidates identify strengths and weaknesses in their approach;
		3	Candidates explain the steps that they went through to design and create a web page and publish it online, if they were able to do so, and include an analysis; They identify strengths and weaknesses in their approach; Additionally, they identify from experience how they would improve their technique to solve the problem if they were to repeat the process.

Task	AO	Mark Band	Characteristics of the work one may expect to see at this mark band can be summarised as follows:
e	AO1	1	Candidates identify and list hardware/software and information required to set up a computer for both internet and e-mail access; Candidates install at least **one** piece of communication software and identify some of the process that they carried out to install the communications software – the steps may be just a bulleted list or a series of screen shots; Candidates provide evidence of the changes they made to the **two** different browser settings; candidate provide graphical evidence of sending and receiving emails;
		2	Additionally candidates describe the function of each item of hardware/software and information required to set up a computer for both internet and e-mail access; Candidates provide a documented explanation of the installation so it could be repeated – this forms part of the technical documentation for the system; Candidates add a description of the changes they made to the browser settings; Candidates provide graphical evidence of setting up and using a file structure for filing received e-mails by moving them manually
		3	Additionally: Candidates fully explain the use of each item of hardware, software and information; Candidates produce full technical documentation on the installation; Candidates fully explain and illustrate the changes they made to the browser settings; Candidates provide graphical evidence of setting and using filters to file received emails automatically.

Unit G047 - Assessment Evidence Grid

Unit G047: Introduction to programming

What candidates need to do:

Evidence needs to include, for **two** different programming languages:

a: [AO1/3] an annotated program listing for a working program, *the candidate has been given* , and written in a different language from that used in Task b [**13:**];

b: [AO1/2/3] annotated program listings for a number of working programs, *that the candidate has written,* to implement designs *the candidate has been given* [**24**];

c: [AO2/4] a report describing the different types of programming language and the purpose of particular languages, analysing the choice of languages used for Tasks a and b and describing the candidate's performance in annotating the given program and writing the working programs [**13**].

How the candidate will be assessed:

Task	Assessment Objective	Mark Band 1	Mark Band 2	Mark Band 3	Mark Awarded
a(i)	**AO1**	The candidate uses ICT tools to annotate the given program listing to identify some techniques; **[0 1 2]**	The candidate uses ICT tools to annotate the given program listing to identify a range of techniques – at least **one** example each of program constructs, storage and manipulation of data and modularity;**[3 4 5]**	The candidate uses ICT tools to annotate the program listing to clearly identify all appropriate techniques – constructs, storage and manipulation of data, modularity, readability and maintainability**. [6 7]**	**/7**
a(ii)	**AO3**	The candidate applies their knowledge of ICT tools and techniques by using correct techniques to annotate the given program listing to describe how selection, repetition and data manipulation have been used; **[0 1 2]**	The candidate applies their knowledge of ICT tools and techniques by correctly annotating the given program listing to explain program constructs, data manipulation and the use of subroutines; **[3 4]**	The candidate applies their knowledge of ICT tools and techniques by correctly annotating the given program listing to fully explain all program constructs, storage and manipulation of data and modularity. **[5 6]**	**/6**
b(i)	**AO1**	The candidate uses ICT tools to produce programs with annotated program listings; The candidate demonstrates use of a limited range of techniques; **[0 1 2 3]**	The candidate uses ICT tools to produce programs with annotated program listings; The candidate demonstrates use of a range of techniques; **[4 5 6]**	The candidate uses ICT tools to produce programs with annotated program listings; The candidate demonstrates the use of all techniques – constructs, storage and manipulation of data, modularity, readability and maintainability. **[7 8]**	**/8**

Unit G047: Introduction to programming (continued)					
Task	**Assessment Objective**	**Mark Band 1**	**Mark Band 2**	**Mark Band 3**	**Mark Awarded**
b(ii)	**AO2**	The candidate demonstrates an understanding of components and functions of programming languages by annotating the program listings to identify the language they have used and where they have used selection, repetition and data manipulation; **[0 1 2 3]**	The candidate **also** annotates their program listings to identify the type of language used and where they have used data storage and subroutines; **[4 5]**	The candidate annotates their program listings fully and clearly to **also** describe the purpose of the language used and the use of local and global variables. **[6 7]**	**/7**
b(iii)	**AO3**	The candidate applies their knowledge of ICT tools and techniques to produce a set of working programs to meet the given designs; **[0 1 2 3]**	The candidate produces effective working solutions to the given designs by making appropriate use of the features of the language used; **[4 5 6]**	The candidate produces effective and efficient solutions to the given designs with appropriate use of techniques for improving readability and maintainability. **[7 8 9]**	**/9**
c(i)	**AO2**	The candidate describes the type and purpose of a limited range of programming languages; **[0 1 2]**	The candidate describes the type and purpose of a range of programming languages; **[3 4]**	The candidate describes a wide range of programming languages fully explaining the type and purpose of each. **[5 6]**	**/6**
c(ii)	**AO4**	The candidate comments on the effectiveness of solutions by identifying the features of the chosen languages that make them suitable for the given program designs and listings; The candidate comments on their actions and role in solving problems in order to complete tasks a and b; **[0 1 2]**	The candidate identifies the features of the chosen languages that make them suitable for the given program designs and listings; The candidate identifies strengths and weaknesses in their initial solutions and refines them in relation to the user's needs by suggesting at least **one** improvement to each of the programs; The candidate includes an analysis of their experiences while annotating and writing programs in order to improve their performance; **[3 4]**	The candidate identifies the features of the chosen languages that make them suitable for the given program designs and listings; The candidate identifies strengths and weaknesses in their initial solutions and refines them in relation to the user's needs by suggesting improvements to **each** of the programs giving a valid reason for each suggested improvement; The candidate includes an analysis of their experiences while annotating and writing programs, suggesting how they might approach a similar task in the future. **[5 6 7]**	**/7**
				Total mark awarded:	**/50**

The further guidance below clarifies the criteria in the *Assessment Evidence Grid* and will help to determine the appropriate mark to be awarded for each strand of work.

Amplification of Criteria			
Task	**AO**	**Mark Band**	**Characteristics of the work one may expect to see at this mark band can be summarised as follows:**
a(i)	**AO1**	**1**	Candidates annotate the program listing with appropriate comments identifying where some constructs, the storage and manipulation of data or modularity have been used but maybe not what is being done; (up to **two** marks depending on the quality of the annotation);
		2	Candidates annotate the use of at least **one** construct, storage and manipulation of data **and** modularity; annotation should indicate some understanding of what the code is doing in the context of the program;
		3	Candidates annotate **all** instances of techniques used and identify use of techniques for readability and maintainability; annotation shows a clear understanding of what each technique is used for in this context.
a(ii)	**AO3**	**1**	Candidates use correct format for comments in places; Annotation is limited to describing how selection, repetition and data manipulation have been used; (up to **two** marks depending on the quality);
		2	Candidates use correct format for comments throughout; They use their knowledge to explain how program constructs, data manipulation and subroutines have been used;
		3	Candidates have used comments in such a way that maintainability is improved; comments are placed so that they don't reduce readability; They fully explain how all program constructs, storage, data manipulation and modularity have been used.
b(i)	**AO 1**	**1**	Candidates produce programs evidenced by screen prints and annotated program listings; Annotation will identify some techniques; (up to three marks depending on the quality of the annotation);
		2	Candidates demonstrate use and annotation of a range of techniques that should include repetition, selection, storage and manipulation of data and some modularity;
		3	Candidates demonstrate use and produce extensive annotation of all techniques and present their program listings in a way that demonstrates readability and maintainability.
b(ii)	**AO 2**	**1**	Candidates will have identified the language used and will have correctly annotated how they have used some techniques in the context of the program;
		2	Candidates will **also** have identified the type of language and will have correctly annotated how they have used a range of techniques in the context of the program;
		3	Candidates will **also** have identified the purpose of the language used and will have extensive annotation explaining the use of all techniques in the context of the program.

Task	AO	Mark Band	Characteristics of the work one may expect to see at this mark band can be summarised as follows:
b(iii)	AO3	1	Candidates produce working programs from the designs; there is a correlation between the designs and the finished programs; there is a close match between the designs and the finished programs;
		2	Candidates make appropriate use of a range of suitable techniques to produce effective solutions (e.g. they may use repetition rather than repeated statements, or a CASE statement rather than a number of nested IF statements);
		3	Candidates make appropriate use of all available techniques, including modularity, readability and maintainability, to produce an efficient working solution to each design; techniques will be the most appropriate in each case and the finished programs will clearly meet the requirements of the designs.
c(i)	AO2	1	Candidates describe a limited range of language identifying the type and main purpose of each;
		2	Candidates describe a range of languages describing the type and main purpose and giving some examples of use;
		3	Candidates describe the full range of languages, explaining the type and main purpose and giving examples of use for each.
c(ii)	AO4	1	Candidates produce a brief description of why the languages used suit the program written by themselves and the **one** given to them, e.g. program is user-oriented and so a visual language is appropriate, functionality is more important than the user interface and so low-level or non-visual could be used, a more complex program with a high-level language will make it easier to program; Candidates make some relevant comments on their approach to the task;
		2	Additionally, candidates identify strengths and weaknesses and suggest at least **one** improvement to their programs, so that they more closely meet the user's needs, e.g. they could have used a different type of loop or a subroutine instead of code in the main program; Candidates highlight their strengths and weaknesses in completing the task;
		3	Additionally, candidates might submit **two** versions (*before* and *after* an improvement) but need to explain why the improvement was made; Candidates analyse their strengths and weaknesses and suggest how they might approach a similar task in future.

Unit G048: Working to a brief

What candidates need to do:

Evidence needs to include:

a: [AO2] a preparatory report into current working practice [**3**];
b: [AO2/3] a project plan in response to the set brief**.** [**8**];
c: [AO1/2/3] a diary or log of work completed [**16**];
d: [AO1] support materials for use with the project [**5**];
e: [AO4] an evaluation of candidates' performance in relation to planning the project [**6**];
f: [AO4] an evaluation of candidates' performance in implementing the project [**6**];
g: [AO4] an evaluation of candidates' ICT solution to the given brief [**6**].

How the candidate will be assessed:

Task	Assessment Objective	Mark Band 1	Mark Band 2	Mark Band 3	Mark Awarded
a	**AO2**	The candidate produces **a** descriptive report into current working practice; **[0 1]**	The candidate produces an analytical report into current working practice; the report highlights strengths and weaknesses of the current working practice; The report highlights some issues of which account need be taken when implementing the project; **[2]**	The candidate produces an analytical report into current working practice; the report highlights strengths and weaknesses of the current working practice; The report highlights all issues of which account need be taken when implementing the project. **[3]**	**/3**
b(i)	**AO2**	The candidate plans their project; **[0 1]**	The candidate uses **one** formal planning technique to plan their project; **[2]**	The candidate uses **two** formal planning techniques to plan their project**.** **[3]**	**/3**
b(ii)	**AO3**	The candidate's plan includes little detail; **[0 1]**	The candidate's plan includes fair detail; most tasks required to complete the project are listed; **[2 3]**	The candidate's plan fully identifies all tasks required in order to complete the project. **[4 5]**	**/5**
c(i)	**AO1**	The candidate produces a diary or log that shows that they have developed or extended their range of ICT skills and techniques whilst planning and producing the response to the brief; **[0 1]**	The candidate produces a diary or log that shows that they have developed and extended their range of ICT skills and techniques whilst planning and producing the response to the brief; **[2 3]**	The candidate produces a diary or log that shows that they have used their initiative to develop and extend their range of ICT skills and techniques whilst planning and producing their response to the brief. **[4 5]**	**/5**
c(ii)	**AO2**	The candidate produces a diary or log that shows that they have used some tools and techniques for developing ICT systems; **[0 1]**	The candidate produces a diary or log that shows that they have used a range of both formal and informal techniques for developing and managing ICT systems; The candidate also shows that they have some awareness that the quality of their work will affect the end-users and/or others with whom they have contact whilst working on the project; **[2]**	The candidate produces a diary or log that shows that they have used an extensive range of both formal and informal techniques for developing and managing ICT systems; The candidate also shows that they have a thorough awareness that the quality of their work will affect end users and/or others with whom they have contact whilst working on the project. **[3]**	**/3**

Unit G048: Working to a brief (continued)					
Task	**Assessment Objective**	**Mark Band 1**	**Mark Band 2**	**Mark Band 3**	**Mark Awarded**
c(iii)	**AO3**	The candidate produces a diary or log that shows that they have dealt with straightforward day-to-day issues arising from running the project; The candidate's diary or log identifies the responses they have taken to issues that have arisen; **[0 1 2]**	The candidate produces a diary or log that shows they have dealt with more complex day-to-day issues arising from running the project; The candidate's diary or log shows that they have used appropriate responses to the day-to-day issues that have arisen; commentary in the candidate's diary or log justifies their decisions; **[3 4 5]**	The candidate produces a diary or log that shows they have dealt with more complex day-to-day issues arising from running the project; The candidate's diary or log shows that they have used appropriate responses to these more complex issues that have arisen; The candidate's diary or log shows that they have taken account of longer term implications arising from these issues and taken action to prevent their reoccurrence; commentary in the candidate's diary or log justifies their decisions **[6 7 8]**	**/8**
d	**AO1**	The candidate develops support materials for use with the project; The candidate's support materials show the application of some skills acquired in this unit, and other units, in this specification; **[0 1]**	The candidate develops support materials for use with the project; The candidate's support materials show the application of a range of skills acquired in this unit, and other units, in this specification; **[2 3]**	The candidate develops support materials for use with the project; The candidate's support materials show the application of a wide range of skills acquired in this unit, and other units, in this specification.**[4 5]**	**/5**
e	**AO4**	The candidate describes their actions in planning their project and identifies areas for improvement; **[0 1 2]**	The candidate analyses their actions in planning their project and identifies some strengths and weaknesses in their planning; The candidate suggests some improvements to the overall process; **[3 4]**	The candidate analyses their actions in planning their project and fully identifies strengths and weaknesses in their planning; The candidate suggests improvements to the overall process; these improvements are clearly linked to their analysis of their actions in planning their project. **[5 6]**	**/6**
f	**AO4**	The candidates describes their actions in implementing their ICT solution for the user and identifies areas for improvement; **[0 1 2]**	The candidate analyses the effectiveness of their actions in implementing their ICT solution and identifies some strengths and weaknesses in the actions they have completed; The candidate suggests some improvements to the overall process; **[3 4]**	The candidate analyses the effectiveness of their actions in implementing their ICT solution and fully identifies strengths and weaknesses in the actions they have completed; The candidate suggests improvements to the overall process; these improvements are clearly linked to their analysis of their actions in implementing their project. **[5 6]**	**/6**

Unit G048: Working to a brief (continued)					
Task	**Assessment Objective**	**Mark Band 1**	**Mark Band 2**	**Mark Band 3**	**Mark Awarded**
g	**AO4**	The candidate comments on the effectiveness of their solution by comparing their solution to the user needs for the project; The candidate's report may contain errors in spelling, punctuation and grammar; **[0 1 2]**	The candidate analyses the effectiveness of their solution by comparing their solution to the user needs for the project; their analysis will be partially based on user or client feedback; The candidate's analysis will identify some strengths and weaknesses of their solution; The candidate's report contains few spelling, punctuation and grammar errors; **[3 4]**	The candidate analyses the effectiveness of their solution by comparing their solution to the user needs for the project; their analysis will be fully based on user and client feedback; The candidate's analysis will fully identify strengths and weaknesses of their solution; The candidate's report is consistently well-structured and there are few, if any, spelling, punctuation and grammar errors. **[5 6]**	**/6**
				Total mark awarded:	**/50**

The further guidance below clarifies the criteria in the *Assessment Evidence Grid* and will help to determine the appropriate mark to be awarded for each strand of work.

