

AS/A Level GCE

GCE ICT

OCR Advanced Subsidiary GCE in ICT H117

OCR Advanced GCE in ICT H517

Vertical black lines indicate a significant change to the previous printed version.

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1 About these Qualifications

This booklet contains OCR's Advanced Subsidiary GCE and Advanced GCE specifications in ICT for teaching from September 2008.

In today's world, where ICT is constantly changing, individuals will increasingly need technological and information literacy skills that include the ability to gather, process and manipulate data. These skills are now as essential as the traditional skills of numeracy and literacy.

The impact of ICT on society is enormous and as the percentage of businesses and households connected to communication networks such as the internet grows, so does the need for individuals who can master and manipulate these new technologies. As well as the rapid development of new technologies that gather, organise and share information, familiar technologies like television, telephone and computers are evolving and being expanded by digitised information, causing a convergence of technologies.

GCE ICT encourages students to become discerning users of ICT. It allows them to develop a broad range of ICT skills, knowledge and understanding. This could form a basis for progression into further learning, including progression from AS to A2, and/or employment.

1.1 The Two-Unit AS

The Advanced Subsidiary (AS) GCE is both a 'stand-alone' qualification and also the first half of the corresponding Advanced GCE. 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 (as of September 2008) is made up of **two** mandatory units, which form 50% of the corresponding four-unit Advanced GCE.

AS Unit G061 is externally assessed, and AS Unit G062 is internally assessed through coursework.

1.2 The Four-Unit Advanced GCE

The Advanced GCE (from September 2008) is made up of **two** mandatory units at AS and **two** further units at A2. Of the A2 units, G063 is externally assessed, and G064 is internally assessed through coursework.

1.3 Qualification Titles and Levels

These qualifications are shown on a certificate as:

- OCR Advanced Subsidiary GCE in ICT;
- OCR Advanced GCE in ICT.

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

1.4 Aims

The aims of these specifications are to encourage candidates to develop:

- the capacity to think creatively, innovatively, analytically, logically and critically;
- the skills to work collaboratively;
- the ability to apply skills, knowledge and understanding of ICT in a range of contexts to solve problems;
- an understanding of the consequences of using ICT on individuals, organisations and society and of social, legal, ethical and other considerations on the use of ICT;
- an awareness of emerging technologies and an appreciation of the potential impact these may have on individuals, organisations and society.

1.5 Prior Learning/Attainment

No prior knowledge of ICT is assumed, although the specifications develop the aims of GCSE specifications in ICT by enhancing and broadening the range and the understanding of the capabilities of applications and information systems studied. The use of a range of tools and techniques is required to solve more extensive and more complex problems.

2 Summary of Content

2.1 AS Units

Unit G061: *Information, Systems and Applications*

- Data, information, knowledge and processing
- Software and hardware components of an information system
- Characteristics of standard applications software and application areas
- Spreadsheet concepts
- Relational database concepts
- Applications software used for presentation and communication of data
- The role and impact of ICT – legal, moral and social issues

Unit G062: *Structured ICT Tasks*

- Design
 - Software development
 - Testing
 - Documentation
-

2.2 A2 Units

Unit G063: *ICT Systems, Applications and Implications*

- The systems cycle
- Designing computer-based information systems
- Networks and communications
- Applications of ICT
- Implementing computer-based information systems
- Implications of ICT

Unit G064: *ICT Project*

- Definition, investigation and analysis
 - Design
 - Software development, testing and installation
 - Documentation
 - Evaluation
-

3 Unit Content

3.1 AS Unit G061: *Information, Systems and Applications*

This unit covers the fundamental knowledge required to support all subsequent units of study. It is intended to provide candidates with a deeper understanding and knowledge of basic concepts covered by a GCSE (Short Course) syllabus in ICT; however, the depth of study is at AS Level and candidates are expected to respond appropriately and fully to question papers.

3.1.1 Data, Information, knowledge and processing

Content

- data information and knowledge;
- types of data;
- sources of data;
- static and dynamic data;
- quality of information;
- encoding data;
- validation and verification;
- back-up and archive;
- cost of information;
- input-process-output-feedback loop.

Learning outcomes

Candidates should be able to:

- a. describe the term data, using an example, clearly identifying the fact that data has no meaning;
- b. describe what is meant by the term information, using an example to show how data can become information through the use of context, structure and meaning;
- c. compare different methods used to convey information: text, pictures, videos, animation, sound and LED, and give advantages, disadvantages and examples of the use of each;
- d. describe what is meant by the term knowledge, distinguishing the difference between information and knowledge;
- e. describe different data types: Boolean, real, integer, string, date/time, selecting an appropriate data type for a given situation;
- f. give examples of different sources from which data can be derived, for example, gathered from original source or gathered from an indirect source and explain the advantages and disadvantages of using each source;
- g. describe the terms static and dynamic data and compare the use of static information sources (eg CD-ROM) with dynamic sources (eg the internet);

- h. describe the following and how they can affect the quality of the information produced: accuracy, relevance, age, completeness, presentation, level of detail;
- i. explain the advantages and disadvantages of encoding data, and describe different methods that can be used to encode data;
- j. describe and give examples of the following validation methods: range, type, check digit (modulus 11 and ISBN), length, lookup, picture/format and presence, and their purpose, indicating that these methods can only ensure reasonable data is input to a system and that there is no certainty of accuracy;
- k. describe and give examples of the following verification methods: double entry with automatic comparison and proof reading, and understand that verification does not ensure the data is correct but that it is entered correctly and reduces errors;
- l. describe the difference between backing up and archiving of data and give reasons why they are necessary;
- m. describe the costs of producing information in terms of hardware, software, consumables and personnel;
- n. describe the terms input, processing, output, storage and feedback, drawing a diagram to illustrate how they are related.

3.1.2 Software and hardware components of an information system

Content

- difference between hardware and software;
- input, output and storage devices;
- specialist hardware devices;
- specialist software devices;
- types of software;
- user interfaces.

Learning outcomes

Candidates should be able to:

- a. describe the difference between hardware and software, and explain the lack of standardisation affecting both hardware and software;
- b. identify an appropriate input, output or storage device for a given situation and justify the choice made;
- c. describe specialist hardware devices for physically disabled users: puff-suck switch, foot mouse, eye typer, Braille printers, keyboards, speakers and microphones and justify their use for given situations;
- d. describe specialist software for physically disabled users: predictive text, sticky keys, zoom and voice recognition and justify their use for given situations;
- e. describe different types of software (operating systems, user interfaces, utilities, applications software) and give examples of how and where each type of software would be used;

-
- f. describe the characteristics of different styles of user interface, command-based, forms, dialogue, natural language, wimp interfaces (windows, icons, menus, pointer), and their appropriate uses.

3.1.3 Characteristics of standard applications software and application areas

Content

- types of applications software used for basic tasks;
- characteristics of systems;
- wizards, style sheets, templates and macros
- design considerations and tailoring of data entry screens;
- house style;
- master documents and slides;
- file types.

Learning outcomes

Candidates should be able to:

- a. describe different types of applications software and justify their use for given tasks;
- b. describe the characteristics and use of the following systems: personnel, stock control, invoicing, booking, timetabling, route finding and training I
- c. describe the purpose and characteristics of wizards, style sheets, templates and macros, describing the advantages and disadvantages of their use;
- d. describe the design considerations for tailored data-entry screens;
- e. describe how standard/generic applications software can be tailored using buttons, forms, form controls, menus and templates and give examples of the use of each;
- f. explain the advantages and disadvantages of tailoring standard/generic applications software;
- g. explain why an organisation needs a consistent house style;
- h. describe how master documents/slides, styles, style sheets and templates can be used to create a consistent house style;
- i. explain the need for different file types and the advantages and disadvantages of having different file types

3.1.4 Spreadsheet concepts

Content

- characteristics of modelling software;
 - variables, formulae, functions and rules;
 - worksheets, workbooks, rows, columns, cells, ranges;
 - absolute and relative referencing.
-

Learning outcomes

Candidates should be able to:

- a. describe the characteristics of modelling software and give reasons why a model might be used;
- b. describe how variables, formulae, rules and functions are used in modelling software;
- c. describe how a data model may be used for answering 'what-if?' questions and explain the advantages of being able to answer such questions using a spreadsheet;
- d. describe and explain the purpose and use of worksheets, workbooks, rows, columns, cells and ranges in spreadsheet software;
- e. describe absolute and relative cell referencing, and give examples of uses of each method;
- f. explain the advantages and disadvantages of using a spreadsheet to create and run simulations.

3.1.5 Relational database concepts

Content

- database terminology;
- advantages and disadvantages of normalisation;
- data dictionary;
- entity relationship diagrams;
- characteristics of first, second and third normal form;
- select data types;
- queries.

Learning outcomes

Candidates should be able to:

- a. describe the terms typically used in relational database terminology: tables, primary keys, fields, records, relationships, foreign keys, duplicate data, referential integrity, entity, attribute, explaining the role and purpose of each;
 - b. identify tables, records, fields, primary keys and foreign keys, and interpret and create entity relationship diagrams for a given scenario;
 - c. identify the characteristics of data in unnormalised (0NF), first normal form (1NF), second normal form (2NF) and third normal form (3NF);
 - d. describe the advantages and disadvantages of normalisation;
 - e. describe the components of a data dictionary;
 - f. select appropriate data types for a given set of data, and explain the advantages and disadvantages of alternative data types;
 - g. describe dynamic and static parameter queries and simple and complex queries and explain when and how they might be used, giving examples of use.
-

3.1.6 Applications software used for presentation and communication of data

Content

- characteristics of documents;
- mail merge;
- reformatting documents to meet the needs of an application;
- clip art and thumbnail images;
- vector and bitmap graphics;
- graphic libraries;
- features of presentation software.

Learning outcomes

Candidates should be able to:

- a. describe the characteristics of documents: character, paragraph, sections, frames, headers, footers, footnotes and pages, and how they should be used;
- b. describe how word processing and desktop publishing (DTP) software can be used with data from a spreadsheet or database for mail merge, and describe the advantages and disadvantages of using this technique;
- c. describe how a document can be reformatted to suit the needs of a given application;
- d. describe the advantages and disadvantages of using clip art images and collections of thumbnail images;
- e. describe the differences between vector and bitmap graphics and evaluate their suitability for given applications;
- f. describe the advantages and disadvantages of using graphic libraries and their use in the following applications: interior design, landscaping, cartography and network design;
- g. compare image libraries, clipart libraries and graphic libraries;
- h. describe the features of presentation software: text, images, sound, video, animation, slide transition, hyperlinks, hotspots, buttons;
- i. compare delivering a presentation using printed acetate and using a computer and projector describing the advantages and disadvantages of each;
- j. compare and give advantages and disadvantages of different modes of navigation (automatic and manual transition) and identify and give examples of when the use of each method is more suitable;
- k. describe nonlinear and hierarchical presentations giving the advantages and disadvantages of each. Identify and give examples of where each may be more suitable.

3.1.7 The role and impact of ICT

Content

- impact of ICT;
- future developments of ICT;
- legal aspects of ICT;
- combating ICT crime and protecting ICT systems;
- networking computers;
- standards in ICT;
- health and safety.

Learning outcomes

Candidates should be able to:

- a. discuss the impact of ICT on society, organisations and individuals;
- b. discuss possible future developments in ICT and their impact on the following areas: transport, medicine, the disabled, education, entertainment, digital piracy, shopping, marketing and communication;
- c. discuss the main aspects, purpose and implications of the Data Protection Act (1998), Computer Misuse Act (1990), Copyright, Designs and Patents Act (1988), Regulation of Investigatory Powers Act (2000), Electronic Communications Act (2000) and Freedom of Information Act (2000) and subsequent changes/updates;
- d. explain methods for combating ICT crime and protecting ICT systems: physical security, firewalls, backup, encryption, biometric security, software patches/updates, 'anti-virus' and anti-spyware software, access rights, auditing, education of users, user IDs, passwords and methods for ensuring passwords remain effective;
- e. describe the advantages and disadvantages of networking computers;
- f. describe the purpose and activities of professional bodies, eg BCS;
- g. explain the advantages and disadvantages of belonging to a professional body;
- h. describe health problems related to working with ICT: repetitive strain injury, carpal tunnel syndrome, ulnar neuritis, deep vein thrombosis, eyesight defects, fatigue, backache and stress;
- i. describe safety problems related to working with ICT: trailing wires, risk of fire and electrocution, unsecured equipment, food and drink and proximity to water;
- j. describe appropriate measures for avoiding health and safety problems.

3.2 AS Unit G062: *Structured ICT Tasks*

This unit is designed to develop practical aspects of the subject in a way that is not possible when leading to a formal written examination. A structured approach is possible that is suitable for AS GCE candidates. The tasks are intended to be structured in nature, covering practical aspects of ICT that cannot easily be tested in an examination environment.

The following skills are developed:

- design;
- software development;
- testing;
- documentation.

Tasks may involve:

- the design of part of a system;
- the production of a testing strategy;
- the use of software for development;
- the production of documentation to show the user how to use/amend/update the system;

Each year, a selection of the content and learning outcomes listed below will be tested through the use of the structured ICT tasks.

3.2.1 Design

Candidates should be able to create a design, using appropriate methods such as flow charts, screen connectivity diagrams, entity relationship models, layout diagrams and written specifications.

Content	<ul style="list-style-type: none">▪ interface design;▪ data structures/models;▪ routines.
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Learning outcomes

Candidates should be able to:

- a. design the layout of data capture forms, screen layouts, report layouts and/or other forms of output (eg audio output);
- b. design how input screens and outputs link together as part of the interface;
- c. produce written design specifications;
- d. design the data structures/models necessary to solve a given problem;
- e. specify any routines using appropriate methods such as flow charts.

3.2.2 Software development

Candidates should be able to develop a solution to a problem using software such as word processing, desk-top publishing, spreadsheets, graphics, web design, multimedia, monitoring and control and databases.

Content

- creation of data structures;
- creation of user interfaces and methods of input;
- using software;
- producing outputs;
- setting up security;

Learning outcomes

Candidates should be able to:

- a. create data structures using appropriate software tools;
 - b. create user interfaces appropriate to a given audience;
 - c. create customised routines using methods such as validation, macros and wizards;
 - d. use word processing software to create and edit documents – in particular candidates will be expected to use mail merge;
 - e. use desk-top publishing software to create and edit documents;
 - f. use functions and formulae to solve a problem;
 - g. use graphics software to create and edit graphical images;
 - h. use web design software to create and edit web pages;
 - i. use multimedia software to create and edit presentations, sounds, animations and videos;
 - j. use database software to solve problems;
 - k. incorporate various types of data (eg text, images, sound, video, animation) into a single document;
 - l. create customised outputs;
 - m. set up appropriate security methods.
-

3.2.3 Testing

Candidates should be able to select suitable test data, develop a test plan using that data and then test a solution following the test plan.

Content

- test data;
- test plan;
- software testing.

Learning outcomes

Candidates should be able to:

- a. select suitable test data that could be used to test a given problem, including normal, invalid and extreme data where appropriate;
- b. produce a test plan that could be used to test a solution;
- c. test a solution, providing documented evidence that the solution has been tested.