Amplification of Criteria			
Task	**AO**	**Mark Band**	**Characteristics of the work one may expect to see at this mark band can be summarised as follows:**
a	**AO2**	**1**	Candidates produce a report that describes the current working practices that apply to the project;
		2	Candidates produce a report that describes the current working practices that apply to the project. The report highlights the strengths and weaknesses of the current working practice. There is justification for some points made; The report highlights some issues of which account need be taken when implementing the project. These issues may be highlighted within the main body of the report, or as a stand alone section at the end of the report;
		3	Candidates produce a report that describes the current working practices that apply to the project. The report highlights the strengths and weaknesses of the current working practice. Each point made is fully justified; The report highlights all issues of which account need be taken when implementing the project. These issues may be highlighted within the main body of the report, or as a stand alone section at the end of the report.
b(i)	**AO2**	**1**	Candidates produce a plan in any format.
		2	Candidates use **one** formal planning technique to plan the project.
		3	Candidates use **two** formal planning techniques to plan the project.
b(ii)	**AO3**	**1**	Candidates produce a plan that includes no indication of timings. The plan may not cover all aspects of the task;
		2	Candidates produce a plan that gives full indication of timings. The plan is reasonably detailed with all aspects covered. However, the plan includes some tasks that could be further broken down;
		3	Candidates produce a plan that gives full indication of timings. The plan is well detailed with all aspects covered and in detail. At the highest level, the project is planned in minute detail, with no scope for further breaking down of tasks into constituent parts.
c(i)	**AO1**	**1**	Candidates produce a diary or log which shows that as they have progressed through the project, they have either learnt to use software with which they have previously had no experience, or have extended their ranges of skills and techniques in software they had previously used. This evidence may be clear from explicit comments included in the diary, or by a comparative skills audit produced before and after the project;

Task	AO	Mark Band	Characteristics of the work one may expect to see at this mark band can be summarised as follows:
c(i)	AO1	2	Candidates produce a diary or log which shows that as they have progressed through the project, they have learnt to use software with which they have previously had no experience, **and** have extended their ranges of skills and techniques in software they had previously used. This evidence may be clear from explicit comments included in the diary, or by a comparative skills audit produced before and after the project;
		3	Candidates produce a diary or log which shows that as they have progressed through the project, they have learnt to use software with which they have previously had no experience, **and** have extended their ranges of skills and techniques in software they had previously used. It is clear that candidates have used their own initiative to achieve these developments. This initiative would include, but is not limited to, the use of on-line help facilities or referring to expert helpers (other than the teacher(s) involved in delivery of this unit). This must be part of a planned and targeted learning opportunity (rather than stumbled upon whilst exploring the software and MUST be an extension to the delivery of the course. This evidence may be clear from explicit comments included in the diary, or by a comparative skills audit produced before and after the project.
c(ii)	AO2	1	Candidates produce a diary or log that shows they have used some tools or techniques for developing ICT systems;
		2	Candidates produce a diary or log that shows they have used a fair amount of **both** formal and informal techniques for developing ICT systems. These may be evidenced by the inclusion of minutes of formal meetings, letters to and from clients, drafts of telephone calls, with actions required as follow up or explicit comments made in the diary or log. The candidate shows that they are aware that the quality of the work will affect others. This may be evidenced by the inclusion of comments within the diary or log;
		3	Candidates produce a diary or log that shows they have used an extensive amount of **both** formal and informal techniques for developing ICT systems. These may be evidenced by the inclusion of minutes of formal meetings, letters to and from clients, drafts of telephone calls, with actions required as follow up or explicit comments made in the diary or log. The candidate shows that they have a thorough awareness that the quality of the work will affect others. This may be evidenced by the inclusion of comments within the diary or log.
c(iii)	AO3	1	Candidates produce a diary or log which shows that they have dealt with straightforward issues arising from running the project;
		2	Candidates produce a diary or log which shows that they have dealt with more complex issues arising from running the project. The diary makes it clear that the responses chosen have been appropriate and includes justification for the actions taken;
		3	Candidates produce a diary or log which shows that they have dealt with more complex issues arising from running the project The diary makes it clear that the responses chosen have been appropriate and includes justification for the actions taken. The justification includes clear evidence that the candidate has considered the long term implications of each issue that has arisen and has chosen solutions with the express intention of avoiding the reoccurrence of these issues.

Task	AO	Mark Band	Characteristics of the work one may expect to see at this mark band can be summarised as follows:
d	AO1	1	Candidates produce simple support materials in any format for the project. Support materials are any materials that would be reasonably expected to be given to the client and or user on completion of the project;
		2	Candidates produce support materials for the project. These materials are of a reasonably high quality. Support materials are any materials that would be reasonably expected to be given to the client and or user on completion of the project;
		3	Candidates produce support materials for the project. These materials are of a near professional quality. Support materials are any materials that would be reasonably expected to be given to the client and or user on completion of the project.
e	AO4	1	Candidates produce a report on how they planned their project and identify areas for improvement;
		2	Candidates **analyse** their actions in planning the product and, based on this analysis, identify some strengths and weaknesses of their actions. Candidates suggest improvements to the overall process;
		3	Candidates **analyse** their actions in planning the product and, based on this analysis, identify all strengths and weaknesses of their actions. Candidates suggest and justify substantial improvements to the overall process. These improvements deal with those areas identified in the initial analysis and subsequent identification of strengths and weaknesses.
f	AO4	1	Candidates produce a report on how they implemented their project and identify areas for improvement;
		2	Candidates **analyse** their actions in implementing the product and, based on this analysis, identify some strengths and weaknesses of their actions. Candidates suggest improvements to the overall process;
		3	Candidates **analyse** their actions in implementing the product and, based on this analysis, identify all strengths and weaknesses of their actions. Candidates suggest and justify substantial improvements to the overall process. These improvements deal with those areas identified in the initial analysis and subsequent identification of strengths and weaknesses.

Task	AO	Mark Band	Characteristics of the work one may expect to see at this mark band can be summarised as follows:
g	AO4	1	Candidates produce a report that compares their solution to the needs of the original brief. At the top end of the mark band, candidates use this analysis to comment on the effectiveness of their solution. Errors in spelling, punctuation and grammar may affect the readability of the report.
		2	Candidates produce a report that analyses the effectiveness of their solution by comparing it to the original user needs. These user needs will be explicit from the work. The analysis of the solution is partially based on feedback that has been gained from either the user **or** the client. At the top end of the mark band, this feedback will be substantial. The analysis of the solution will lead to a clear statement of some of the strengths and weaknesses of the solution The report will have been spell checked and proof-read but common errors such as there/their, weather/whether, could of/could have, US spellings or incorrect choice from the list offered by the spell checker may still appear; these will not affect readability.
		3	Candidates produce a report that analyses the effectiveness of their solution by comparing it to the original user needs. These user needs will be explicit from the work. The analysis of the solution is fully based on feedback that has been gained from both the user and the client. At the top end of the mark band, this feedback will be substantial. The analysis of the solution will lead to a clear statement of all of the strengths and weaknesses of the solution The report is well-structured with suitable headings and subheadings and with a logical order of points, which will be well-expressed with correct spelling, grammar and punctuation – 100% accuracy is unlikely but the number of errors should be very small.

Unit G049 - Assessment Evidence Grid

Unit G049: Numerical modelling using spreadsheets

What candidates need to do:

Evidence needs to include:

a: [AO3] an analysis of a suitable user problem and a design specification that describes how candidates will solve it by numerical modelling [**7**];
b: [AO1] evidence of implementing the solution using suitable entry aids and processing facilities [**15**];
c: [AO3] a record of how candidates overcame their problems [**5**];
d: [AO4] a specification for testing the candidate's spreadsheet, and evidence of the results of these tests [**7**];
e: [AO2] technical documentation that explains how the candidate's spreadsheet works, and user documentation that explains how it is used [**8**];
f: [AO4] an evaluation of the effectiveness of the candidate's solution and their personal performance [**8**].

How candidates will be assessed:

Task	Assessment Objective	Mark Band 1	Mark Band 2	Mark Band 3	Mark Awarded
a	**AO3**	The candidate produces an analysis of a problem that identifies the main user requirements and a design specification that takes account of these requirements and that identifies the numerical processing required and how output will be presented; **[0 1 2]**	The candidate produces an analysis of a problem that fully identifies the user requirements and a design specification that is complete and that provides full details of sources of data, numerical processing required, user aids and how output is to be presented; **[3 4 5]**	The candidate produces a detailed analysis of a complex problem and user requirements along with a design specification that provides a clear, precise and complete description of a numerical modelling solution to the problem that could be implemented by someone else. **[6 7]**	**/7**
b(i)	**AO1**	The candidate implements a numerical modelling spreadsheet solution to a problem; **[0 1 2]**	The candidate implements an easy to use numerical modelling spreadsheet solution that solves a problem effectively; **[3 4 5]**	The candidate implements a complete, effective, efficient and easy to use numerical modelling spreadsheet solution to a complex problem; **[6 7]**	**/7**
b(ii)	**AO1**	The candidate produces a numerical modelling spreadsheet solution that includes data entry, numerical processing and output; **[0 1 2]**	The candidate produces a numerical modelling spreadsheet solution that includes data entry, specialist numerical processing functions, complex spreadsheet facilities and presentation of output; **[3 4 5]**	The candidate produces a numerical modelling spreadsheet solution that includes appropriate use of a range of specialist numerical processing functions and complex spreadsheet facilities for data entry, numerical processing and presentation of output. **[6 7 8]**	**/8**
c	**AO3**	The candidate produces a record of the strategy used to implement the spreadsheet solution, including methods used to overcome problems; **[0 1 2]**	The candidate produces a record of the strategy used to implement the spreadsheet solution, the candidate show that the solutions used to overcome problems show an understanding of both the user's needs and the effective use of spreadsheet facilities; **[3 4]**	The candidate produces a record of the strategy used to implement the spreadsheet solution, the candidate use methodical, analytical and critical approaches to overcome problems during implementation; The candidate's methods will fully address the user's needs and make effective use of spreadsheet facilities. **[5]**	**/5**

Unit G049: Numerical modelling using spreadsheets (continued)					
Task	**Assessment Objective**	**Mark Band 1**	**Mark Band 2**	**Mark Band 3**	**Mark Awarded**
d	**AO4**	The candidate produces a basic test specification and provides evidence that it was used to test that the spreadsheet is functional and that the results are accurate; **[0 1 2]**	The candidate produces a test specification that includes acceptable and unacceptable input, and expected output, and provides evidence that it was used to adequately test the functionality and accuracy of the spreadsheet solution and that the solution meets the requirements of the design specification; **[3 4]**	The candidate produces a detailed test specification which tests all aspects of the solution with a full range of acceptable and unacceptable input, expected output, and any associated error messages; The candidate provides evidence that it was used to fully test the functionality and accuracy of the spreadsheet solution and that the solution fully meets the requirements of the design specification. **[5 6 7]**	**/7**
e	**AO2**	The candidate produces clear technical documentation that identifies the numerical processing methods used, and user documentation that includes copies of menus and screens used, instructions on data entry and routes through the spreadsheet menus and the outputs expected; **[0 1 2 3]**	The candidate produces technical and user documentation that makes use of graphic images, their technical documentation includes explanations of all technical aspects of the solution, the user documentation includes copies of menus and data input screens, instructions on data entry and routes through the spreadsheet menus, types of output available and possible error messages; **[4 5]**	The candidate produces complete, high-quality, stand-alone technical and user documentation that makes effective use of graphic images, their technical documentation includes explanations of all technical aspects of the solution, the user documentation includes copies of menus and data input screens, instructions on data entry and routes through the spreadsheet menus, types of output available and possible error messages; **[6 7 8]**	**/8**
f	**AO4**	The candidate comments on the effectiveness of the final solution, with some overall indication of how the work may be improved in the future; The candidate evaluates aspects of their personal performance that affected the solution; The report may contain errors in spelling, punctuation and grammar; **[0 1 2]**	The candidate provides an analysis of their final solution that identifies its strengths and weaknesses and considers user feedback in order to identify how the work may be improved in the future; The candidate evaluate aspects of their personal performance that affected the solution by identifying their strengths and weaknesses, with some suggestions for improvement to the overall process; the report contains few spelling, punctuation and grammar errors; **[3 4 5]**	The candidate provides a full critical analysis of their final solution identifying how well it meets the initial brief, taking into account and analysing user feedback in order to identify how the work may be improved in the future; The candidate evaluates aspects of their personal performance by identifying their strengths and weaknesses and how they may address these issues to be more effective in the future; The report is consistently well-structured and there will be few, if any, spelling, punctuation and grammar errors. **[6 7 8]**	**/8**
				Total mark awarded:	**/50**

The further guidance below clarifies the criteria in the *Assessment Evidence Grid* and will help to determine the appropriate mark to be awarded for each strand of work.

Amplification of Criteria			
Task	**AO**	**Mark Band**	**Characteristics of the work one may expect to see at this mark band can be summarised as follows:**
a	**AO3**	**1**	Candidates produce an analysis of a straightforward problem that includes a brief outline of what the user expects the spreadsheet to do an how the output should be presented. Candidates use these requirements as the basis for a design specification that includes as a minimum, details of the data that will be input, the required output and the processing that must be carried out; Some sketches of input and output screens will be included, however these may lack detail;
		2	Candidates produce an analysis of a problem that includes a detailed description of what output information the user wants, how information is currently obtained, where the input data will come from and how the output should be presented. The design specification produced considers all user requirements, the sources of data, the processing required, the user aids to operation that will be provided and how output will be presented– sketches of screen layouts and a description of the planned use of numerical modelling are included;
		3	Candidates produce a thorough and detailed analysis of a complex problem that includes an analysis of what output information the user wants, how information is currently obtained, where the input data will come from and how the output should be presented. The design a specification produced will clearly match user requirements and will be precise and detailed enough to enable a competent third party (for instance, another Applied ICT candidate) to implement it independently – this includes sketches of the spreadsheet layouts and a description of all functions and facilities to be used; There is clarity on how the use of numerical modelling will facilitate the solution; The complexity of the proposed system, plus the quality and completeness of the specification, will determine the mark awarded.
b(i)	**AO1**	**1**	Candidates produce a spreadsheet solution to a fairly simple problem or make a good attempt at a more complex problem; Some numerical modelling is used in the spreadsheet;
		2	Candidates produce a very good solution to a simple problem, or a good solution to a more complex problem; The uses of numerical modelling techniques beyond the basic level; The solution is easy to use by a user with limited experience of spreadsheets;
		3	Candidates produce a very good solution to a complex problem, which includes very good use of numerical modelling; There are no obvious areas of weakness in the solution – the complexity, quality and completeness of the finished system will determine the mark awarded.
b(ii)	**AO1**	**1**	Candidates produce a spreadsheet solution that includes some data entry facilities, suitable numerical processing and presentation output;
		2	Candidates produce a spreadsheet solution that includes well-designed data input screens, at least one appropriate, specialist numerical processing function and a range of complex spreadsheet facilities; Output will be well designed and easy to follow; ca
		3	Candidates produce a spreadsheet solution that includes well-designed data input screens, a number of appropriate, specialist numerical processing functions and a wide range of complex spreadsheet facilities; Output will fully match the user requirements and be of high quality.

c	**AO3**	**1**	Candidates produce some record of how the spreadsheet was implemented – this could be chronological (a diary) or an explanation of the facilities used in a sensible order; Some reference is made to problems encountered, and how they were overcome, which may include reference to the *system life cycle* approach to problem solving;
		2	Candidates produce a more detailed description of problems encountered– this will include considerations of alternative strategies to solve the problems and should make reference to the *system life cycle* approach to problem solving;
		3	Candidates produce a complete and detailed description of problems encountered– this will include considerations of alternative strategies to solve the problems, and will make reference to the *system life cycle* approach to problem solving.