3.2.4 Documentation

Candidates should be able to produce documentation appropriate to the specified audience.

Content

- documentation.

Learning outcomes

Candidates should be able to:

- a. prepare an instruction guide to show a user how to use/amend/update a system;
- b. prepare documentation for a system to include, as appropriate, title page, contents page, page numbers, overview, hardware requirements, software requirements, instruction guide, troubleshooting, glossary of terms and index;
- c. prepare documentation in an electronic format using text, images, sound, animation and video.

3.3 A2 Unit G063: *ICT Systems, Applications and Implications*

This module covers communications between computers and interactions between humans and computers. A range of other information and communications technologies is also covered. The convergence of communications technology and information technology and their impact on society, commerce and industry is an integral part of the module. Candidates are expected to acquire a more in-depth knowledge of the range of application areas covered at AS Level ICT, and demonstrate knowledge of the growing range of applications resulting from advances in ICT.

The purpose of this module is to extend the fundamental ICT concepts developed at AS Level. It provides candidates with a more detailed understanding of the nature of both information technology and communications technology and the importance and potential of both for a wide range of applications.

Candidates are expected to explore the need for communication between computer-based information systems, and between human users and computer-based information systems.

Candidates are introduced to the design and selection of ICT solutions for a range of problems.

Candidates are expected to have knowledge of a range of application areas.

Candidates should be able to demonstrate knowledge of information and communications technologies and their applications and capabilities, both in general and within a context.

3.3.1 The systems cycle

Content

- systems cycle;
- project management;
- process modelling.

Learning outcomes

- Candidates should, in general and within the context of a scenario, be able to:
- a. describe the following stages of the system life cycle (definition of the problem, investigation and analysis, design, implementation, testing, installation, documentation, evaluation and maintenance) and how the stages relate to ICT systems;
 - b. describe the advantages and disadvantages of different approaches an analyst might use when investigating a system: questionnaires, interviews, meetings, document analysis, observation;
 - c. describe the following software development methodologies: prototyping and rapid application development (RAD);
 - d. describe the purpose of test data and explain the importance of testing and test plans;
 - e. describe the contents of the requirements specification, the design specification and the system specification, distinguishing between them;
 - f. describe the roles and responsibilities of the following members of the project team: project manager, systems analyst, systems designer, programmer and tester;
 - g. describe, interpret and create critical path analysis (CPA) and Gantt charts, and for each explain its suitability for use in a given application.
 - h. describe, interpret and create data flow diagrams and flowcharts, and for each explain its suitability for use in a given application.

3.3.2 Designing computer-based information systems

Content

- processing systems;
- designing the user interface.

Learning outcomes

Candidates should, in general and within the context of a scenario, be able to:

- a. compare batch, interactive and real-time processing systems in terms of processing methods, response time and user interface requirements;
- b. describe the difference between types of operating systems (single-user, multi-user, multi-tasking, interactive, real time, batch processing and distributed processing systems) by identifying their major characteristics;
- c. explain the use of colour, layout, quantity of information on screen, size of font, complexity of language and type of controls when designing a human–computer interface;
- d. explain the concept and implication of good methods of human–device communications, particularly human–computer interfaces (HCI) using command line interfaces, menus/submenus, graphical user interfaces (GUIs), natural languages (including speech input–output) and forms dialogue;
- e. explain how a potential user’s perception, attention, memory and learning can be taken into account when designing an interface;
- f. describe mental models and how they can be applied to the design of a user interface;
- g. explain the importance of designing a system model that matches closely the user’s mental model;
- h. describe the user interface design tool known as the Model Human Processor, developed by Card, Moran and Newell, and its application.

3.3.3 Networks and communications

Content

- network environments: intranets, internets, on-line services;
- communications and standards.

Learning outcomes

Candidates should, in general and within the context of a scenario, be able to:

- a. compare the characteristics of a local area network (LAN), a wide area network (WAN) and a virtual network;
- b. compare the characteristics and purpose of intranets, the internet and extranets;
- c. describe client-server and peer-to-peer networks giving advantages and disadvantages of each;
- d. explain the importance of bandwidth when transmitting data and analyse how different types of communication media (cables, wireless, optical)

govern the bandwidth available (knowledge of examples of different communication media is expected);

- e. compare the role of the following network components: switches, hubs, wireless access points, network interface cards, wireless network interface cards, routers, repeaters, gateways, firewalls and servers (file, applications, mail, proxy, print, backup) and justify where their use would be appropriate;
 - f. describe optical communication methods (infrared, fibre optic, laser), their advantages and disadvantages and typical applications;
 - g. describe wireless communication methods (Bluetooth®, radio), their advantages, disadvantages and typical applications;
 - h. describe the facilities of the following communication applications: fax, email, bulletin (discussion) boards, tele/video conferencing and instant messaging and compare their use for a given task;
 - i. discuss the use and implications of social networking;
 - j. compare different types of broadband connection and analyse suitable situations where the use of each would be appropriate: asymmetric digital subscriber line (ADSL), cable, wireless, leased line, satellite;
 - k. describe how a mobile phone network operates (cellular and satellite) and the advantages and disadvantages of cellular and satellite mobile phone systems and their use;
 - l. describe how satellite communications systems are used and work in global positioning, weather, data transfer systems and television, explaining the advantages and disadvantages of using satellites for these applications;
 - m. describe how mobile technology and networks can enable communication from anywhere in the world;
 - n. discuss the implications of being able to communicate from anywhere in the world using mobile technology and networks;
 - o. explain the importance of standards for communicating between devices and explain how protocols are used to enable this communication (candidates will not be expected to have detailed knowledge of specific protocols).
-

3.3.4 Applications of ICT

Content

- applications and limitations of ICT;
- converging communications and information technologies;
- distributed databases;
- systems.

Learning outcomes

Candidates should, in general and within the context of a scenario, be able to:

- a. describe the advantages and disadvantages of the following software-based training methods: online tutorials, computer based training, video conferencing
- b. discuss the limitations of using ICT in society today and how advances in technology may overcome some of those limitations;
- c. discuss the use of networks of computers at work and at home;
- d. describe how distributed database systems may be stored in more than one physical location using the following approaches: partitioned between sites (vertical and horizontal), entire databases duplicated at each site, central database with remote local indexes;
- e. discuss the use of different types of distributed database systems;
- f. explain security issues of distributed databases: interception of data, physical access to data, consistency and integrity of data and analyse methods of overcoming these issues;
- g. describe the components of an expert system (user interface, inference engine, knowledge base) and explain the advantages and disadvantages for a given application;
- h. describe the features of an effective management information systems (MIS) and explain the advantages and disadvantages of its use;
- i. describe how MIS and expert systems can be used by organisations;
- j. discuss the range of services offered by digital television networks and the impact of these services on individuals, television companies and broadcasters;
- k. discuss the range of services offered by mobile communication services and the impact of these services on individuals and organisations;
- l. describe the internal resources of an organisation: human, technological and premises.

3.3.5 Implementing computer-based information systems

Content

- custom-written and off-the-shelf approaches;
- upgrading systems;
- system installation;
- system maintenance.

Learning outcomes

Candidates should, in general and within the context of a scenario, be able to:

- a. explain the involvement of the client when a custom-written computer-based information system is to be produced, from the initial meeting with the client to the installation of the system;
 - b. discuss the implications of selecting, implementing and supporting the installation of custom-written and off-the-shelf solutions;
 - c. explain how the expertise of staff, costs, benefits and current systems affect decisions about upgrading or installing software and hardware;
 - d. describe a range of methods for installing a new computer-based information system: parallel, phased, direct, pilot;
 - e. discuss the choice of a particular installation method or methods for a range of applications;
 - f. explain the role of reviews during the life of a computer-based information system, describing how reviews may be planned for and carried out effectively;
 - g. describe perfective, adaptive and corrective maintenance;
 - h. explain the need for perfective, adaptive and corrective maintenance during the life of a computer-based information system.
-

3.3.6 Implications of ICT

Content

- the impact of external change;
- managing change;
- the impact of ICT on the role of the manager;
- quality issues;
- advanced systems.

Learning outcomes

Candidates should, in general and within the context of a scenario, be able to:

- a. discuss the impact of external change on an organisation, individuals within the organisation and on the systems in use;
 - b. discuss change management and factors that must be considered (staff capability, staff views, systems, equipment and accommodation) when managing change;
 - c. discuss the importance of consultation, participation and communication when managing change;
 - d. discuss ethics relating to ICT with reference to codes of conduct, for example, the British Computer Society (BCS) code of conduct and the Association for Computing Machinery (ACM) Code of Ethics and Professional Conduct;
 - e. discuss the need to keep data confidential and explain how this can be achieved;
 - f. discuss how encryption, authorisation, authentication, virus checking, virus protection and physical security can be used to protect data;
 - g. discuss hardware and software developments that are changing, or might change, the way we live. Examples might include advances in treating injuries or disease, leisure activities, the environment, the home, education and freedom of speech and movement. This list of examples is not exhaustive as questions will reflect the current use or abuse of ICT in society.
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3.4 A2 Unit G064: *ICT Project*

This project allows candidates to develop their knowledge and understanding of ICT and the skills described in Assessment Objective 2. The project is a substantial piece of work requiring analysis and design over an extended period of time, which is organised, evaluated and presented in a report.

Collaborative working

Candidates choose, in conjunction with a third-party user, a well-defined client-driven problem that enables them to demonstrate their skills to:

- analyse a problem;
- design a solution to the problem;
- develop the software solution;
- test the solution against the requirements specification;
- document the solution;
- evaluate the solution;
- work with another person/people to successfully complete the above steps.

Recommended prior knowledge

Candidates are likely to have completed the ICT AS modules before starting the ICT project. The project will be conducted in parallel with the study of the A2 theory module.

Candidates should identify a problem that requires solving rather than a project to complete. Each candidate must submit a report on their work, supported by evidence of software development and testing.

The supervisor marks the project using the mark scheme provided by OCR, after which moderation takes place according to OCR procedures.

ICT projects are assessed as follows:

- | | |
|---|------------|
| • definition, investigation and analysis; | [23 marks] |
| • design; | [15 marks] |
| • software development, testing and installation; | [21 marks] |
| • documentation; | [10 marks] |
| • evaluation; | [8 marks] |
| • presentation of report. | [3 marks] |

More detailed marking criteria are given in Appendix B.

3.4.1 Definition, investigation and analysis

An explanation of the problem to be solved, the client requirements and how they were obtained is expected. There should be a clear statement of the requirements and how they were determined. Candidates should be aware that the relative complexity of the problem solution will have a bearing on the marks that are available in section 3 (software development and testing) – see Appendix B for details.

Content

- define the problem to be solved;
- investigate the problem;
- record and analyse findings, identify problems and inefficiencies with current system and establish a working relationship with the owner of the problem;
- identify possible solutions and present them in such a way as to be understandable to the end user;
- specify the objectives for the project and the hardware and software requirements.

Learning outcomes

Candidates should:

- a. undertake an initial investigation to determine the nature of the problem to be solved. This should include a clear identification of the user if different to the client;
- b. identify methods with which to investigate the problem and use such methods to inform their analysis of the requirements of the owner of the problem. This must include a structured interview;
- c. study the current solution to the problem if one exists;
- d. study and analyse similar systems **if** there is no existing system;

-
- e. record information/data and gather sample documents currently used if appropriate to the solution of the problem;
 - f. analyse the data/information collected;
 - g. specify the client's requirements of the system;
 - h. consider a number of different methods for satisfying the requirements of the system and make a reasoned determination of the most effective in discussion with the client;
 - i. specify the hardware and software requirements to produce and operate the system.

3.4.2 Design

A system design should be produced and documented including, where necessary, details of input format, output format, the processing involved, data structures and website maps.

Content

- design of the solution using decisions made in section 1;
- project plan;
- test plan.

Learning outcomes

Candidates should:

- a. consider the data requirements of the proposed system to include, where necessary, the design of the methods of data capture, preparation, input and storage, and the design of structures to be used;
 - b. specify any validation required as well as the nature of any interactive feedback required if any data are input incorrectly;
 - c. design the output required from the system;
 - d. consider the processing required to produce the intended results;
 - e. create, develop and document a test plan for the design;
 - f. select suitable test data and test actions/responses for the design, to include a determination of expected results to the tests;
 - g. produce a detailed project plan specifying the steps necessary to create the solution.
-

3.4.3 Software development, testing and installation

A software solution is developed from the design evidence of the creation of a solution that meets the requirements is shown. Development of one aspect of process needs to be shown. Customisation of the interface should be shown. The test plan created in the design section should be run with the output from the testing shown and analysed. User testing should be in evidence.

Content

- software development;
- testing the software solution;
- installation of the finished solution, including testing by the end user.

Learning outcomes

Candidates should:

- a. tailor standard application packages or utilise other software to develop their design;
- b. test the software solution, illustrating how the software solution evolves;
- c. produce a strategy for installing the system into the host organisation;
- d. test the software solution with the user, providing documented evidence that the user has successfully used the solution.

3.4.4 Documentation

Content

- the production of supporting documentation.

This should include step by step instructions for operating all aspects of the system, including a means of dealing with any errors that may occur. The documentation should include appropriate 'Help' and other messages within the software solution, or be present in the form of a hypertext document.

Learning outcomes

Candidates should:

- a. develop a detailed hard-copy manual;
 - b. include appropriate on-screen help within the software solution.
-

3.4.5 Evaluation

This section should include a report by the candidate which provides an evaluation of the system listing the things they managed to do and those that they could not, or that still need work to improve them and identification of possible future extensions to the system beyond those identified in analysis. This should be supported by feedback from the client.

Content

- user/client evaluation of the solution;
- production of an evaluation report including a description by the candidate of any limitations and necessary/possible extensions to the system.

Learning outcomes

Candidates should:

- a. obtain a written response to the system produced from the original client/end user and comment on the points made;
- b. produce an evaluation report describing any limitations and possible extensions to the system, indicating how the extensions could be carried out;
- c. evaluate the timings of the development of the solution by comparing the actual timings with these given in the project plan.

3.4.6 Presentation of report

It is expected that the candidate will bring together the elements of the project in the form of a report. The candidate should keep in mind the importance of the quality of presentation and ease of understanding of the report.

The quality of your written communication is assessed in this documentation

4 Schemes of Assessment

4.1 AS GCE Scheme of Assessment

AS GCE ICT (H117)

AS Unit G061: *Information, Systems and Applications*

60% of the total AS GCE marks	This paper has one section, comprising both short and long answer questions.
2 h written paper	
120 marks	Candidates are required to answer all questions in this paper.