Task	AO	Mark Band	Characteristics of the work one may expect to see at this mark band can be summarised as follows:
d	AO4	1	Candidates produce a test specification that includes details of the tests to be carried out and the expected results – the range of proposed tests may be limited; Screen print evidence of testing is included that tests the spreadsheet functions as intended, for example that the required output is produced and that all macros perform the required operations, and that formulae and functions produce accurate results – by using a calculator to check results or using dummy data that allows manual checking;
		2	Candidates produce evidence of a strategic approach to testing – a test specification is detailed before testing begins; which takes into account initial user requirements, Screen print evidence is included that a suitable range of tests are undertaken which test the majority of the spreadsheet solution Test data is chosen which represents normal and some abnormal data – results of the tests are well documented;
		3	Candidates produce evidence of testing which is well planned and strategic – it meets fully initial user requirements; It comprehensively tests all aspects of the solution's functionality, with normal, abnormal and boundary data; the test schedule may be revised in the light of results from earlier tests – results of the tests, and corrective action needed, are well documented using screen prints.
e	AO2	1	Candidates produce documentation both for a user and as a technical reference; The user documentation includes some of the items listed in relation to this document in 'Documentation' in the Unit Contents section, including copies of menus, screens and examples of output – it enables the user to understand the purpose of the solution, and how to begin using it; The technical documentation includes some of the items listed in relation to this document in 'Documentation' in the Unit Contents section, including details of numerical processing – calculations, formulae and functions used – at this level the information may appear as evidence for task b or c;
		2	candidates produce documentation which includes all the items identified for each type of documentation in 'Documentation' in the Unit Contents section,; Use of graphic images make the user documentation more understandable; All technical aspects of the solution are explained, with printouts of formulae and functions used – the information may appear as evidence for tasks a, b, c and d;
		3	candidates produce documentation which is complete and detailed; Both the technical and user documentation include all the relevant items identified in 'Documentation' in the Unit Contents section in well-structured stand-alone documents that are appropriate for their intended audience; All technical aspects of the solution are fully explained, with printouts of formulae and functions used so that a suitable experienced person could maintain or reproduce the solution.
f	AO4	1	Candidates make some evaluative comments on the effectiveness of the solution, making some reference to the initial user requirements; Sensible improvements to the solution are suggested; Some evaluation of the candidate's own performance in producing the solution is included; Errors in spelling, punctuation and grammar may affect the readability of the report;

		2	Candidates produce an evaluation which considers both positive and negative aspects, and takes into account feedback from the user(s) – the evaluation takes account of the design specification and initial user requirements; Reference is made to the effectiveness of numerical modelling techniques; The evaluation of the candidate's own performance refers to aspects of problem-solving techniques and/or *the system life* cycle – both positive and negative aspects are considered and some improvements suggested; The report will have been spell checked and proof-read but common errors such as there/their, weather/whether, could of/could have, US spellings or incorrect choice from this list offered by the spell checker may still appear; these will not affect readability;
		3	Candidates produce an evaluation which is thorough and takes into account feedback from the user(s) – the evaluation is consistently linked back to the design specification and initial user requirements; Reference is made to the effectiveness of numerical modelling techniques; The evaluation of the candidate's own performance refers to aspects of problem-solving techniques and/or *the system life cycle* – both positive and negative aspects are considered, with suggested improvements being clearly linked to the negative aspects identified; The report is well-structured with suitable headings and subheadings and with a logical order of points, which will be well-expressed with correct spelling, grammar and punctuation – 100% accuracy is unlikely but the number of errors should be very small.

Unit G050 - Assessment Evidence Grid

Unit G050: Interactive multimedia products

What candidates need to do:

Evidence needs to include:

a: [AO2] a review of **two** non web-based commercially-produced interactive multimedia products, showing how candidates' designs influenced the design of the interactive multimedia product that they produce [**5**];

b: [AO3/4] detailed designs, of which **one** is chosen as the design for the final product [**12**];

c: [AO1/3] a multimedia product to meet the client's requirements [**21**];

d: [AO4] a detailed test plan [**3**];

e: [AO2] a detailed user guide [**3**];

f: [AO4] a review of both the interactive multimedia product that candidates produced and their personal performance [**6**].

How the candidate will be assessed:

Task	Assessment Objective	Mark Band 1	Mark Band 2	Mark Band 3	Mark Awarded
a	**AO2**	The candidate describes **two** non web-based multimedia products and draws some conclusions about features to include in the design of their final product; **[0 1]**	The candidate describes **two** non web-based multimedia products and compares like with like to draw some conclusions about features to include in the design of their final product; **[2 3]**	The candidate produces a report which critically evaluates **two** non web-based commercial multimedia products, discusses the good and the bad features of each, and fully explains how each product has influenced the design of their final product. **[4 5]**	**/5**
b(i)	**AO3**	The candidate produces more than **one** simple design; **[0 1 2]**	The candidate produces more than **one** design plan with clear consideration of the content of the product; **[3 4]**	The candidate produces more than **one** clear and detailed design plan that could be implemented by someone else. **[5 6]**	**/6**
b(ii)	**AO4**	The candidate comments on the effectiveness of their designs; **[0 1 2]**	The candidate identifies the strengths and weaknesses of their designs and uses these to choose which design to implement; **[3 4]**	The candidate provides a critical analysis of their designs – the candidate identifies their strengths and weaknesses and uses these to choose which design to implement. **[5 6]**	**/6**
c(i)	**AO1**	The candidate shows development of a multimedia solution that meets the client's brief – in doing so the candidate develops their range of ICT skills; **[0 1 2 3]**	The candidate shows development of a multimedia solution that meets the client's brief – in doing so the candidate develops and extends their range of ICT skills to create at least **three** elements from video, sound, images, animation, charts/diagrams/drawings; **[4 5 6]**	The candidate shows development of a multimedia solution that meets the client's brief – in doing so the candidate uses their initiative to develop and extend their ICT skills to create an extensive variety of elements to be used in the interactive multimedia product. **[7 8 9]**	**/9**

Unit G050: Interactive multimedia products (continued)					
Task	**Assessment Objective**	**Mark Band 1**	**Mark Band 2**	**Mark Band 3**	**Mark Awarded**
c(ii)	**AO1**	The candidate identifies some of the ICT skills that they have used to develop the elements for the multimedia solution and to incorporate interaction in the multimedia solution; **[0 1 2]**	The candidate describes the range of ICT skills that they have used to develop the elements for the multimedia solution and to incorporate interaction in the multimedia solution; **[3 4]**	The candidate fully explains the complete range of ICT skills that they have used to develop the elements for the multimedia solution and to incorporate interaction in the multimedia solution. **[5 6]**	**/6**
c(iii)	**AO3**	The candidate applies their knowledge to create a solution to the client's brief; **[0 1 2]**	The candidate applies their knowledge and skills to create an effective solution to the client's brief, making good use of design and layout facilities incorporating a variety of methods of interaction between the user and the product; **[3 4]**	The candidate applies their knowledge and skills to create a complete solution to a complex problem that shows effective use of design and layout facilities incorporating an extensive range of interactive features. **[5 6]**	**/6**
d	**AO4**	The candidate produces a test plan to check that their multimedia product meets the requirements of the design specification; **[0 1]**	The candidate produces a detailed test plan and use it to test their multimedia product; **[2]**	The candidate produces a detailed test plan which tests all aspects of the multimedia product, and revises the product if necessary. **[3]**	**/3**
e	**AO2**	The candidate produces clear user documentation that includes an explanation of the purpose of their multimedia presentation, its system requirements and how to install and use it; **[0 1]**	The candidate produces clear user documentation that includes an explanation of the purpose of their multimedia presentation, its system requirements, and how to install and use it, together with explanations of technical aspects of the solution; **[2]**	The candidate produces clear user documentation, making good use of graphic images and detailed instructions for use; The guide includes an explanation of the purpose of their multimedia presentation, its system requirements and how to install and use it, together with explanations of technical aspects of the solution. **[3]**	**/3**
f	**AO4**	The candidate comments on the effectiveness of their final solution, with some overall indication of how the work may be improved in the future; The candidate comments on their actions and role in solving the problem and identifies areas for improvement; The candidate's report may contain errors in spelling, punctuation and grammar; **[0 1 2]**	The candidate includes an analysis of their final solution, taking account of the user's feedback, identifying the strengths and weaknesses in order to identify how the work may be improved in the future; The candidate includes an analysis on their own performance by identifying strengths and weaknesses, with some suggestions for improvement to the overall process; The candidate's report contains few spelling, punctuation and grammar errors; **[3 4]**	The candidate provides a full critical analysis of their final solution, identifying how well it meets the initial brief, taking account of user feedback in order to identify how the work may be improved in the future; The candidate includes an analysis on their own performance by identifying strengths and weaknesses and uses this analysis to show how they will address these issues to be more effective in the future; The candidate's report is consistently well-structured and there are few, if any, spelling, punctuation and grammar errors. **[5 6]**	**/6**
				Total mark awarded:	**/50**

The further guidance below clarifies the criteria in the *Assessment Evidence Grid* and will help to determine the appropriate mark to be awarded for each strand of work.

<table>
<tr><td colspan="4">The further guidance below clarifies the criteria in the Assessment Evidence Grid and will help to determine the appropriate mark to be awarded for each strand of work.

Amplification of Criteria</td></tr>
<tr><th>Task</th><th>AO</th><th>Mark Band</th><th>Characteristics of the work one may expect to see at this mark band can be summarised as follows:</th></tr>
<tr><td rowspan="3">a</td><td rowspan="3">AO2</td><td>1</td><td>Candidates produce a description of two multimedia products, with some comparison or conclusions drawn;</td></tr>
<tr><td>2</td><td>Candidates produce a description of two multimedia products, with some comparisons drawn;
There is some indication of how these comparisons will inform the design of the final product;</td></tr>
<tr><td>3</td><td>Candidates produce, at the lower end of this mark band, a written report that considers all aspects but gives a more general description of each aspect and considers the influence of each on the final design;
Candidates produce, at the top end of this mark band, a full report that discusses the good and bad points of each product under review and fully explains how each product has influenced the design of the final product.</td></tr>
<tr><td rowspan="3">b (i)</td><td rowspan="3">AO3</td><td>1</td><td>Candidates produce some evidence of having planned the final product;</td></tr>
<tr><td>2</td><td>Candidates produce initial design plans of the content, with some indication of the route through the product;</td></tr>
<tr><td>3</td><td>Candidates produce full design plans, including content and the paths through the product;
The chosen plan needs to be reflected in the structure of the final product.</td></tr>
<tr><td rowspan="3">b (ii)</td><td rowspan="3">AO4</td><td>1</td><td>Candidates include some comments about how well each design fits the brief;
The higher marks within this mark band will be awarded for including some indication as to why the final design was chosen;</td></tr>
<tr><td>2</td><td>Candidates produce an evaluation of their designs, considering strengths and weaknesses of the designs with the beginnings of a reasoned argument about which design was chosen as the final structure;</td></tr>
<tr><td>3</td><td>Candidates produce a critical analysis of their designs, ranging from an overall review of each with the beginnings of a reasoned argument about which design was chosen as the final structure, through to a step-by-step analysis of each design, considering good and bad points, with a clearly argued explanation of why the final design was chosen.</td></tr>
</table>

Task	AO	Mark Band	Characteristics of the work one may expect to see at this mark band can be summarised as follows:
c (i)	AO1	1	Candidates show how they have developed a multimedia product to meet the brief and can identify some of the skills that have been developed to create the elements listed in 'Creation of Elements of an Interactive Multimedia Product in the Unit Content section;
		2	Candidates show how they have developed a multimedia product to meet the brief; Candidates show that they have developed and extended their ICT skills in producing at least **three** elements from video, sound, still images, animation, and charts or diagrams or drawings, as in 'Creation of Elements of an Interactive Multimedia Product in the Unit Content section; but the development and suggestion of which skills to use is mainly based on advice and training from others;
		3	Candidates show how they developed a multimedia product to meet the brief; Candidates show independence in developing and extending their ICT skills to produce an extensive variety of elements to be used in the interactive multimedia product, by using sources of information and advice that they have identified themselves, such as help files and online tutorials.
c (ii)	AO1	1	Candidates produce a multimedia product to meet the brief and can identify some of the skills that have been used to create the elements, as in 'Creation of Elements of an Interactive Multimedia Product in the Unit Content section, the skills used to incorporate interaction, as in 'Authoring an Interactive Multimedia Product' in the Unit Content section;
		2	Candidates produce a multimedia product to meet the brief and can describe the skills that have been used to create the elements, as in 'Creation of Elements of an Interactive Multimedia Product in the Unit Content section, and the skills used to incorporate interaction, as in 'Authoring an Interactive Multimedia Product' in the Unit Content section;
		3	Candidates produce a multimedia product to meet the brief and can fully explain the skills that have been used to create the elements for the interactive multimedia product, as in 'Creation of Elements of an Interactive Multimedia Product in the Unit Content section, and the skills used to incorporate interaction, as in 'Authoring an Interactive Multimedia Product' in the Unit Content section.
c (iii)	AO3	1	Candidates produce a multimedia product that meets the client's brief;
		2	Candidates create an effective solution to the client's brief, making good use of design and layout facilities; The solution demonstrates good understanding of design and the end product is easy to use; A variety of methods of interaction, as identified in 'Authoring an Interactive Multimedia Product' in the Unit Content section, have been incorporated.
		3	Candidates create a complete solution to a complex problem that shows effective use of design, layout and a range of interactive features; The solution demonstrates good use of an extensive range of interactive features, as identified in 'Authoring an Interactive Multimedia Product' in the Unit Content section; The product is suited to the user's needs.
d	AO4	1	Candidates plan what elements to test in the product and how each is to be tested;
		2	Candidates test each element of the product in a predetermined manner and compare the actual results of each test to the expected result;
		3	Candidates test each element of the product in a predetermined manner and compare the actual results of each test to the expected result and use the results of those tests to revise the product.

e	**AO2**	**1**	Candidates produce a simple text-based guide;
		2	Candidates produce a guide with some images from the presentation;
		3	Candidates produce a full and clear guide that explains how to use the product, with images taken from the product to clarify points made.

Task	AO	Mark Band	Characteristics of the work one may expect to see at this mark band can be summarised as follows:
f	**AO4**	**1**	Candidates give a basic comparison of their product as a whole to the requirement of the brief; Candidates comment on the steps that they went through to create a multimedia product;
		2	Candidates are able to use their own assessment of their product and the views of others to comment on their product as a whole and suggest some improvements; Candidates explain the steps that they went through to create a multimedia product;
		3	Candidates make use of feedback from users to assess each element of the product and its general structure; Candidates are able to use their own assessment of their product, linking it back to the initial brief, and suggest improvements; Candidates explain the steps they went through to create a multimedia product, additionally they identify, from experience, how they would improve their technique to solve the problem if they were to repeat the process.

Unit G051 - Assessment Evidence Grid

Unit G051: Publishing

What candidates need to do:

Evidence needs to include:

a: [AO2] notes taken during an initial, and any subsequent, meeting with a client, negotiating and amending a brief for the production of a publishable version of a document [**5**];

b: [AO1/3] evidence of the drafting and production of a publishable version of the candidate's final document to meet the brief and, in doing so, show that candidates can create and capture images, as well as import material from other packages, utilise object libraries such as clip art, and select and further develop images to meet the style and content of the final copy as negotiated with the client [**21**];

c: [AO1/2] a publishable version of a document, of at least **ten** A4 pages or the equivalent, that combines different types of information presented to the client for approval together with a letter which correctly describes the final production stage and external factors which may affect completion of the final published document [**9**];

d: [AO4] an evaluation of both the layout and content of the candidate's final copy and their performance [**15**].

How the candidate will be assessed:

Task	Assessment Objective	Mark Band 1	Mark Band 2	Mark Band 3	Mark Awarded
a	**AO2**	The candidate produces notes taken during the negotiation of a brief and subsequent meetings with the client that evidence discussion of the ICT tools available and possible solutions to the brief together with some discussion of alternative solutions; the candidate considers deadlines; **[0 1 2]**	The candidate produces notes taken during the negotiation of a brief and subsequent meetings with the client that evidence a full discussion of the ICT tools available and possible solutions to the brief, together with a full discussion of alternative solutions; the candidate includes evidence of amending their ideas as a result of discussion with the client; the candidate agrees interim and final deadlines; **[3 4]**	The candidate produces notes taken during the negotiation of a brief and subsequent meetings with the client that evidence a full discussion of the ICT tools available and a wide range of possible solutions to the brief, together with the implications of each of these solutions and a full discussion of alternative solutions; the candidate includes evidence of amending their ideas as a result of discussion with the client and gains approval from the client for the chosen solution; the candidate agrees interim and final deadlines, renegotiating these to take account of external factors. **[5]**	**/5**
b(i)	**AO1**	The candidate produces different types of information to be used in the final copy some of which need to show evidence of information having been manipulated to explore different styles of presentation; **[0 1 2]**	The candidate produces and edits different types of information for inclusion in the final copy, some of which need to show evidence of the use of a range of editing and manipulation tools available within an appropriate applications package to explore different styles of presentation; **[3 4]**	The candidate produces, and edits a variety of types of information for inclusion in the final copy, showing clear evidence of the use of a comprehensive range of editing and manipulation tools available within the appropriate applications packages in order to explore different means of presenting the same information. **[5 6]**	**/6**

Unit G051: Publishing (continued)					
Task	**Assessment Objective**	**Mark Band 1**	**Mark Band 2**	**Mark Band 3**	**Mark Awarded**
b(ii)	**AO3**	The candidate follows the design stage processes, including some of: sketching different initial document designs, evidence of at least **one** of the following; house style, creating master page layouts, presenting page proofs, producing artwork sketches, setting text orientation and creating style sheets; **[0 1 2]**	The candidate follows all but **two** of the design stage processes, including most of: sketching different initial document designs, following house style, creating master page layouts, presenting page proofs, producing artwork sketches, setting text orientation and creating style sheets; **[3 4]**	The candidate follows all design stage processes, including sketching different initial document designs, following house style, creating master page layouts, presenting page proofs, producing artwork sketches, setting text orientation and creating style sheets. **[5 6]**	**/6**
b(iii)	**AO3**	The candidate provides a brief description of the design stage processes they have followed; **[0 1 2]**	The candidate demonstrates understanding by describing the design stage processes they have followed with some explanation of how they contribute to the quality of the final document; **[3 4]**	The candidate demonstrates understanding by describing all of the design stage processes and fully explains how they contribute to the quality of the final document. **[5 6]**	**/6**
c(i)	**AO1**	The candidate produces a publishable version of the agreed design that combines different types of information; there is some evidence of the use of editing and formatting techniques to produce a publication that is appropriate for the audience and contains few, if any, errors; **[0 1 2 3]**	The candidate produces a publishable version of the agreed design that combines different types of information to suit the purpose and audience of the publication; there is clear evidence of using a range of editing and formatting techniques, including editing of imported text to produce a publication that is of high quality and error free; **[4 5 6]**	The candidate will produce a publishable version of the agreed design that combines different types of information to suit the purpose and audience of the publication and improve its impact; there is clear evidence of the effective use of a wide range of advanced editing and formatting techniques, including editing imported text to produce a publication of professional quality; **[7 8 9]**	**/9**
c(ii)	**AO2**	The candidate produces a final letter that presents the publishable version to the client for their approval along with an outline of the final production stages required before publication; **[0 1]**	The candidate produces a final letter that presents the publishable version to the client for their approval, together with a description of the final production stages required before publication; **[2]**	The candidate produces a final letter that presents the publishable version to the client for their approval, together with a full explanation of the final production stages required before publication; the letter also explains how the final product can be altered at a later stage; **[3]**	**/3**
d(i)	**AO4**	The candidate comments on the effectiveness of the layout and content of the publishable version of their design in relation to the client brief, with some overall indication of how the work may be improved; The report may contain errors in spelling, punctuation and grammar; **[0 1 2 3]**	The candidate provides an analysis of the layout and content of the publishable version of their design in relation to the client brief, identifying the strengths and weaknesses in order to refine the solution, taking account of the client's feedback; The report contains few spelling, punctuation and grammar errors; **[4 5 6]**	The candidate provides a full critical analysis of the layout and content of the publishable version of their design, clearly identifying how well it meets the initial brief and any subsequent refinements, taking account of user feedback and suggesting further improvements that could be made; The report is consistently well-structured and there are few, if any, spelling, punctuation and grammar errors; **[7 8]**	**/8**

Unit G051: Publishing (continued)					
Task	**Assessment Objective**	**Mark Band 1**	**Mark Band 2**	**Mark Band 3**	**Mark Awarded**
d(ii)	**AO4**	The candidate comments on their actions and role in negotiating the brief and designing and producing the publication; the candidate identifies areas for improvement, with some suggestions as to how they may be more efficient in the future; **[0 1 2]**	The candidate includes an analysis on their own performance in negotiating the brief and designing and producing the publication by identifying strengths and weaknesses, with some suggestions for improvement to the overall process; **[4 5]**	The candidate includes an analysis on their own performance, including a discussion of how they produced the publication from the negotiation of the brief through to the submission of the publication for approval, by identifying strengths and weaknesses and using this analysis to show how they will address these issues to be more effective in the future. **[6 7]**	**/7**
				Total mark awarded:	**/50**

The further guidance below clarifies the criteria in the *Assessment Evidence Grid* and will help to determine the appropriate mark to be awarded for each strand of work.

Amplification of Criteria			
Task	**AO**	**Mark Band**	**Characteristics of the work one may expect to see at this mark band can be summarised as follows:**
a	**AO2**	**1**	Candidates produce notes of the initial discussion with the client and any subsequent meetings; the notes include some discussion of both the hardware and software available to complete the brief; and suggest a possible solution as well as at least one alternative solution; these notes also include details of the material to be included in the final document, examples of previously published materials to be used as a guide to house-style, and a schedule for completion of the work;
		2	In addition to the evidence developed for Mark Band 1, candidates consider the restrictions placed on the solution by the limitations of the hardware and software available; they make detailed suggestions for more than one possible solution and more than one alternative solution – perhaps considering the use of different hardware and software; Deadlines are agreed with the client and they are kept; Notes on subsequent meetings include evidence of the candidate amending their ideas in response to client feedback;
		3	In addition to the evidence developed for Mark Band 2, candidates notes make it clear that they have been able to both suggest a number of solutions to the problem and explain to the client the full advantages and disadvantages of each of these solutions, so that the client is well equipped to make informed decisions about which solution should be adopted; Notes of subsequent meetings show that the candidate has gained approval from the client for the solution and that deadlines have been renegotiated to take account of external factors.
b(i)	**AO1**	**1**	This task relates to candidates preparing both textual and graphic material to include in the final document, this will involve using different input devices and software to create or capture and edit text and images; Candidates produce information that needs to be imported into the final document, some of the information will show evidence that they have used a limited range of editing and manipulation tools in word processing and/or graphics software;
		2	Candidates use a wider range of editing and manipulation tools than those working at Mark Band 1, they show evidence that they have experimented with the tools to try out different presentation styles;
		3	Candidates use an extensive range of editing and manipulation tools in different software applications to prepare information they will import into the final product, this will involve experimenting with the different tools to explore different means of presenting the same information.

Task	AO	Mark Band	Characteristics of the work one may expect to see at this mark band can be summarised as follows:
b(ii)	AO3	1	Candidates include, as a minimum, sketches of more than one design idea for the layout of the publication, and evidence of presenting page proofs, along with evidence of at least **one** of: following house style, creating master page layouts, producing artwork sketches, setting text orientation and creating style sheets;
		2	Candidates provide evidence of competently following **all but two** of the design stage processes listed; sketches of initial document designs include consideration of the content of each page as well as the layout;
		3	Candidates provide clear evidence that they have followed all the deign stage processes listed with a high degree of competency.
b(iii)	AO3	1	Candidates provide some description of those design stage processes they have evidenced in task b(ii);
		2	Candidates descriptions of the design stage processes they have followed demonstrates understanding of the processes involved and they are able to provide some explanation of the impact of these processes on the quality of the final product;
		3	Candidates descriptions of all the design stage processes demonstrates clear understanding of the processes involved and they are able to provide detailed explanations of the impact of these processes on the quality of the final product.
c(i)	AO1	1	Candidates create a publication that combines different types of information and that meets the client's brief; there is evidence that the candidate has used some editing and formatting techniques relating to the document as a whole, such as headings and subheadings, setting margins, justification or pagination; the publication has few, if any, errors in it;
		2	The publication combines a variety of information in a manner that is clearly suitable for the purpose and audience as determined by the negotiation of the brief; candidates provide evidence that they have used a more extensive range of editing and formatting techniques than those working at Mark Band 1, such as headers and footers, footnotes or endnotes, leading and/or kerning, or tables of content and show editing of imported text; the final publication is of high quality and virtually free of errors;
		3	Candidates create a publication that is professional in quality and incorporates advanced editing and formatting techniques, such as setting different structures and styles for different sections of the publication, using repeating elements or using callouts.
c(ii)	AO2	1	Candidates produce a letter to the client that identifies some of the final production stages, such as print colours, paper weight and size, printing devices and services and binding/folding;
		2	The letter includes descriptions of each of the final production stages;
		3	Candidates produce a letter that explains the implications of each of the final production stages; the candidate also includes an explanation of how the publication could be altered at a later stage.

Task	AO	Mark Band	Characteristics of the work one may expect to see at this mark band can be summarised as follows:
d(i)	AO4	1	Candidates describe the layout and content of their publishable version and make general comments about how well they think it meets the brief; they are able to give some very general indications of how the work may be improved in the future, but these improvements will be, at best, general and will not concentrate on specific choice or use of software in any detail; Errors in spelling, punctuation and grammar may affect the readability of the report;
		2	Candidates compare their product to the brief and standards set by both the client's previously produced material and other similar professionally published material – they are aware that there may be differences between their work and the standards set and, with the help of feedback from their client, are able to identify the strengths and weaknesses of their product in relation to these standards; they give some ways in which the weaknesses may be remedied in the future, although, at the lower end of this mark band, this tends to concentrate on the document as a whole and not on the quality of writing or of individual images; At the higher end of this mark band, there are the beginnings of a full analysis of all images and text used, both in terms of content and quality; The report will have been spell checked and proof-read but common errors such as there/their, weather/whether, could of/could have, US spellings or incorrect choice from this list offered by the spell checker may still appear; these will not affect readability;
		3	Candidates evaluate the publishable version to see how well it meets the client's requirements, as set out by the initial brief and any further additions to the brief, the house-style and the standards set by similar professionally published documents and make recommendations for further improvement; At the higher end of this mark band, candidates include discussion of each image and piece of text, and show that the decision to include them was the result of referring back to an identified house-style and the negotiated brief; The report is well-structured with suitable headings and subheadings and with a logical order of points, which will be well-expressed with correct spelling, grammar and punctuation – 100% accuracy is unlikely but the number of errors should be very small.
d(ii)	AO4	1	Candidates provide some description of how they went about negotiating the brief with the client and the steps they took to design and create the publication; they will be able to identify aspects of the process that did not go as well as it could have and suggest what they would do differently in future;
		2	The description of their role in the process shows some awareness of the issues involved, including aspects that went well as well as those that did not go as planned, and candidates suggest realistic improvements;
		3	Candidates evaluate their role in the process of producing the publication from the negotiation of the initial brief through to the production of the publishable version and its submission for approval, together with a full discussion of their strengths and weaknesses and a reflection on how they may address these issues to be more effective in the future.

Unit G052: Artwork and imaging

What candidates need to do:

Evidence needs to include:

a: [AO1] a portfolio of artwork samples produced to demonstrate a range of artwork skills [**9**];

b: evidence of the development of computer artwork, using a variety of graphics software, following negotiation of a brief from a client, from initial ideas to final product accepted by the client, to include:

- **(i)** [AO2] notes taken during the negotiation of a brief, together with a range of initial proposals in response to a complex problem [**8**];
- **(ii)** [AO4] an analysis of the candidate's design proposals to select the one they will develop [**6**];
- **(iii)** [AO3] development of a final product, showing editing techniques and the candidate's choice of printer type, media and resolution [**6**];
- **(iv)** [AO1] development of ICT skills required by the candidate's solution [**6**];
- **(v)** [AO3] a substantial artwork product that meets the requirements of the brief [**6**];

c: [AO4] an evaluation of both the final product and an evaluation of the candidate's performance [**9**].