AS Unit G062: *Structured ICT Tasks*

40% of the total AS GCE marks	Coursework for this unit comprises of a number of structured tasks covering practical aspects of ICT.
Coursework	Each year, a selection from the content listed in section 3.2 will be tested through the use of these structured ICT tasks.
80 marks	The structured ICT tasks direct candidates to answer questions using practical ICT skills. The tasks are set by OCR and change each year. Students are able to work on the tasks any time from 1 September in the year before they are assessed.
	Assessment criteria: the mark scheme is confidential and retained by OCR until March in the year of assessment. Centres must not allow students to see the mark scheme until after the publication of results by OCR and advice must not be given to candidates once the mark scheme has been viewed. Each year the mark scheme will be different and will reflect the specific questions asked in the Structured ICT Tasks. Teachers can ask their examinations officer to release the mark scheme in stages if they wish to mark one of the tasks before another is completed by students. Centres are required to submit one copy of a completed mark scheme per piece of coursework assessed. Annotations should be made on the mark scheme and work to indicate where marks have been awarded.
	Please refer to Appendix C at the back of this specification.

4.2 Advanced GCE Scheme of Assessment

Advanced GCE ICT (H517)

AS units as above, Unit G061 being 30% of the total Advanced GCE marks and Unit G062 being 20% of the Advanced GCE marks.

A2 Unit G063: *ICT Systems, Applications and Implications*

30% of the total
Advanced GCE
marks
2 h written paper
120 marks

This question paper has **two** sections, comprising both short and long answer questions:

Section A: candidates are required to answer all questions in this section.

Section B: candidates are required to answer all questions in this section.

This unit is synoptic.

and

A2 Unit G064: *ICT Project*

20% of the total
Advanced GCE
marks
Coursework
80 marks

The project is a substantial piece of work requiring analysis and design over an extended period of time, allowing candidates to demonstrate their skills to analyse a problem, design a solution to a problem, develop a software solution and test, document and evaluate the solution. This project is conducted in parallel with Unit G063.

This unit is synoptic.

4.3 Unit Order

The normal order in which the unit assessments could be taken is AS Units G061 and G062 in the first year of study, leading to an AS GCE award, then A2 Units G063 and G064, 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.

4.4 Unit Options (at AS/A2)

There are no optional units in the AS GCE specification; for AS GCE ICT candidates must take AS Units G061 and G062.

There are no optional units in the Advanced GCE specification; for Advanced GCE ICT candidates must take AS Units G061 and G062, *and* A2 Units G063 and G064.

4.5 Synoptic Assessment (A Level GCE)

Synoptic assessment is included in all A2 GCE units.

Synoptic assessment tests the candidates' understanding of the connections between different elements of the subject. Both A2 Units G063 and G064 fulfil this requirement. Each is based on areas of study covered in both AS Units G061 and G062.

A2 Unit G063 requires candidates to demonstrate an understanding of both information technology and communications technology and the importance and potential of both for a wide range of applications. A2 Unit G064 gives candidates the opportunity to practically demonstrate their ICT skills and knowledge that has been built up in the AS units.

4.6 Assessment Availability

There are two examination series each year, in January and June.

All units **except** AS Unit G062 *Structured ICT Tasks* are available in January and June. AS Unit G062 *Structured ICT Tasks* is **only** available in June.

In 2009, only AS units will be assessed.
From 2010 onwards, both AS units and A2 units will be assessed.

4.7 Assessment Objectives

Candidates are expected to demonstrate the following in the context of the content described:

AO1 Demonstrate knowledge and understanding

Candidates should be able to demonstrate knowledge and understanding of:

- the characteristics of data and information, and the need for organisation and manipulation to facilitate its effective use;
- the use of ICT for a range of purposes;
- the influence of social, cultural, legal, technical, ethical, economic and environmental considerations on the use of ICT;

- the consequences of using ICT for individuals, organisations and society;
- the components, characteristics and functions of ICT systems (including hardware, software and communication) that allow effective solutions to be achieved;
- the systematic development of high quality ICT based solutions to problems;
- emerging technologies and their implications for future use of ICT.

AO2 Skills

Candidates should be able to:

- investigate and analyse a problem and produce a specification;
- design an effective solution;
- select and use appropriate application software;
- test and implement an effective ICT related system;
- document specifications and solutions;
- evaluate solutions and their own performance.

AO weightings in AS GCE

Unit	% of AS GCE		Total
	AO1	AO2	
AS Unit G061: <i>Information, Systems and Applications</i>	55–60	0–5	60%
AS Unit G062: <i>Structured ICT Tasks</i>	0–10	30–40	40%
	55–70%	30–45%	100%

AO weightings in Advanced GCE

Unit	% of Advanced GCE		Total
	AO1	AO2	
AS Unit G061: <i>Information Systems and Applications</i>	27.5–30	0–2.5	30%
AS Unit G062: <i>Structured ICT Tasks</i>	0–5	15–20	20%
A2 Unit G063 <i>ICT Systems, Applications and Implications</i>	15–20	10–15	30%
A2 Unit G064 <i>ICT Project</i>	0–2.5	17.5–20	20%
	42.5–57.5%	42.5–57.5%	100%

4.8 Quality of Written Communication

Quality of Written Communication is assessed in all units and credit may be restricted if communication is unclear.

Candidates need to:

- ensure that text is legible and that spelling, punctuation and grammar are accurate so that the meaning is clear;
- select and use a form and style of writing appropriate to the 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. 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 (the four-figure alphanumeric codes given in brackets at the end of the unit title) are quoted in all correspondence with OCR. See Sections 4.1 and 4.2 for these unit entry codes.

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 (entry code H117).
- Advanced GCE certification (entry code H517).

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 in a later series.

AS GCE certification is available from June 2009.

Advanced GCE certification is available from January 2010.

5.3 Grading

All GCE units are awarded a-e. The Advanced Subsidiary GCE is awarded on the scale A-E. The Advanced GCE is awarded on the scale A-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 comparison of candidates' performance across units and across series. The two-unit AS GCE has a total of 200 *uniform* marks and the four-unit Advanced GCE has a total of 400 *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 ICT specifications, the four units of the Advanced GCE specification have UMS weightings of 30%, 20%, 30% and 20% (and the two units of the AS GCE specification have UMS weightings of 60% and 40%). The UMS totals are 120 and 80, respectively. 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					u
		a	b	c	d	e	
30%	120	120–96	95–84	83–72	71–60	59–48	47–0
20%	80	80–64	63–56	55–48	47–40	39–32	31–0

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					U
	A	B	C	D	E	
AS GCE	200–160	159–140	139–120	119–100	99–80	79–0
Advanced GCE	400–320	319–280	279–240	239–200	199–160	159–0

5.4 Result Enquiries and Appeals

Under certain circumstances, a centre may wish to query the grade available to one or more candidates or to submit an appeal against an outcome of such an enquiry. Enquiries about unit results must be made immediately following the series in which the relevant unit was taken.

For procedures relating to enquires on results and appeals, centres should consult the OCR *Administration Guide for General Qualifications* and the document *Enquiries about Results and Appeals – Information and Guidance for Centres* produced by the Joint Council. Copies of the most recent editions of these papers can be obtained from OCR.

5.5 Shelf-life of Units

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

5.6 Unit and Qualification Resits

There is no restriction on the number of times a candidate may resit 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.

5.7 Guided Learning Hours

AS GCE ICT requires **180** guided learning hours in total.

Advanced GCE ICT requires **360** guided learning hours in total.

5.8 Code of Practice/Subject Criteria/Common Criteria Requirements

These specifications comply in all respects with current *GCSE, GCE, GNVQ and AEA Code of Practice* as available on the QCA website, the subject criteria for GCE ICT and *The Statutory Regulation of External Qualifications 2004*.

5.9 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 and Special Consideration: Regulations and Guidance Relating to Candidates who are Eligible for Adjustments in Examinations* produced by the Joint Council. In such cases advice should be sought from OCR as early as possible during the course.

5.10 Prohibited Qualifications and Classification Code

Candidates who enter for the OCR GCE specifications may not also enter for any other GCE specification with the certification title *ICT* in the same examination series.

Every specification is assigned to a national classification code indicating the subject area to which it belongs.

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 Achievement and Attainment Tables.

The classification code for these specifications is 2650.

5.11 Coursework Administration/Regulations

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.

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).

Deadlines for the receipt of coursework marks are:

10 January for the January series

15 May for the June series

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 *Administration Guide for General Qualifications*. Further copies of the coursework administration documents are available on the OCR website (www.ocr.org.uk).

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 postal moderation takes place in accordance with OCR procedures.

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.

The sample of work that is submitted to the moderator for moderation must show how the marks have been awarded in relation to the marking criteria.

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 Other Specification Issues

6.1 Overlap with other Qualifications

There is a small degree of overlap between the content of these specifications and those for Advanced GCE Computing.

6.2 Progression from these Qualifications

Throughout the course of study candidates are encouraged to become discerning users of ICT, developing a broad range of ICT skills and knowledge and understanding of ICT. This should form a basis for progression into further learning, including progression from AS to A2, and/or employment.

6.3 Key Skills Mapping

These specifications provide opportunities for the development of the Key Skills of *Communication, Application of Number, Information Technology, Working with Others, Improving 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	C			AoN			IT			WwO			IOLP			PS			
	.1a	.1b	.2	.3	.1	.2	.3	.1	.2	.3	.1	.2	.3	.1	.2	.3			
1	✓		✓	✓				✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
2	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
3	✓		✓	✓				✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
4	✓		✓	✓				✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

6.4 Spiritual, Moral, Ethical, Social, Legislative, Economic and Cultural Issues

These specifications encourage candidates to explore the spiritual, moral, ethical, social, legal, economic and cultural aspects of the introduction of ICT solutions to problems through a study of the effects of ICT on society.

Candidates have an opportunity to consider issues such as changing leisure patterns and work practices, privacy and confidentiality of data held in systems, opportunities for access to information and environmental concerns.

6.5 Sustainable Development, Health and Safety Considerations and European Developments

These specifications support these issues, consistent with current EU agreements, in AS Unit G061, Section 3.1.7

6.6 Avoidance of Bias

OCR has taken great care in the preparation of these specifications and assessment materials to avoid bias of any kind.

6.7 Language

These specifications and associated assessment materials are in English only.

6.8 Disability Discrimination Act Information Relating to these Specifications

AS/A levels 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 AS/A level qualification 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. For this reason, very few candidates will have a complete barrier to any part of the assessment. Information on reasonable adjustments is found in *Access Arrangements and Special Consideration Regulations and Guidance Relating to Candidates who are Eligible for Adjustments in Examinations* produced by the Joint Council (refer to Section 5.9 of this specification).

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

Appendix A: Performance Descriptions

Performance descriptions have been created for all GCE subjects. They describe the learning outcomes and levels of attainment likely to be demonstrated by a representative candidate performing at the A/B and E/U boundaries for AS and A2.

In practice most candidates will show uneven profiles across the attainments listed, with strengths in some areas compensating in the award process for weaknesses or omissions elsewhere. Performance descriptions illustrate expectations at the A/B and E/U boundaries of the AS and A2 as a whole; they have not been written at unit level.

Grade A/B and E/U boundaries should be set using professional judgement. The judgement should reflect the quality of candidates' work, informed by the available technical and statistical evidence. Performance descriptions are designed to assist examiners in exercising their professional judgement. They should be interpreted and applied in the context of individual specifications and their associated units. However, performance descriptions are not designed to define the content of specifications and units.

The requirement for all AS and A level specifications to assess candidates' quality of written communication will be met through one or more of the assessment objectives.

The performance descriptions have been produced by the regulatory authorities in collaboration with the awarding bodies.

AS performance descriptions for ICT

	Assessment Objective 1	Assessment Objective 2
Assessment Objectives for AS GCE	<p>Candidates should be able to demonstrate knowledge and understanding of:</p> <ul style="list-style-type: none">• the characteristics of data and information, and the need for their organisation and manipulation to facilitate effective use• the use of ICT for a range of purposes• the influence of social, cultural, legal, technical, ethical, economic and environmental considerations on the use of ICT• the consequences of using ICT for individuals, organisations and society• the components, characteristics and functions of ICT systems (including hardware, software and communication) which allow effective solutions to be achieved• the systematic development of high-quality ICT- related solutions to problems• emerging technologies and their implications for future use of ICT.	<p>Candidates should be able to:</p> <ul style="list-style-type: none">• investigate and analyse problems and produce a specification• design effective solutions• select and use appropriate application software• test and implement an effective ICT-related system• document specifications and solutions <p><i>evaluate solutions and their own performance.</i></p>

Assessment Objective 1

Assessment Objective 2

AS A/B boundary
Performance
Descriptions

Candidates characteristically demonstrate:

- an understanding of the characteristics of data and information
- a clear understanding of the need for organisation of data and information to facilitate effective use of ICT
- a knowledge of how ICT is used for a range of purposes
- an understanding of how social, cultural, legal, technical, ethical, economic and environmental considerations affect the use of ICT
- an understanding of the consequences of the use of ICT on society, individuals and organisations
- a thorough knowledge of the characteristics and functions of the hardware components and application software that make up an ICT system and how these are used to provide effective ICT solutions
- an understanding of the communications systems that support ICT use
- an understanding of the need for a systematic approach when developing ICT solutions to problems.
- an understanding of the development of ICT technologies and the implications of emerging technologies for the future use of ICT.

Candidates characteristically demonstrate:

- the ability to use subject -specific terminology appropriately and accurately
- the ability to analyse a complex problem and produce a specification
- the ability to design effective solutions, documented appropriately
- the selection and use of application software to implement effective solutions
- the ability to design and implement an appropriate testing strategy
- evaluation skills which analyse their own performance and that of their solution.

AS E/U boundary
Performance
Descriptions

Candidates should be able to demonstrate knowledge and understanding of:

- the characteristics of data and information, and the need for their organisation and manipulation to facilitate effective use
- the use of ICT for a range of purposes
- the influence of social, cultural, legal, technical, ethical, economic and environmental considerations on the use of ICT
- the consequences of using ICT for individuals, organisations and society
- the components, characteristics and functions of ICT systems (including hardware, software and communication) which allow effective solutions to be achieved
- the systematic development of high-quality ICT-related solutions to problems
- emerging technologies and their implications for future use of ICT.

Candidates should be able to:

- investigate and analyse problems and produce a specification
- design effective solutions
- select and use appropriate application software
- test and implement an effective ICT-related system
- document specifications and solutions
- evaluate solutions and their own performance.

A2 performance descriptions for ICT

Assessment Objective 1

Assessment Objective 2

Assessment
Objectives for
Advanced GCE

Candidates should be able to demonstrate knowledge and understanding of:

- The characteristics of data and information, and the need for their organisation and manipulation to facilitate effective use
- The use of ICT for a range of purposes
- The influence of social, cultural, legal, technical, ethical, economic and environmental considerations on the use of ICT
- The consequences of using ICT for individuals, organisations and society
- The components, characteristics and functions of ICT systems (including hardware, software and communication) which allow effective solutions to be achieved
- The systematic development of high-quality ICT-related solutions to problems
- Emerging technologies and their implications for future use of ICT.

Candidates should be able to:

- Investigate and analyse problems and produce a specification
- Design effective solutions
- Select and use appropriate application software
- Test and implement an effective ICT-related system
- document specifications and solutions
- evaluate solutions and their own performance.