How the candidate will be assessed:

Task	Assessment Objective	Mark Band 1	Mark Band 2	Mark Band 3	Mark Awarded
a	**AO1**	The candidate produces a portfolio of artwork samples to show they have a basic competence in using a variety of ICT tools by including examples of **each** of: simple line drawings, simple statistical charts and boxed charts suitably scaled, icons, background styles and repeated patterns, scientific and mathematical material and the use of colour, colour inversion, colour separation and balance; **[0 1 2 3]**	The candidate produces a portfolio of artwork samples to show they are proficient in using a variety of ICT tools by including examples of **each** of: simple line drawings, simple statistical charts and boxed charts suitably scaled, icons, background styles and repeated patterns, scientific and mathematical material and the use of colour, colour inversion, colour separation and balance; The candidate's portfolio must demonstrate how they have manipulated the images to explore different styles of presentation using ICT methods; **[4 5 6]**	The candidate produces a portfolio of artwork samples to show they are highly proficient in using a variety of ICT tools by including examples of **each** of: simple line drawings, simple statistical charts and boxed charts suitably scaled, icons, background styles and repeated patterns, scientific and mathematical material and the use of colour, colour inversion, colour separation and balance; The candidate's portfolio must show clear evidence of the use of a comprehensive range of advanced editing and manipulation tools available within the chosen graphics package, in order to explore different means of presenting the same image using ICT methods.**[7 8 9]**	**/9**
b(i)	**AO2**	The candidate produces notes taken during the negotiation of the brief with the client that evidence discussion of the ICT tools available and possible solutions to the brief together with some discussion of alternative solutions; The candidate produces initial ideas in the form of sketches, either using ICT or non-ICT methods, in response to a client brief; **[0 1 2 3]**	The candidate produces notes taken during the negotiation of a brief and subsequent meetings with the client that evidence a full discussion of the ICT tools available and possible solutions to the brief, together with a full discussion of alternative solutions; The candidate produces several different proposals in response to a complex problem and include evidence of amending their ideas as a result of discussion with the client; **[4 5 6]**	The candidate produces notes taken during the negotiation of a brief and subsequent meetings with the client that evidence a full discussion of the ICT tools available and a wide range of possible solutions to the brief, together with the implications of each of these solutions and a full discussion of alternative solutions; The candidate produces several different proposals in response to a complex problem and include evidence of amending their ideas as a result of discussion with the client to gain approval from the client for the chosen solution. **[7 8]**	**/8**

Unit G052: Artwork and imaging (continued)					
Task	**Assessment Objective**	**Mark Band 1**	**Mark Band 2**	**Mark Band 3**	**Mark Awarded**
b(ii)	**AO4**	The candidate comments on the effectiveness of their design sketches and gives some reasons for their choice of which design to develop; **[0 1 2]**	The candidate identifies the strengths and weaknesses of their design proposals, taking account of client feedback, and use these to inform their choice of which design to develop, justifying their decision; **[3 4]**	The candidate provides a detailed critical analysis of their design proposals, taking account of client feedback, to inform their choice of which design to develop; they fully justify their choice in relation to the requirements of the brief. **[5 6]**	**/6**
b(iii)	**AO3**	The candidate shows development of a final product and, in doing so, shows that they can create, capture and develop images, import material from other packages and use object libraries including clip art; The candidate identifies an appropriate printer type, media and resolution; **[0 1 2]**	The candidate shows development of a final product, and, in doing so, shows that they can use a range of ICT tools to create, capture and develop images, import material from other packages and use object libraries including clip art; The candidate details an appropriate printer type, media and resolution; **[3 4]**	The candidate shows development of a final product and, in doing so, shows they can use a comprehensive range of ICT tools to create, capture and develop images, import material from other packages and use object libraries including clip art to produce a professional standard of artwork; The candidate explains their choice of an appropriate printer type, media and resolution. **[5 6]**	**/6**
b(iv)	**AO1**	The candidate shows that they have developed or extended their range of ICT skills as required by the solution; The candidate identifies some of the ICT skills that they have used; **[0 1 2]**	The candidate shows that they have developed and extended their range of ICT skills as required by the solution; The candidate identifies the range of ICT skills that they have used; **[3 4]**	The candidate uses their initiative to develop and extend their range of ICT skills as required by the solution; The candidate identifies the range of ICT skills that they have used. **[5 6]**	**/6**
b(v)	**AO3**	The candidate produces a substantial artwork product that includes appropriate material and meets the requirements of the brief; **[0 1 2]**	The candidate produces a substantial artwork product that shows they can be critical in selecting appropriate material for inclusion, meets the requirements of the brief and takes account of client feedback; **[3 4]**	The candidate produces a substantial artwork product that demonstrates individuality and imagination, shows they can be critical in selecting appropriate material for inclusion, meets the requirements of the brief and takes account of client feedback; **[5 6]**	**/6**
c	**AO4**	The candidate comments on the effectiveness of the final product, with some overall indication of how the work may be improved; The candidate comments on their actions and role in solving the problem and identify areas for improvement; The candidate's evaluation may contain errors in spelling, punctuation and grammar; **[0 1 2 3]**	The candidate provides an analysis of their final product, identifying the strengths and weaknesses in order to refine the solution; The candidate includes an analysis of their own performance by identifying their strengths and weaknesses, with some suggestions for improvement to the overall process; The candidate's evaluation contains few spelling, punctuation and grammar errors; **[4 5 6]**	The candidate provides a full critical analysis of their final product, identifying how well it meets the client brief; The candidate includes an analysis of their own performance by identifying their strengths and weaknesses, together with a reflection on how they could address these issues to be more effective in the future; The candidate's report is consistently well-structured and there are few, if any, spelling, punctuation and grammar errors. **[7 8 9]**	**/9**
				Total mark awarded:	**/50**

The further guidance below clarifies the criteria in the *Assessment Evidence Grid* and will help to determine the appropriate mark to be awarded for each strand of work.

<table>
<tr><td colspan="4">The further guidance below clarifies the criteria in the Assessment Evidence Grid and will help to determine the appropriate mark to be awarded for each strand of work.

Amplification of Criteria</td></tr>
<tr><th>Task</th><th>AO</th><th>Mark Band</th><th>Characteristics of the work one may expect to see at this mark band can be summarised as follows:</th></tr>
<tr><td rowspan="3">a</td><td rowspan="3">AO1</td><td>1</td><td>Candidates use a variety of ICT tools (including bit-mapped and vector based) to produce examples of each of: simple line drawings, statistical charts and boxed charts suitably scaled icons, background styles and repeating patterns, scientific and mathematical material and the use of colour, colour separation and balance – the artwork samples generated may show limited skills;</td></tr>
<tr><td>2</td><td>Additionally, candidates include evidence to show how they have edited and manipulated the artwork samples, - the artwork samples demonstrate good skills in the use of software tools to present the images in different ways;</td></tr>
<tr><td>3</td><td>Additionally, candidates show that they can use a comprehensive range of ICT tools with a high level of skill to produce a professional standard of artwork;
candidates explore different ways of presenting the same image by manipulating images several times in different ways.</td></tr>
<tr><td rowspan="3">b(i)</td><td rowspan="3">AO2</td><td>1</td><td>Candidates produce notes of the initial discussion with the client; the notes include some discussion of both the hardware and software available to complete the brief; and suggest a possible solution as well as at least one alternative solution – the brief will present a straightforward problem but will require the development of a substantial product, such as a set of illustrations for a children’s book or packaging and promotional material for a product;
Candidates produce simple sketches, by hand or using ICT, that show their initial ideas to meet the brief;</td></tr>
<tr><td>2</td><td>In addition to the evidence developed for Mark Band 1, candidates consider the restrictions placed on the solution by the limitations of the hardware and software available; they make detailed suggestions for more than one possible solution and more than one alternative solution, perhaps considering the use of different hardware and software – the brief will present a more complex problem;
Candidates produce two or three different proposals to meet the brief that include sufficient detail for the client to have a clear understanding of how each will be developed;
There is evidence of subsequent meetings with the client and changes made to the proposals as a result;</td></tr>
<tr><td>3</td><td>In addition to the evidence developed for Mark Band 2, candidates notes make it clear that they have been able to both suggest a number of solutions to the problem and explain to the client the full advantages and disadvantages of each of these solutions, so that the client is well equipped to make informed decisions about which solution should be adopted;
There is evidence of further negotiation with the client and approval of the design proposal to be developed.</td></tr>
</table>

Task	AO	Mark Band	Characteristics of the work one may expect to see at this mark band can be summarised as follows:
b(ii)	AO4	1	Candidates give a basic comparison of their design sketches to the requirement of the brief, identifying the one they will develop and giving some reasons for this choice;
		2	Candidates use the feedback they have obtained from the client and their own assessment of their designs to identify both advantages and disadvantages of each design; They use the identified advantages and disadvantages to justify their choice of the design to develop;
		3	Candidates make an informed assessment of their designs, using the feedback they have obtained from the client and their own assessment; Their analysis looks at both advantages and disadvantages of each design in relation to the brief and candidates draw on these to make a reasoned argument for the design which is implemented;
b(iii)	AO3	1	Candidates include annotated printouts to show how their final product was developed - they create, capture, and develop images, import material from other packages and use object libraries including clip art but editing and manipulation techniques used may be limited; Candidates simply list the printer type, media and resolution that will be used to print the final images;
		2	Candidates include annotated printouts that show the use of a range of editing and manipulation techniques they have used while developing the final product; Candidates provide some description of the printer type, media and resolution that will be used to print the final images;
		3	Candidates include annotated printouts that show the use of an extensive range of editing and manipulation techniques they have used while developing the final product to a professional standard; Candidates explain their choice of printer type, media and resolution that will be used to print the final images;
b(iv)	AO1	1	Candidates provide evidence that they have either developed existing ICT skills or extended their range of ICT skills by learning new skills;
		2	Candidates provide evidence that they have both developed existing ICT skills and extended their range of ICT skills by learning new skills;
		3	Candidates provide evidence that they have used their own initiative to both develop existing ICT skills and extend their range of ICT skills.
b(v)	AO3	1	Candidates produce a final product that includes a range of different material that is appropriate to its purpose and audience and that meets the requirements of the brief – the product will consist of a number of images, e.g. a set of illustrations for a children's book or packaging and promotional material for a product;
		2	Additionally, candidates show that they use user feedback to refine their artwork and are critical in their selection of material for inclusion in their final product – they discuss both positive and negative points of their artwork and use this information to explain the inclusion/exclusion of artwork in the final product;
		3	Additionally, candidates produce a final product that demonstrates a high level of artistic flair, individuality and imagination.

c	**AO4**	**1**	Candidates identify the appropriateness of the solution; They link it back to the original user objectives; Candidates also make a comment on the method that they used to produce a solution, e.g. they identify whether they broke the task into sub-tasks; Errors in spelling, punctuation and grammar may affect the readability of the report;
		2	Additionally, candidates identify the strengths and weaknesses of their solution and the method that they used to tackle the problem; Candidates identify at least **one** way that they could improve their method to produce a solution in the future; The report will have been spell checked and proof-read but common errors such as there/their, weather/whether, could of/could have, US spellings or incorrect choice from this list offered by the spell checker may still appear; these will not affect readability;
		3	Additionally, candidates critically analyse the strengths and weaknesses of their solution in relation to the original brief and the method that they used to tackle the problem; Candidates offer a number of ways that they could improve their performance in the future; The report is well-structured with suitable headings and subheadings and with a logical order of points, which will be well-expressed with correct spelling, grammar and punctuation – 100% accuracy is unlikely but the number of errors should be very small.

Unit G053 - Assessment Evidence Grid

Unit G053: Developing and creating websites

What candidates need to do::

Evidence needs to include:

a: [AO2] an evaluation of commercial websites that have been downloaded [**5**];

b: [AO2/3] analysis and design notes for a website that has at least **three** pages together with detailed plans for publishing their website [**9**];

c: [AO1] annotated printouts of the candidate's web pages in WYSIWYG format identifying the features and techniques used in the web pages [**15**];

d: [AO3] annotated printouts of the candidate's web pages in HTML format identifying edits to script commands to change page layout [**6**];

e: [AO4] documentation of website testing [**6**];

f: [AO4] evaluation of both the candidate's website and the components used to produce it, and of their own performance [**9**].

How the candidate will be assessed:

Task	Assessment Objective	Mark Band 1	Mark Band 2	Mark Band 3	Mark Awarded
a	**AO2**	The candidate comments on the features in the commercial web pages and states how these have provided ideas for their own website; **[0 1]**	The candidate describes the features in the commercial web pages and explains clearly their reasons for choosing/not choosing the features in web pages and how these have provided ideas for their own website; **[2 3]**	The candidate evaluates critically the design and structure of at least **two** existing commercial websites, clearly identifying how the features have provided ideas for inclusion or exclusion in their own website. **[4 5]**	**/5**
b(i)	**AO3**	The candidate produces an analysis of the website to be produced and planning documentation including structure diagrams, a storyboard, an index of pages to be used in the site and a task list or action plan; The candidate has little or no explanation for the choice of font style, graphics, colour and hyperlinks they plan to use; **[0 1 2]**	The candidate produces an analysis of the website to be produced and planning documentation including structure diagrams, a storyboard, an index of pages and files to be used in the site and a task list or action plan for a hierarchical or mesh website; The candidate has some explanation for the choice of font style, graphics, colour and hyperlinks they plan to use; **[3 4]**	The candidate produces a detailed analysis of the website to be produced and detailed planning documentation including structure diagrams, a storyboard, an index of pages and files to be used in the site and a task list or action plan for a hierarchical or mesh website; The candidate clearly explains the reason for the choice of font style, graphics, colour and hyperlinks they plan to use; **[5 6]**	**/6**

Unit G053: Developing and creating websites (continued)					
Task	**Assessment Objective**	**Mark Band 1**	**Mark Band 2**	**Mark Band 3**	**Mark Awarded**
b(ii)	**AO2**	The candidate identifies the preferred domain name and home-page location to set up and install web pages on an internal/external site so that website visitors can access their pages; **[0 1]**	The candidate identifies the preferred domain name and home page location to set up and install web pages on an internal/external site so that website visitors can access their pages in the correct sequence; The candidate clearly explains the reason for the choice of preferred domain name and home-page location; **[2]**	The candidate identifies the preferred domain name and home page location to set up and install web pages on an internal/external site so that website visitors can access their pages in the correct sequence; The candidate clearly explains the reason for the choice of preferred domain name and home-page location giving appropriate alternative options; **[3]**	**/3**
c(i)	**AO1**	The candidate creates a multiple-page website using **two** from hyperlinks, multimedia and interactive features; **[0 1 2]**	The candidate creates a multiple-page website making effective use of hyperlinks, multimedia and interactive features; **[3 4 5]**	The candidate creates a high quality multiple-page website making effective use of an extensive range of hyperlinks, multimedia and interactive features. **[6 7]**	**/7**
c(ii)	**AO1**	The candidate identifies the design techniques, hyperlinks, multimedia and interactive features used; **[0 1 2]**	The candidate describes some of the design techniques, hyperlinks, multimedia and interactive features used; **[3 4 5]**	The candidate fully explains each of the design techniques, hyperlinks, multimedia and interactive features used. **[6 7 8]**	**/8**
d	**AO3**	The candidate demonstrates knowledge of HTML by explaining **three** different script commands; **[0 1 2]**	The candidate demonstrates understanding of HTML script commands by explaining **three** different script commands, editing HTML script commands to change page layout and adding HTML script commands for at least **one** additional component from graphic, table or hyperlink components; **[3 4]**	The candidate demonstrates understanding of HTML script commands by explaining **three** different script commands, editing HTML script commands to change page layout and adding HTML script commands for a **comprehensive** range of additional components. **[5 6]**	**/6**
e	**AO4**	The candidate produces a basic test plan and provides evidence that they used it to carry out tests to check that the website meets the design specifications produced in task b(i) and is functional; **[0 1 2]**	The candidate produces a test plan and provides evidence that they used it to carry out testing of their website to ensure that the website meets the design specifications produced in task b(i) and is fully functional; **[3 4]**	The candidate produces a detailed test plan and provides evidence that they used it to carry out thorough testing of their website to ensure that the website meets the design specifications produced in task b(i) and is fully functional, revising the website if necessary. **[5 6]**	**/6**

f	**AO4**	The candidate comments on how well their website met the needs of the users and the effectiveness of the components they included; The candidate comments on their actions and role in creating the website and identifies areas for improvement; The candidate's report may contain errors in spelling, punctuation and grammar; **[0 1 2 3]**	The candidate identifies strengths and weaknesses in both their website and the components they included; The candidate includes an analysis on their own performance in designing, implementing and testing the website by identifying strengths and weaknesses, with some suggestions for improvement to the overall process of designing, implementing and testing the website; The candidate's report contains few errors in spelling, punctuation and grammar; **[4 5 6]**	The candidate provides a critical analysis of their website, giving reasons for the components they included, analysing their strengths and weaknesses taking into account any comments received from visitors to their website and suggesting and justifying improvements that they could make; additionally, the candidate provides a critical analysis of the approach they took to designing, implementing and testing the website and suggest how they would refine their approach in the future; The candidate's report is consistently well-structured and there will be few, if any, errors in spelling, punctuation and grammar. **[7 8 9]**	**/9**
				Total mark awarded:	**/50**

The further guidance below clarifies the criteria in the *Assessment Evidence Grid* and will help to determine the appropriate mark to be awarded for each strand of work.

Amplification of Criteria			
Task	**AO**	**Mark Band**	**Characteristics of the work one may expect to see at this mark band can be summarised as follows:**
a	**AO 2**	**1**	Candidates use internet tools to select and download web pages to provide ideas for their own web pages, annotating these to show how they provided those ideas;
		2	Candidates use internet tools to select and download web pages to provide ideas for their own web pages, annotating these to explain clearly their reasons for choosing/not choosing the features in existing web pages; Annotations will be more useful if the purpose and audience of the downloaded pages are similar to the website they are going to create;
		3	Candidates use internet tools to select and download web pages to provide ideas for their own web pages, annotating these to explain clearly their reasons for choosing/not choosing the features in existing web pages; Annotations will be more useful if the purpose and audience of the downloaded pages are similar to the website they are going to create; Candidates also evaluate the design and structure of at least **two** existing websites.
b(i)	**AO 3**	**1**	Candidates produce documentation, including structure diagrams, a storyboard, an index of pages in the site and a task list or action plan;
		2	Candidates produce documentation, including structure diagrams, a storyboard, an index of pages and files used in the site and a task list or action plan for a hierarchical or mesh website; Candidates provide limited explanation for the choice of font style, graphics, colour and hyperlinks planned for;
		3	Candidates produce documentation, including structure diagrams, a storyboard, an index of pages and files used in the site and a task list or action plan for a hierarchical or mesh website; Candidates clearly explain the reason for the choice of font style, graphics, colour and hyperlinks planned for;
b(ii)	**AO 2**	**1**	Candidates identify a domain name and home page location to set up and install web pages on a site;
		2	Candidates identify a domain name and home page location to set up and install web pages on a site – they clearly explain the reason for the choice of domain name and home page location;
		3	Candidates identify a domain name and home page location to set up and install web pages on a site – they clearly explain the reason for the choice of domain name and home page location, giving alternative options.

Task	AO	Mark Band	Characteristics of the work one may expect to see at this mark band can be summarised as follows:
c(i)	AO 1	1	Candidates create a multiple-page website using **two** from hyperlinks, multimedia and interactive features see 'Planning a Website' and 'Creating a Website' in the Unit Content section;
		2	Candidates create a multiple-page website making effective use of hyperlinks, multimedia and interactive features used see 'Planning a Website' and 'Creating a Website' in the Unit Content section;
		3	Candidates create a high quality multiple-page website making effective use of an extensive range of hyperlinks, multimedia and interactive features used see 'Planning a Website' and 'Creating a Website' in the Unit Content section;
c(ii)	AO 1	1	Candidates identify the design techniques, hyperlinks, multimedia and interactive features used in the multiple-page website see 'Planning a Website' and 'Creating a Website' in the Unit Content section,, e.g. they identify hyperlinks, tables, images, colours used;
		2	Candidates describe some of the design techniques, hyperlinks, multimedia and interactive features used in the multiple-page website see 'Planning a Website' and 'Creating a Website' in the Unit Content section;, e.g. they describe hyperlinks, tables, image types, colours used;
		3	Candidates fully explain each of the design techniques, hyperlinks, multimedia and interactive features used in the multiple-page website see 'Planning a Website' and 'Creating a Website' in the Unit Content section;, e.g. they explain why they have used hyperlinks, tables, image types, colour schemes, style sheets.
d	AO 3	1	Candidates explain **three** different HTML script commands, e.g. explain html to set up a font size;
		2	In addition candidates edit HTML script commands to change page layout and print out the script commands before and after changes, e.g. explain how they have changed the code to change the colour of a font; Candidates add HTML script commands for at least **one** additional component and print out the script commands before and after the additions, e.g. they add a script command to hyperlink to a different part of the web page.
		3	In addition candidates edit HTML script commands to change page layout and print out the script commands before and after changes, e.g. explain how they have changed the code to change the colour of a font; Candidates add HTML script commands for a **comprehensive** range of additional components and print out the script commands before and after the additions, e.g. they add a script command to hyperlink to a different part of the web page.
e	AO 4	1	Candidates produce a basic test plan and carry out tests to check that the website meets the design specifications in task b(i), e.g. the website is fit for purpose, suits the intended audience and has been proof read;
		2	Candidates produce a test plan and carry out testing of their website to ensure that the website meets the design specifications in task b(i) and is functional, e.g. the website is fit for purpose and the user can navigate correctly;
		3	Candidates produce a detailed test plan and carry out thorough testing of their website to ensure that the website meets the design specifications in task b(i) and is fully functional; Candidates make and document any changes in light of errors found.

Task	AO	Mark Band	Characteristics of the work one may expect to see at this mark band can be summarised as follows:
f	AO 4	1	Candidates comment on how well their website met the needs of the users and the effectiveness of the components used – they refer back to the design specification;
		2	Candidates identify both strengths and weaknesses in their website and the strengths and weaknesses of the components used – they also comment on their approach to designing, implementing and testing the website;
		3	Candidates provide a critical analysis of their website, giving reasons for the components that were included; They analyse their strengths and weaknesses taking into account any comments received from website users – improvements will be suggested; Additionally candidates provide a critical analysis on their approach to designing, implementing and testing the website, suggesting refinements to their approach in the future.

Unit G056: Program design, production and testing

What candidates need to do:

Candidates will produce: a working program with complete documentation to meet a given user requirement.
Evidence needs to include:

a: [AO1/3] a program specification to meet the given requirement with a description of how their specification meets the program requirements and how they have considered the user's needs [**12**];

b: [AO2/3] a program design arising from their specification and an analysis of the design methods they have used [**14**];

c: [AO1] an annotated modular program to realise the design, which must include at least **one** data structure, all data types, all control structures and all appropriate operators listed in the programming section [**9**];

d: [AO4] test documentation including a test plan with valid, invalid and boundary data, expected results, actual results and changes identified as a result of testing [**6**];

e: [AO4] a program review and evaluation report including an evaluation of their own performance [**9**].

How the candidate will be assessed:

Task	Assessment Objective	Mark Band 1	Mark Band 2	Mark Band 3	Mark Awarded
a(i)	**AO1**	The candidate shows that they have developed their skills by developing a specification which identifies some inputs, outputs and processing requirements for the given program requirement; **[0 1 2]**	The candidate shows that they have extended their skills by developing a specification which identifies most inputs, outputs and processing requirements for the given program requirement; **[3 4]**	The candidate shows that they have used their initiative to extend and enhance their skills by developing a clear and full specification which identifies all inputs, outputs and processing requirements for the given program requirement. **[5 6]**	**/6**
a(ii)	**AO3**	The candidate applies their knowledge and skills to briefly describe how their specification meets the requirements of a straightforward problem, considering the user's needs; **[0 1 2]**	The candidate applies their knowledge and skills to describe how their specification meets the requirements of a complex problem and how they have identified the users' needs; **[3 4]**	The candidate applies their knowledge and skills to fully and clearly describe how their specification meets the requirements of a complex problem and fully considers how the user's needs will be met. **[5 6]**	**/6**
b(i)	**AO2**	The candidate demonstrates knowledge of design techniques by using some appropriate techniques, such as pseudocode, flowcharts, event-action charts, to design processes; The candidate designs input screens, output formats, validation and verification, data structures and at least one file structure; **[0 1 2 3]**	The candidate demonstrates knowledge of different design techniques by using a range of appropriate techniques such as pseudocode, flowcharts, event-action charts, to design processes; The candidate's designs are accurate and cover the whole program (input, output, processes, data structures, all file structures and file organisation); **[4 5 6]**	The candidate demonstrates thorough, detailed knowledge of formal and informal design techniques by using a structured design method and a wide range of appropriate techniques, such as pseudocode, flowcharts, event-action charts; The candidate's designs are accurate, clear and complete and cover the whole program (input, output, processes, data structures, all file structures and file organisation). **[7 8]**	**/8**

Unit G056: Program design, production and testing (continued)					
Task	**Assessment Objective**	**Mark Band 1**	**Mark Band 2**	**Mark Band 3**	**Mark Awarded**
b(ii)	**AO3**	The candidate applies their knowledge and skills to comment on the appropriateness of the design methods they used and identifies areas for improvement; **[0 1 2]**	The candidate applies their knowledge and skills to analyse the appropriateness of the design methods they used by describing strengths and weaknesses and suggesting improvements; **[3 4]**	The candidate applies their knowledge and skills to analyse the appropriateness and effectiveness of the design methods they used by describing strengths and weaknesses and showing how they have modified their design methods to address the identified weaknesses. **[5 6]**	**/6**
c	**AO1**	The candidate shows that they have developed their skills by producing a program from their specification and design; The candidate's program meets most of the original requirements; **[0 1 2 3]**	The candidate shows that they have extended their skills by producing a fully working program from their specification and design; The candidate's program is modular, meets most of the original requirements and is easy to use; **[4 5 6]**	The candidate shows that they have used their initiative to extend and enhance their skills by producing a fully working program with clear and fluent annotation; The candidate's program is modular, meets all original requirements, is easy to use and makes full use of all appropriate data structures, data types, control structures and operators. **[7 8 9]**	**/9**
d	**AO4**	The candidate produces a test plan and documents test results that cover all data validation; **[0 1 2]**	The candidate produces a test plan with valid, invalid and boundary data and documents test results to cover all eventualities; **[3 4]**	The candidate produces a test plan that covers all paths and user operations as well as all valid, invalid and boundary data, documenting test results to cover all eventualities and using the results to refine the solution. **[5 6]**	**/6**
e	**AO4**	The candidate comments on the effectiveness of their solution and identifies at least one improvement that they could make; The candidate comments on their actions and role in solving the problem and identifies areas for improvement; The candidate's report may contain errors in spelling, punctuation and grammar; **[0 1 2 3]**	The candidate comments on the effectiveness of their solution by identifying strengths and weaknesses and by considering the problems found during testing; The candidate comments on how they could have reduced testing errors by changes to their design; The candidate includes an analysis of their own performance by identifying strengths and weaknesses, with some suggestions for improvement to the overall process; The candidate's report contains few spelling, punctuation and grammar errors; **[4 5 6]**	The candidate provides a critical analysis of their solution, taking account of user feedback, to identify the strengths and weaknesses; The candidate explains refinements that could be made to the solution as a result of their analysis; The candidate includes an analysis on their own performance by identifying strengths and weaknesses and uses this analysis to show how they will address these issues to be more effective in the future; The candidate's report is consistently well-structured and there will be few, if any, spelling, punctuation and grammar errors. **[7 8 9]**	**/9**

The further guidance below clarifies the criteria in the *Assessment Evidence Grid* and will help to determine the appropriate mark to be awarded for each strand of work.

Amplification of Criteria			
Task	**AO**	**Mark Band**	**Characteristics of the work one may expect to see at this mark band can be summarised as follows:**
a(i)	**AO1**	**1**	Candidates identify some inputs, outputs and processing requirements, all are relevant to the given requirement and are presented in table form or otherwise;
		2	Candidates correctly identify all inputs, processes and outputs relevant to the given requirement;
		3	All relevant inputs, processes and outputs are described with indication of the input and output methods to be used.
a(ii)	**AO3**	**1**	Candidates describe how they have considered the user's needs (e.g. ease of use, shortcuts) and identify which parts of the original requirement will be implemented by each input, output and process; the program will be straightforward (e.g. menus to one level, one point of exit, one algorithm);
		2	Candidates describe how they have considered the user's needs (e.g. ease of use, shortcuts) and identify which parts of the original requirement will be implemented by each input, output and process; the program will be complex (e.g. multiple levels of choice in menus, multiple exit points, complex algorithms);
		3	Candidates describe how they have shown full consideration of the user's needs by explaining how each specified input, process or output meets those needs and which parts of the original requirement will be implemented by each; the program will be complex (e.g. multiple levels of choice in menus, multiple exit points, complex algorithms).
b(i)	**AO2**	**1**	Candidates use an appropriate design technique such as pseudocode, flowchart, event-action chart, decision table to design processes; candidates may make repeated use of one technique; candidates design inputs, outputs, data structures and a file structure;
		2	Candidates use a range of appropriate design techniques such as pseudocode, flowchart, event-action chart, decision table to design processes; candidates correctly design inputs, outputs, data structures, file structures and file organisation;
		3	Candidates use all appropriate techniques to design processes, this might include prototyping or other design method; candidates correctly design a full user interface that aids user input and fully validates and verifies it; designed file structures are effective in their use of space and organisation.
b(ii)	**AO3**	**1**	Candidates correctly identify the methods they have used, comment on how appropriate each was to the problem and how these or other methods could be better used;
		2	Candidates correctly identify the methods that they have used and describe how appropriate each method was to the problem; they describe the strengths and weaknesses of each method and suggest ways that they could improve their use of these or other design methods;
		3	Candidates correctly identify the methods that they have used, describe how they have used them and how effective the methods were in solving the problem; they describe strengths and weaknesses of each design method and how they modified the methods they used to overcome identified weaknesses and improve the design.

Task	AO	Mark Band	Characteristics of the work one may expect to see at this mark band can be summarised as follows:
c	AO1	1	Candidates produce a program which closely matches both specification and design and meets the original requirements; some complex requirements might be omitted;
		2	Candidates produce a working program which closely matches both specification and design and meets the original requirements; the program is easy to use, e.g. helpful messages, consistent user interface, no surprises, etc. and has no obvious errors;
		3	Candidates produce a working program which closely matches both specification and design and clearly meets all the program requirements; the program is easy to use, has no errors and makes full use of all appropriate data structures, data types, control structures and operators; the program is annotated clearly and fluently.
d	AO4	1	Candidates produce test documentation that includes the tests, the test data and the expected outcomes; all input data is tested for validation.
		2	Candidates produce test documentation that includes the tests, the test data, identification of the type of test data, e.g. boundary data, and the expected outcomes; tests cover valid, invalid and boundary input data; all functional parts of the program are tested;
		3	Candidates produce test documentation that includes the tests, the test data, identification of the type of test data, e.g. boundary data, and the expected outcomes; all functional parts of the program, all user operations and all paths through the program are tested; candidates refine their solution to overcome problems found during testing.
e	AO4	1	Candidates comment on how their solution meets the requirements of the original specification effectively (e.g. how it is designed for minimal storage, ease of use or efficient algorithms); candidates at the higher end of this mark band make a valid comparison and identify at least one improvement that could be made to the solution; Candidates make some comment on how they approached the task;
		2	Candidates comment on the effectiveness of the solution and relate it back to the results of the testing; candidates analyse the techniques they have used, identify what worked well and what not so well; candidates at the higher end of this mark band identify **one** area of their design that is particularly strong, indicating why this is so, and identify **one** area that could be improved, indicating how; Candidates describe strengths and weaknesses in their approach to the task;
		3	Candidates produce a critical analysis that takes account of the user feedback, together with strengths and weaknesses; they describe techniques that they could have made more use of and how these would make the task more effective; candidates suggest refinements to their solution; Candidates fully evaluate their approach to the task and suggest how they might improve in the future.

Unit G057: Database design

What candidates need to do:

Candidates need to produce: a relational database to meet a given specification requiring at least **three** related tables supported by design and analysis notes, technical and user documentation and an evaluation of the database produced.

Evidence needs to include:

a: [AO3] analysis and design notes [**6**];
b: [AO3] normalisation of the data model to 3rd normal form (NF) with documentation [**6**]
c: [AO1] a user interface including data input forms and methods of obtaining output [**9**];
d: [AO1] a working relational database [**6**];
e: [AO2] user and technical documentation [**8**];
f: [AO4] test plans and the results of the testing of the database [**9**];
g: [AO4] evaluation of the effectiveness of their solution and performance [**6**].