Assessment Objective 1

Assessment Objective 2

Candidates characteristically demonstrate:

- a clear understanding of the characteristics of data and information
- a thorough understanding of the need for organisation of data and information to facilitate effective use
- a thorough knowledge of how ICT is used for a wide range of purposes
- an in-depth understanding of how social, cultural, legal, technical, ethical, economic and environmental considerations affect the use of ICT
- a full understanding of the consequences of the use of ICT on society, individuals and organisations
- an in-depth knowledge of the characteristics and functions of the hardware components and application software which make up an ICT system and how these are used to provide effective ICT solutions
- a clear understanding of the communications systems that support ICT use
- a full understanding of the systematic approach required to develop high-quality ICT solutions to problems.
- a comprehensive understanding of the development of ICT technologies and the implications of emerging technologies for the future use of ICT.

Candidates characteristically demonstrate:

- the ability to use subject-specific terminology appropriately and accurately
- the ability to analyse a complex problem and produce a detailed specification
- the ability to design an effective and efficient solution, with clear and detailed documentation
- the selection and use of appropriate software, using advanced features, to implant an effective solution
- the ability to design and implement a rigorous testing strategy using evaluation skills which analyse in depth their own performance and that of their solution.

A2 A/B boundary
Performance
Descriptions

Candidates characteristically demonstrate:

- some understanding of the characteristics of data and information
- a basic understanding of the need for organisation of data and information to facilitate effective use
- a basic knowledge of how ICT is used for a range of purposes
- a superficial understanding of how social, cultural, legal, technical, ethical, economic and environmental considerations affect the use of ICT
- a basic understanding of the consequences of the use of ICT on society, individuals and organisations
- an basic knowledge of the characteristics and functions of the hardware components and application software which make up an ICT system and how these are used to provide effective ICT solutions
- a basic understanding of the communications systems that support ICT use
- a basic understanding of the systematic approach required to develop ICT solutions to problems.
- a basic understanding of the development of ICT technologies and the implications of emerging technologies for the future use of ICT.

Candidates characteristically demonstrate:

- a basic use of subject-specific terminology appropriately and accurately
- the ability to analyse a problem and draw up a basic specification
- the ability to design a solution with basic documentation
- the ability to select appropriate software with which to produce a solution and justify their choice to some extent
- the use of appropriate features of application software to implement working solutions
- the ability to design and implement a limited testing strategy
- evaluation skills which analyse both their own performance and that of their solution.

A2 E/U boundary
Performance
Descriptions

Appendix B: Coursework Assessment Criteria

A2 Unit G064: *ICT Project*

Since the ICT project seeks to assess the systems analysis section of the specification in a practical manner, the candidate should **not** produce a system from their own limited knowledge of the requirements of the organisation.

A project should:

- allow candidates to demonstrate their knowledge and understanding of ICT systems and their skills in the assessment objectives;
- encourage the sensible use of computers and communications systems to produce a solution, which solves a problem sensibly, within the constraints of resources available to candidates;
- show the successful completion of a whole task from its initial definition involving a third party user, to its acceptance and evaluation by that third party and other possible users. Projects that involve much repetitive design, analysis or, especially, implementation, leading to unwieldy reports, are to be discouraged;
- involve all elements of the skills of definition, analysis, design, development, testing, documentation, installation and evaluation. Projects need not be stand-alone: the enhancement or modification of an existing system provided that all these elements are covered, is more likely to be a real work situation;
- involve a client and/or third party user, who may be different people and who will provide information for the analysis, use the solution and contribute towards its evaluation. Whilst a teacher could act as the third party, this arrangement is far from ideal. Candidates should, individually, look beyond school life into business and organisations in their community for their projects. Though it is recognised that this may be impractical, a member of the family is often an ideal client/user. The student should seek to involve them and present them with a report on the work that has been carried out.

The client/user has to be someone who is willing to be involved in the project throughout, but particularly at the following stages:

- in the analysis of the problem, where their requirements are obtained. This will include an interview with the candidate, who will be taking an active part in decision making;
- at the software development, testing and installation stages, where they are involved in prototyping;
- at the evaluation stage, where they are involved in checking that the system is completed as specified and, leading on from this, is then willing to write a letter of acceptance of the system, including any criticism of it.

Candidates should make the final choice of the problem for solution in collaboration with the potential client/user, although guidance about the suitability of the chosen problem should be given by the supervisor. Guidance should continue throughout the life of the project. This should include guidance on the appropriateness of an implementation on a stand-alone or networked computer-

based information system or other available facility. In a well-organised project the candidate will focus on the production of an overall system analysis and design.

The solution may be implemented using one or more of:

- a standard generic applications software package;
- prewritten modules;
- toolkits/authoring/publishing software;
- interface/client software (including HTML/JAVA).

Descriptions of any software used, together with reasons for their selection, should be included in the report.

Test data should be devised and used systematically to thoroughly test the effectiveness of the solution in solving the problem. The choice of test data used, and the reason for choice, should be included. A description of the methods of testing should also be included, together with evidence of testing.

The project report should contain the title, a contents list, a description and justification of investigation, analysis, design and an evaluation. Pages should be clearly numbered. The report must be supported by appropriate evidence of implementation, such as screen dumps or photographs of screen layouts and printouts, paper-based documentation and a letter(s) from the client/third party user to support the evaluation.

Candidates should **not** submit magnetic or optical media as supporting evidence, but can make references to web pages available over the internet or photographic evidence supplied. A witness statement would also provide suitable evidence where it is not possible to produce suitable hard copy evidence of parts of their solution, eg hyperlinks.

The projects will seldom involve programming or the installation of hardware but will involve the choosing of the types of hardware and software that will be needed to implement the solution.

The mark scheme has attempted to be as generic as possible, but there will, doubtless, be occasions when candidates are creating a solution that is not adequately covered by the mark scheme. On these occasions please contact OCR for advice about adapting the given scheme to fit the solution.

Some possible ideas are given below. However, it is important for candidates to realise that the project chosen should be user driven. This means that candidates must understand that they should find possible users of ICT systems and find out their needs before developing an idea.

The examples do not show the analysis of the problem nor do they give all facilities that may be required by the user. For example, the staff who run the village hall bank may well require many other facilities that can only be ascertained by interviewing the appropriate staff and, possibly, some of the users of the bank. The examples only give a few ideas of the type of project, which could provide candidates with the opportunities to demonstrate Advanced GCE ICT skills and an understanding of solving real life problems.

Example 1

The local village hall committee has a bank that is used by a large number of local people to save money for Christmas. The staff who run the bank must keep details of people who use the bank as well as details of individual accounts. It is useful to have a list of all the people who use the bank together with addresses and so on, which help the staff to contact them. Sometimes the staff need to contact someone urgently.

Villagers need bank statements from time to time. This occurs when someone asks for a statement at the end of November. The statements are sent automatically as emails or email attachments to the bank users.

The bank statements must give details of each transaction such as deposit number, amount withdrawn, amount deposited and an up-to-date balance. It should also show any interest payments.

The staff have to be able to create a separate statement for each person and it must only be accessed by the person's account number. Sometimes people forget their account numbers and the staff must be able to provide them on proof of identity.

The committee who run the scheme are particularly worried about the security of the files.

Candidates would be expected to produce a tailored solution with an appropriate interface. An obvious solution would be to use a table of customers, each record being linked to a spreadsheet of activity for the person's account. Data could be extracted from the table and relevant spreadsheet to produce a statement and a photograph could be appended to records to provide proof of identity.

Example 2

A local hotelier wants to have a website to advertise the facilities available at the hotel.

You are to design a computer-based information system that could be used by the hotelier.

This would involve the student in analysing the problem, collecting the necessary information and designing a solution, and fully developing the site.