How the candidate will be assessed:

Task	Assessment Objective	Mark Band 1	Mark Band 2	Mark Band 3	Mark Awarded
a	**AO3**	The candidate produces analysis and design notes that present the initial data model **[0 1 2]**	The candidate produces analysis and design notes that use technical language fluently, and which includes the design of the user interface, and screen and printed reports; **[3 4]**	The candidate produces full and complete analysis and design notes that use technical language fluently and correctly, and which includes the design of the user interface, screen and printed reports. **[5 6]**	**/6**
b	**AO3**	The candidate shows, in a graphical form, the normalisation of the data model to 1st normal form; The candidate produces incomplete documentation that shows some of the entities, attributes, keys, relationships and internally-generated or processed data; **[0 1 2]**	The candidate shows the process of normalisation of the data model to 2nd normal form; The candidate produces an ERD in 2nd NF and documentation that shows all entities, attributes, keys, relationships and internally-generated or processed data; **[3 4]**	The candidate shows the process of the normalisation of the data model to 3rd normal form; The candidate produces an ERD in 3rd NF and produce complete and detailed documentation that shows all entities, attributes, keys, relationships and internally-generated or processed data. **[5 6]**	**/6**
c	**AO1**	The candidate produces a user interface and suitable and correct data input forms and provide straightforward means of obtaining output; **[0 1 2 3]**	The candidate makes effective use of validation and produces a user-friendly, well laid out user interface, and data input forms with title labels, field names, set widths, pull down lists and instructions, as appropriate; **[4 5 6]**	The candidate produces a fully-customised user interface that hides the underlying database from the user and provides input forms that allow data entry into multiple tables. **[7 8 9]**	**/9**
d	**AO1**	The candidate produces a working relational database that allows the user to append, delete and edit data, run queries and print reports; **[0 1 2]**	The candidate produces a working relational database; The candidate creates reports that make use of queries, using data from more than one related table, and include grouping or arithmetic formulae; **[3 4]**	The candidate produces a working relational database; The candidate creates reports that make correct and effective use of queries, using data from more than one related table, grouping and arithmetic formulae. **[5 6]**	**/6**

Unit G057: Database design (continued)					
Task	**Assessment Objective**	**Mark Band 1**	**Mark Band 2**	**Mark Band 3**	**Mark Awarded**
e	**AO2**	The candidate produces a user guide that enables a novice user to make effective use of the database; The candidate produces technical documentation that defines clearly and accurately the database structure, data relationships and the range of acceptable data; The candidate includes example output from queries and reports; **[0 1 2]**	The candidate makes good use of graphic images and use annotated screen prints to create effective user instructions for the database. The candidate produces technical documentation that defines clearly and accurately the database structure and data relationships; The candidate includes a data dictionary including the range of acceptable data and associated validation routines; The candidate includes example output from queries and reports; **[3 4 5]**	The candidate makes good use of graphic images and use annotated screen prints to create effective user instructions for the database; The candidate creates high-quality technical documentation that would enable someone else to recreate or maintain the database; The candidate define clearly and accurately the database structure and data relationships in the technical documentation; The candidate includes a data dictionary including the range of acceptable data and associated validation routines; The candidate includes example output from queries and reports. **[6 7 8]**	**/8**
f	**AO4**	The candidate plans and carries out basic test procedures to demonstrate that the database meets the specification, including ensuring that the user can append, delete and edit data successfully, and that the queries and reports generate the expected outcomes; Using the results of their testing the candidate comments on the operation of the database in relation to user needs; **[0 1 2 3]**	The candidate designs and carries out systematic test procedures, covering most aspects of the database; Using the results of their testing the candidate comments on the operation of the database, and how well it meets the specification; **[4 5 6]**	The candidate designs and carries out systematic and comprehensive test procedures covering all aspects of the database, including rejection of data outside the acceptable range; Using the results of their testing the candidate provide a crytical analysis of the operation of their database solution and how well it meets the specification. **[7 8 9]**	**/9**
g	**AO4**	The candidate comments on the effectiveness of the final solution identifying how well it meets the defined user requirements, with some identification of how the solution could be improved; The candidate evaluates aspects of their actions and role in solving the problem and identify areas for improvement; The candidate's report may contain errors in spelling, punctuation and grammar; **[0 1 2]**	The candidate provides an analysis of the final solution identifying how well it meets the defined user requirements and its strengths and weaknesses in order to identify how the solution could be improved; The candidate evaluates their own performance by identifying strengths and weaknesses, with some suggestions for improvement to the overall process; The candidate's report contains few errors in spelling, punctuation and grammar; **[3 4]**	The candidate provides a full critical analysis of the final solution identifying how well it meets the defined user requirements, taking into account user feedback in order to identify how the work could be improved in the future; The candidate evaluates their own performance by identifying strengths and weaknesses, and uses this analysis to show how they will address these issues to be more effective in the future; The candidate's report is consistently well-structured and there will be few, if any errors in spelling, punctuation and grammar. **[5 6]**	**/6**
				Total mark awarded:	**/50**

The further guidance below clarifies the criteria in the *Assessment Evidence Grid* and will help to determine the appropriate mark to be awarded for each strand of work.

Amplification of Criteria			
Task	**AO**	**Mark Band**	**Characteristics of the work one may expect to see at this mark band can be summarised as follows:**
a	**AO3**	**1**	Candidates produce design and analysis notes that present the initial data model; Candidates may not provide full and complete details of the analysis of the problem to be solved. The design notes do not fully cover the requirements of the end-user.
		2	Candidates produce analysis and design notes that use technical language fluently and correctly. Design notes also include sketched designs for the layout of the user interface and the screen and printed reports to be generated;
		3	Candidates produce full and complete design and analysis notes that use technical language fluently and correctly. The design notes include the design of the user interface, screen and printed reports.
b	**AO3**	**1**	Candidates show how they normalised the initial data model to at least 1st normal form; Candidates produce incomplete documentation that shows some of the entities, attributes, keys, relationships and internally-generated or processed data;
		2	Candidates show the process of normalisation of the data model to 2nd normal form. Candidates produce an ERD in 2nd NF and documentation showing all entities, attributes, keys, relationships and internally-generated or processed data,
		3	Candidates show the process of the normalisation of the data model to 3rd normal form; Candidates produce an ERD in 3rd NF and produce complete and detailed documentation showing all entities, attributes, keys, relationships and internally-generated or processed data.
c	**AO1**	**1**	Candidates produce a simple user interface. Candidates produce simple but correct data input forms that allow the user to input data; Candidates also provide straightforward methods of obtaining specific output such as the use of a switchboard or macro buttons
		2	Candidates produce a user-friendly user interface. Candidates apply appropriate validation rules to some input data. Data input forms are well laid out and user friendly, with suitable labels, instructions and pull-down lists for limited data sets;
		3	Candidates make use of the facilities available in the database management software to create a fully customised solution that hides the underlying database from the user; This includes input forms with sub-forms that allow the entry of data into multiple tables.

Task	AO	Mark Band	Characteristics of the work one may expect to see at this mark band can be summarised as follows:
d	AO1	1	Candidates use the data model they have developed to create a database to meet the specification; Where the data model is weak, candidates may need to make changes to implement the database successfully; As well as enabling the user to append, delete and edit data, the database needs to allow the user to access queries and print reports that candidates have provided; The range of queries and reports provided is limited;
		2	Candidates provide a range of reports for the user that are based on appropriate queries, include data from more than **one** related table and include the use of grouping or arithmetic formulae; Candidates use of queries, grouping and arithmetic formulae may not work or be entirely correct;
		3	Candidates provide a range of reports for the user that are based on appropriate queries, include data from more than **one** related table and include the use of grouping and arithmetic formula; Candidate's use of queries, grouping and arithmetic formulae works and is entirely correct and effective in their use.
e	AO2	1	Candidates produce a user guide which gives instructions on how to input data and obtain output from the database created, **not** how to use the DBMS to generate queries and design reports; The instructions tell the user how to start the database, how to append, delete and edit records and how to use queries and produce reports; The technical documentation includes details of the structure and data relationships actually implemented (which may differ from the data model); Some details of entities and attributes, including data type, length, whether a key, any validation rules and the range of acceptable data is included; Example outputs from the available queries and reports are included; Test procedures include ensuring that the user can append, delete and edit data successfully, and that the queries and reports generate the expected outcomes;
		2	Both the user guide and technical documentation include the effective use of graphic images, including annotated screen prints, to demonstrate the actions being described; The Data Dictionary includes details of all entities and attributes, including data type, length, whether a key, any validation rules and the range of acceptable data
		3	The technical documentation includes full details of the data model and database implementation, such that someone else could recreate or maintain it.
f	AO4	1	Candidates plan and carry out the test procedures include ensuring that the user can append, delete and edit data successfully, and that the queries and reports generate the expected outcomes; Using the results of their testing candidates make brief comments on how well their database works in relation to user needs;
		2	Candidates design and implement systematic test procedures covering most aspects of the database. to ensure that the database works reliably, e.g. that any buttons and/or switchboard items work and that the user can access all input screens, queries and reports; Candidates comment on how well the database operates and how well it meets the specification, e.g. identifying aspects of the specification that have not been met;
		3	Candidates design and implement systematic testing covering all aspects of the database and includes testing of acceptable, unacceptable and boundary input data to ensure that data outside the acceptable range is rejected; Candidates provide a critical analysis of the operation of their database solution that includes consideration of how well it meets the specification.

g	**AO4**	**1**	Candidates produce an evaluation identifying how well their solution meets the defined user requirements. Some identification of how the solution could be improved is included. Candidates make brief comments on how they tackled and solved the problem, identifying areas for improvement; The report may contain errors in spelling, punctuation and grammar;
		2	Candidates provide an analysis of the final solution identifying how well it meets the defined user requirements and its strengths and weaknesses in order to identify how the solution could be improved. Candidates produce an analysis of their own performance by identifying strengths and weaknesses, with some suggestions for improvement to the overall process; The report contains few errors in spelling, punctuation and grammar;
		3	Candidates provide a full critical analysis of the final solution identifying how well it meets the defined user requirements, taking into account user feedback in order to identify how the work could be improved in the future. Candidates evaluate their own performance by identifying strengths and weaknesses, and use this analysis to show how they will address these issues to be more effective in the future; The report is consistently well-structured and there will be few, if any errors in spelling, punctuation and grammar.

Unit G058: Developing and maintaining ICT systems for users

What candidates need to do:

Candidates need to produce: records of specifying, upgrading and repairing ICT systems. Evidence needs to include:

a: [AO3] records of interviews with **two** different users to identify their key requirements [**6**];

b: [AO2] detailed specifications for an ICT system for **each** user, along with explanations of the reasons for selecting particular components, in non-technical language [**8**];

c: [AO1] records of carrying out an upgrade involving selecting and adding a new component to a system [**8**];

d: [AO1] records of carrying out an upgrade by replacing a component in a system [**7**];

e: [AO3] records of troubleshooting procedures carried out to identify faulty components [**6**];

f: [AO4] an evaluation of the information sources used to find information on components [**7**];

g: [AO4] an evaluation of the specifications and approaches taken to specifying, upgrading and repairing systems [**8**].

How the candidate will be assessed:

Task	Assessment Objective	Mark Band 1	Mark Band 2	Mark Band 3	Mark Awarded
a	**AO3**	The candidate plans some questions to ask each user and uses their responses to analyse each user's needs and establish their key requirement; **[0 1 2]**	The candidate plans detailed questioning of each user and uses their responses to analyse each user's needs and establish their key requirement; **[3 4]**	The candidate plans and uses in-depth questioning to analyse each user's needs and establish their key requirement, asking supplementary questions and/or re-interviewing the user(s) as necessary. **[5 6]**	**/6**
b	**AO2**	The candidate specifies, for **each** system, at least **one** of **each** of the following components: – micro-processor and associated components; – display system; – memory; – storage device; – input device; – output device; and includes, in the specification for each component, details of type, size, speed, method of connection, bus type, type of case, device controllers and other cards, as appropriate; The candidate explains, in language that can be understood by each user, the characteristics of components that relate to their requirements; **[0 1 2 3]**	The candidate uses a range of sources of information, such as computer magazines, technical manuals, text books and the internet to gather information about the components listed in Mark Band 1, and their prices and configurations, in order to advise each user of configurations which closely match the requirements, renegotiating these if necessary and amending their specification to meet the revised requirements; The candidate explains, in language that can be understood by each user, the characteristics of components that relate to their requirements and justify their choice of each configuration by matching it to the user's key requirements; **[4 5 6]**	in addition to the requirements of Mark Bands 1 and 2, the candidate provides a detailed explanation of the impact on their recommended systems of the compatibility of the recommended components and other factors such as cost and availability; The candidate includes advice about 'future-proofing' in their report to each user. **[7 8]**	**/8**

Unit G058: Developing and maintaining ICT systems for users (continued)					
Task	**Assessment Objective**	**Mark Band 1**	**Mark Band 2**	**Mark Band 3**	**Mark Awarded**
c	**AO1**	The candidate determines a user's needs for an upgrade and selects components that meet the user's needs and that are compatible with the existing system; The candidate carries out an upgrade that requires the addition of a single component, following correct procedures; **[0 1 2 3]**	The candidate determines a user's needs for an upgrade and recognises the limitations of the existing system when recommending and selecting components to upgrade it; The candidate carries out an upgrade that requires the BIOS to be reset and/or reconfiguration of the operating system, following correct procedures; **[4 5]**	The candidate determines a user's needs for an upgrade and selects components for an upgrade, recognising the limitations of the existing system and identifying any additional components or reconfiguration required; The candidate carries out an upgrade where such additional components and/or reconfiguration are required, as well as an upgrade that requires the BIOS to be reset, following correct procedures. **[6 7 8]**	**/8**
d	**AO1**	The candidate upgrades a system by replacing **one** component with another that is compatible with the existing system, following correct procedures; **[0 1 2]**	The candidate upgrades a system where the upgrade of **one** component requires the replacement of another, following correct procedures; **[3 4 5]**	The candidate carries out an upgrade to a system where the upgrade of **one** component requires the replacement of another and that requires the BIOS to be replaced or upgraded, following correct procedures; **[6 7]**	**/7**
e	**AO3**	The candidate uses a systematic approach to identifying the component that is causing a system to fail, keeping brief records of problems and solutions; **[0 1 2]**	The candidate uses a systematic approach, including the use of testing tools and procedures, to identifying the component that is causing the system to fail, keeping detailed records of problems and solutions; **[3 4]**	The candidate uses a systematic approach, including the use of testing tools and procedures and locating information on hardware error messages, to help them identify the component that has caused a system to fail, keeping a detailed problem log that indexes problems and solutions to help solve similar problems in the future. **[5 6]**	**/6**
f	**AO4**	The candidate compares the information sources used when specifying and upgrading systems in terms of their accuracy, currency and relevance;**[0 1 2 3]**	The candidate evaluates the accuracy, currency and relevance of the information sources they have used when specifying and upgrading systems; **[4 5]**	The candidate provides a critical analysis of the information sources they have used when specifying and upgrading systems in terms of their accuracy, currency and relevance; **[6 7]**	**/7**
g	**AO4**	The candidate comments on how well their specifications met the needs of the users and the effectiveness of the approach they took to specifying, upgrading and repairing ICT systems; The candidate's report may contain errors in spelling, punctuation and grammar; **[0 1 2]**	The candidate identifies strengths and weaknesses in their specifications in relation to the needs of the users and the approach they took to specify, upgrading and repairing ICT systems, recommending improvements; The candidate's report will contain few spelling, punctuation and grammar errors; **[3 4 5]**	The candidate provides a critical analysis of their specifications in relation to the needs of the users, taking into account user feedback, and of the approach they took to specifying, upgrading and repairing ICT systems, suggesting how they would refine them in the future; The candidate's report will be consistently well-structured and there will be few, if any, spelling, punctuation and grammar errors. **[6 7 8]**	**/8**
				Total mark awarded:	**/50**

The further guidance below clarifies the criteria in the *Assessment Evidence Grid* and will help to determine the appropriate mark to be awarded for each strand of work.

Amplification of Criteria			
Task	**AO**	**Mark Band**	**Characteristics of the work one may expect to see at this mark band can be summarised as follows:**
a	**AO3**	**1**	Candidates plan some straightforward questions to ask each user and use the information provided to identify each user's key requirements;
		2	Candidates interview users to establish their key requirements, planning the detailed questions they ask in advance;
		3	In addition, candidates use supplementary questions to gain precise information from users that enables them to establish each user's key requirements – this may involve interviewing a user again.
b	**AO2**	**1**	Candidates specify components for **each** different systems as indicated – users need to be chosen to enable candidates to specify very different systems; Candidates use non-technical language to explain to the users the characteristics of the components chosen and relate these to the users' requirements;
		2	Candidates use a range of sources of information, both paper-based and on-line, to gather the information they require; Candidates renegotiate requirements with the user, e.g. by suggesting a slight increase in cost to enable the performance requirements to be met fully, or replacing a component that is unavailable with another that has a different specification, candidates then amend the specification to take account of such changes; Candidates use non-technical language to explain to the users the characteristics of the components chosen and relate these to the users' requirements, justifying the components chosen by matching each configuration chosen to the user's key requirements ;
		3	In addition, candidates explain in detail how the compatibility of components, as well as other factors such as cost and availability affect the systems they recommend; Candidates also give advice to users on future-proofing the systems recommended, e.g. how they allow for enhancement or upgrading.
c	**AO1**	**1**	Candidates find out from a user what they want an upgrade to a system to achieve and select suitable components to upgrade the system, e.g. adding a graphics card; Candidates carry out an upgrade by adding a single compatible component, following correct procedures including anti-static, rules and regulations relating to electrical equipment and health and safety guidelines – this may be different from the upgrade specified, depending on equipment availability; Candidates check that the upgrade has been carried out successfully;
		2	Additionally, candidates identify when a required upgrade is not possible due to the limitations of the existing system; Candidates upgrade a system by adding a component that requires the BIOS to be reset, e.g. adding USB ports, or the operating system to be reconfigured, e.g. adding a network interface card (NIC);
c	AO1	**3**	Additionally, candidates select suitable components, including any additional components or reconfiguration required, to upgrade the system; Candidates select components for, and carry out, an upgrade that requires additional components or reconfiguration of the system, e.g. the addition of an IDE storage device.

Task	AO	Mark Band	Characteristics of the work one may expect to see at this mark band can be summarised as follows:
d	AO1	1	Candidates carry out the simple upgrade of a system by replacing **one** device with another, e.g. replacing a hard-disk drive with **one** of higher capacity; Candidates carry out the upgrade, following correct procedures including anti-static, rules and regulations relating to electrical equipment, and health and safety guidelines; Candidates check that the upgrade has been carried out successfully;
		2	Candidates carry out an upgrade that requires the replacement of more than **one** component, e.g. where replacing the CPU also requires the replacement of the motherboard;
		3	Candidates carry out an upgrade where changing a component requires the BIOS to be changed or upgraded, e.g. replacing the CPU with a newer model that requires the BIOS to be upgraded.
e	AO3	1	Candidates use a systematic approach to identifying the component that has caused a system to fail involving a range of straightforward methods, such as observation, questioning, simple diagnostic tests and component swapping; Candidates keep a log that identifies each problem and outlines how it was solved;
		2	Additionally, candidates use; use testing tools, such as disk scanners and memory testers, to help them identify the component that has caused a system to fail; Candidates keep a log that describes each problem and its solution in detail, so that a similar problem could be solved in future;
		3	Additionally, candidates use hardware manuals or sites on the internet to locate information on hardware error messages; Candidates index their problem log to easily locate solutions to specific problems when they occur again.
f	AO4	1	Candidates, for example, use more than **one** source to confirm the accuracy of information, use only information that is relevant to the specification being developed, and check the date of publication of the information, using the most up-to-date; Candidates include a comparison of different information sources such as books, magazines, suppliers' catalogues and websites;
		2	Candidates include an evaluation of the information sources used based on their accuracy, relevance and currency
		3	Candidates critically analyse the information sources used, providing the advantages and disadvantages of each in terms of their accuracy, currency and relevance.
g	AO4	1	Candidates provide brief comments matching each specification to the needs of the user; Candidates also provide brief comments on the effectiveness of their approach to specifying, upgrading and repairing ICT systems;
		2	Candidates identify aspects of their specifications that fully met the user's needs and aspects that did not; Candidates also identify approaches to specifying, upgrading and repairing ICT systems that worked well and those that worked less well or did not work; Candidates suggest some ways to improve their performance;
		3	Candidates provide a detailed and critical evaluation of their work that draws on feedback from the users involved; Candidates suggest ways of refining their approach to future specification, upgrading and repairing tasks.

Unit G059 - Assessment Evidence Grid

Unit G059: ICT solutions for people with individual needs

What candidates need to do:

Candidates need to produce: a report or presentation for ICT solutions which assesses the needs, defines ICT solutions and evaluates the solutions in response to **three** case studies. Each of the individuals in these case studies will have different needs and candidates need to include **one** case study that relates to an individual who has sensory needs.

Evidence needs to:

a: [AO2] show an understanding of legislation and the rights of each of the individuals in connection with the candidate's ICT solutions [**4**];

b: [AO2] show a clear understanding of the disabilities or limiting factors and resultant needs, identify and show suitable items of equipment and software as appropriate [**4**];

c: [AO4] evaluate the viability and effectiveness of candidate's proposed solutions, indicating how the solutions will enhance the quality of life for each individual [**9**];

d: [AO1] present reports or presentations in a way that is suitable for the needs of the individuals outlined in each case study, or for a carer if the case study is that of a young child or a person with very limited understanding [**6**].

e: [AO1/3/4] for at least **one** case study, provide a specification for a complete system, to include configuration and customisation of software and equipment as appropriate and demonstrate that candidates can customise the available operating system and applications evaluating their actions and role in solving this problem, [**27**];

How the candidate will be assessed:

Task	Assessment Objective	Mark Band 1	Mark Band 2	Mark Band 3	Mark Awarded
a	**AO2**	The candidate describes the current legislation that affects the requirements for support for people with individual needs; **[0 1]**	The candidate describes some implications of the current legislation that affects the requirements for support for people with individual needs; **[2 3]**	The candidate fully explains the implications of the current legislation that affects the requirements for support for people with individual needs. **[4]**	**/4**
b	**AO2**	The candidate describes ICT solutions for each of the **three** users, describing suitable equipment for use by each of them and alternative equipment available; **[0 1 2]**	The candidate describes ICT solutions for each of the **three** users, explains the reasons for their choice of equipment in each ICT solution and shows how their knowledge, skills and understanding of the development of specialised equipment have led to their conclusions; **[3]**	The candidate describes ICT solutions for each of the **three** users, explains the reasons for their choice of equipment in each ICT solution and show how their knowledge, skills and understanding of the development of specialised equipment have led to their conclusions; The candidate considers the effectiveness of their recommended solutions and compares them with an alternative solution. **[4]**	**/4**

Unit G059: ICT solutions for people with individual needs (continued)					
How the candidate will be assessed:					
Task	**AO**	**Mark Band 1**	**Mark Band 2**	**Mark Band 3**	**Mark Awarded**
c	**AO4**	The candidate comments on how the solutions will enhance the quality of life for the user in each case study; **[0 1 2 3]**	The candidate identifies some strengths and weaknesses of their suggestions for ICT solutions and describes how the solutions will enhance the quality of life for the user in each case study; **[4 5 6]**	The candidate fully analyses the strengths and weaknesses of their suggestions for ICT solutions and includes a full discussion of how the solution will enhance the quality of life of each user, giving consideration to realistic aims and objectives. **[7 8 9]**	**/9**
d	**AO1**	The candidate presents their recommendations for each user in a way that is easy for the user to follow; **[0 1 2]**	The candidate has specifically used a media, format and style for their recommendations for each user – or a sub-set of them – to suit the special needs of the user; **[3 4]**	The candidate produces well-presented accurate information in their recommendations of ICT solutions for each user, using a media, format and style to suit the special needs of the user; The candidate verifies the accuracy of the information by showing that they have used a wide variety of sources. **[5 6]**	**/6**
e(i)	**AO3**	The candidate produces a specification for a system that meets the individual's needs for **one** of the users, including configuration of some software and equipment; **[0 1 2]**	The candidate produces a specification for a system that provides an effective solution for the individual, including configuration of most software and equipment, **[3 4]**	The candidate produces a specification for a system that provides an effective solution, *with alternative suggestions*, including configuration of all software and equipment. **[5 6]**	**/6**
e(ii)	**AO3**	The candidate identifies how the configuration of recommended items will meet the individual's needs of **one** of the users; **[0 1 2]**	The candidate explains how the configurations will meet the individual's needs; **[3 4]**	The candidate explains how the configurations *of* the proposed solution and the alternatives will meet the individual's needs. **[5 6]**	**/6**
e(iii)	**AO1**	The candidate gives a practical demonstration of *partially* customising the operating system, application software and the hardware; **[0 1 2 3]**	The candidate gives a practical demonstration of *completely* customising the operating system, application software and the hardware; **[4 5 6]**	The candidate gives a practical demonstration of *completely* customising the operating system, application software and the hardware, to provide an effective solution for the user. **[7 8 9]**	**/9**
e(iv)	**AO4**	The candidate comments on their actions and how effective their method was to find information and provide a specification and identifies areas for improvement; **[0 1 2]**	The candidate includes an analysis on their own performance on how effective their method was to find information and provide a specification by identifying strengths and weaknesses, with some suggestions for improvement to the overall process; **[3 4]**	The candidate includes an analysis on their own performance on how effective their method was to find information and provide a specification by identifying strengths and weaknesses and uses this analysis to show how they will address these issues to be more effective in the future. **[5 6]**	**/6**
				Total mark awarded:	**/50**

The further guidance below clarifies the criteria in the *Assessment Evidence Grid* and will help to determine the appropriate mark to be awarded for each strand of work.

Amplification of Criteria			
Task	**AO**	**Mark Band**	**Characteristics of the work one may expect to see at this mark band can be summarised as follows:**
a	**AO2**	**1**	Candidates show awareness of current and relevant legislation relating to support for people with individual and special needs; the list includes United Kingdom and European law; this may be in the form of a report and does not need to be replicated for each case study;
		2	candidates expand on the list of legislation, giving an explanation of how the legislation relates to people with individual and special needs;
		3	candidates further expand on the basic list of legislation, reflecting on the effectiveness of examples of the legislation, and evaluating the effectiveness; there may be reference to opinions and comments from special needs users.
b	**AO2**	**1**	Candidates review the needs of the individuals in **three** case studies who have different individual or special needs; the case studies chosen reflect a variety of different needs so that candidates can provide different technology-based solutions for each of the case studies, and **at least one** of the case studies includes a sensory disability; candidates explore solutions relating to the **three** different needs and describe some of the range of equipment available that is suitable for each user;
		2	additionally, candidates explaining why they have chosen the equipment for each user, how the user will benefit from the solution and what the limitations are likely to be;
		3	candidates also consider the effectiveness of the proposed solution and compare it with an alternative solution, considering such areas as ease of use, cost and suitability to the user's needs.
c	**AO4**	**1**	Candidates comment on how the **three** case study solutions will enhance the quality of life by enabling the individuals to achieve greater independence or to do something that was previously more difficult or impossible to achieve;
		2	candidates identify aspects of their solutions that fully meet the needs of each individual and others that do not; candidates describe how their solution for each individual will enhance that individual's quality of life;
		3	candidates analyse the strengths and weaknesses of all **three** solutions, including a detailed discussion of how the solutions could realistically enhance the quality of life for each user.
d	**AO1**	**1**	Candidates present their findings using non-technical language that is appropriate to the individual in the case study;

Task	AO	Mark Band	Characteristics of the work one may expect to see at this mark band can be summarised as follows:
d	**AO1**	**2**	candidates consider the specific abilities and disabilities of the user in the case study, matching their report, or a sub-set of the report, to the individual needs – this may include large print or an audio-cassette version for a user with impaired vision, or a simplified version for a user with a learning difficulty; candidates could also present a sub-set of the information verbally in a simulation; it may not be necessary to present all **three** cases in this way, but the remaining presentations must still be appropriate to the understanding and ability of the individual;
		3	additionally, candidates present all case studies to a high standard, checking and verifying the recommendations and making sure the reports are accurate; they acknowledge the sources of information;
e(i)	**AO3**	**1**	Candidates produce a specification for a system for **one** of the **three** users, that will go some way to meeting their needs – the candidate will not include details of the configuration required for all software and equipment specified;
		2	candidates produce a full and itemised specification for an appropriate system, including most customisation, training and support that may be needed, in order that the user in the case study can achieve full potential; candidates provide a solution which clearly meets the needs of the case study, is **practical, useable** and **economically viable**;
		3	candidates produce a full and itemised specification for an appropriate system, including most customisation, training and support that may be needed, in order that the user in the case study can achieve full potential; candidates provide a solution which clearly meets the needs of the case study, is **practical, useable** and **economically viable**; candidates expand further on the proposed solution, showing alternative solutions
e(ii)	**AO3**	**1**	Candidates show an understanding of the needs of **one** user and explain the effectiveness of the solution, as matched to their identified individual and special needs;
		2	candidates are able to explain how their solution meets the needs of the user in the case study, and is **practical, useable** and **economically viable**;
		3	candidates explain the reason for the recommendation made as compared to the alternatives; candidates clearly show how both the recommended and alternative solutions will meet the needs of the individual.

e (iii)	**AO1**	**1**	Candidates are observed customising application and system software for **one** user and support this with a description of what they have done with before and after photographs or screen prints – not all of the possible customization will be carried out; customising hardware may, of necessity, be limited to something basic, such as exchanging the mouse for a trackerball; care should be taken to select the case study that gives the candidate the best opportunity to show customising skills;
		2	candidates expand on this by customising all possible aspects; candidates at the higher end of this mark band customise further applications, adding relevant hardware or selecting more appropriate hardware, e.g. a printer that is easier to use by someone who has limited hand movement;
		3	candidates show how the actions taken will produce an effective solution for the user; candidates show an understanding of the abilities and disabilities of the user for whom the customising was carried out.
e (iv)	**AO4**	**1**	Candidates make brief comments on how effective their method was to find information and provide a specification for **one** user; they suggest simple improvements to their method;
		2	candidates' evaluations consider both good, and not so good, features of each method used to find information and provide a specification; candidates provide sensible suggestions as to how each method could be improved;
		3	candidates **analyse** their actions in solving the problem and, based on this analysis, identify all strengths and weaknesses of their actions; candidates suggest and justify substantial improvements to the overall process – these improvements deal with those areas identified in the initial analysis and subsequent identification of strengths and weaknesses.

Appendix C: Guidance for the Production of Electronic Coursework Portfolio

Structure for evidence

A Coursework portfolio is a collection of folders and files containing the candidate's evidence for each unit. 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 candidate's centre number, candidate number, surname and forename, together with the Unit code, so that the portfolio is clearly identified as the work of one candidate.

Each candidate's Coursework portfolio should be stored in a secure area on the centre network. Prior to submitting the Coursework portfolio to OCR, the centre should add a folder to the folder tree containing Coursework mark sheets.

Data formats for evidence

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

Candidates 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.

Electronic Coursework is designed to give candidates an opportunity to demonstrate what they know, understand and can do using current technology. Candidates do not gain marks for using more sophisticated formats or for using a range of formats. A candidate 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 advise 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 candidate.

Accepted File Formats
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)