Candidates should be aware that, on one level, this is a fairly trivial problem. The teacher/moderator will be looking for detailed analysis of the problem, and design solutions, which involve the hotelier at all stages. It will also be necessary to ensure that some of the implementation is at more than a basic level, examples could include the ability to download documents like the hotel brochure from the site, a link to a file that keeps a record of all queries sent to the site, or the ability to book rooms and pay for them in advance through the site (though candidates hoping to do this should be made aware of the difficulties before they start).

As the original problem was to create a website to advertise a hotel, it is reasonable to insist that part of the problem solution must be to make the website available over the internet. This would mean that the candidate must provide a URL to allow the site to be accessed during assessment.

Example 3

Ms Johnson has a small newsagent's shop and employs eight people to deliver the papers. She wishes to be able to produce delivery lists for each morning round and each evening round. At the moment she does not deliver Sunday papers but may wish to do so in the future.

She wants to keep details of her customers, including which morning papers and which evening papers they have and which delivery round they are on. Some customers only have one morning and one evening paper; others do not have both a morning and evening paper. Some customers have weekly magazines, some fortnightly magazines and some monthly magazines.

Ms Johnson would also like to be able to produce a weekly paper bill for each customer.

You are to design a computer-based information system that could be used by Ms Johnson including the facility to browse on-line for information.

(Note that the actual production of the lists for the rounds in specific orders is difficult and has been avoided during the problem formulation. The problem is difficult enough, particularly when considering the unknown number of papers and periodicals that each person may order).

This is an example of a popular type of project, being based on database software, however the formulation of the problem is everything with this type of problem and candidates should be wary of too simplistic an approach. The solution that simplifies the problem unreasonably will also be penalised.

Example 4

The student is asked by the head teacher of a school to develop an information system for use in the classrooms and public areas. The information needs to be on computer screens, which can be amended from a central location.

The student is involved in analysing the problem in respect to site of screens, user interfaces, types of information, passwords to allow users to edit only their pages, etc.

You are to design a computer-based information system that could be used by the school.

The implementation of the system is relatively straightforward using a piece of authoring software. However, the candidate can enlarge the scope of the project by including, for instance, a budgeting system so that individual departments are allocated a set amount of time or an accounting system so that departments can be billed on a monthly basis. Another extension might be to include an archiving system to store messages for future inspection.

The teacher/moderator should be looking for a detailed analysis of the requirements and a measure of extension to the basic problem, which would illustrate the candidate's ability to integrate the information into other software.

Exemplification of Mark Scheme: Teachers' Notes

(a) Definition, Investigation and Analysis

[23 marks]

(i) Definition – nature of the problem to be investigated

[2 marks]

1 mark	a brief description of the organisation or group that has the problem and an introduction to the client and/or the end user(s) and their place within the organisation or group; <i>For example: name, location, purpose, number of employees, name(s) of relevant staff, their positions in the company, consideration of different users (end user, client, managers) who may have different needs, may be an organisation chart.</i>	
1 mark	an outline of the problem that needs to be solved. <i>A very brief outline of the problem as seen at this early stage, can be given by the company.</i>	

This section will be relatively short; one or two paragraphs would suffice.

(ii) Investigation

[12 marks]

2 marks	For the existing system, a thorough planning of the mechanics of the interview situation; <i>where, when, how (e.g. email, telephone, in person). Consideration of why the method(s) was/were chosen.</i>	
3 marks	reasoned set of questions to elicit important information about the existing system (possible responses have been considered and follow-up questions have been planned); <ul style="list-style-type: none">• 3 marks: a comprehensive list of questions with follow up questions for some. Reasoning for each question or group of questions. Questions will be different for different groups of people where relevant (client/end user)• 2marks: a list of basic questions with some attempt at justifying most of them. Some attempt at follow up questions• 1 mark: a basic set of questions with little or no reasoning.	
1 mark	record of key responses of interview(s) <i>a record of responses from the interviewee(s) including follow-ups. Does not have to be a verbatim transcript of the entire conversation. All relevant parties who have involvement in the current system will have been interviewed</i>	
3 marks	evidence of analysis of the current system or of likely problem areas, arriving at reasoned conclusions that will show evidence of being agreed by client; 3 marks: full summary of the current situation with all problem areas discussed, conclusions about what the issues are, agreement from the client in the form of a signed letter/document 2 marks: summary of the current situation, a discussion of problem areas in the current system, agreement from the client as before. 1 mark: brief summary of the current method/system used	
2 marks	Information collected about the requirements of the new system 2 marks: a complete set of information about the new system with justification 1 mark: some information collected, but may be incomplete and/or unjustified	
1 mark	clear presentation of the information collected about the new system.	

(iii) Analysis

[9 marks]

3 marks	a requirements specification containing a number of clearly defined objectives that the solution should meet. These must be arrived at through consultation with the client; 3 marks: a list of requirements which cover all aspects discovered during data collection. This may be reworked several times, if necessary, in consultation with the client. If so, this should be documented. Agreement, in writing, from the client. Each requirements is supported with evidence from the investigation. The requirements are specific. 2 marks: a list of requirements, covering most of the aspects of the proposed solution and can be linked to the investigation. Agreement, in writing, from the client. The requirements lack detail 1 mark: some basic requirements which cover some of the aspects of the proposed solution, agreed to in writing by the client.	
3 marks	a comparison of a number of different methods of solution, one of which may be the present solution and at least two others to allow a reasoned decision to be made in consultation with the client; 2-3 marks: three solutions are considered in terms of cost, feasibility, extent to which they meet the requirements. Chosen system is identified and justified in terms of cost and benefits to the organisation. 1 mark: three solutions are considered to a limited depth. The final system will be identified with limited justification	
3 marks	a reasoned list of hardware and software requirements for the new system, providing clear justification for each choice in relation to the problem to be solved. 3 marks: clear list of hardware and software, possibly offering two alternative choices for each, with sensible justification based on the needs of the client and/or solution. Inputs, processing, outputs and storage devices and software are all covered for 3 marks. 1-2 marks: a list of hardware and software with basic justification for each and with limited reference to the client/solution needs. There may be gaps.	

(b) Design

[15 marks]

(i) Nature of the solution

[13 marks]

4 marks	design of data handling, including capture, preparation and storage, to include map and diagrammatic representation of links where relevant; 4 marks: a complete set of system designs appropriate to the solution including some or all of the following as relevant: data storage, data flows and processes. The designs can be in diagrammatic or textual format. The designs should be sufficient that they could be picked up and developed by a third party. 2-3 marks: some of the above are evident but elements appropriate to the solution may be missing or incomplete. 1 mark: a basic attempt at the above. More than one element appropriate to the solution is missing.	
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4 marks	<p>design of inputs, queries/processing and outputs, including error capture reports as appropriate, based clearly on the analysis of the client requirements;</p> <p>4 marks: designs and design specifications for all input forms, including colours, fonts, sizes etc. Complete interface designs showing any validation, lookups, calculations which are carried out. Complete processing designs for example, queries, calculations, formulae, manipulation of HTML or other code. Security procedures which may include back up and restore routines, passwords and access rights.. Design of outputs, automated emails, files created and appended to. All designs are logically correct and fit for purpose.</p> <p>2-3 marks: may be missing some of the above elements but must cover all areas of input, output and processing. There may be loose ends.</p> <p>1 mark: basic designs showing little depth and missing important elements.</p>	
1 mark	<p>clear evidence of iteration and development of designs in the form of annotated drafts; where relevant this should include feedback from the client and evidence of how these have had an effect on the solution.</p>	
4 marks	<p>a test plan that will identify a number of tests that will be carried out on completion of the work. All requirements should be tested. The specific test to be carried out should be included in the plan together with the result expected. Some elements of testing should involve the end user(s).</p> <p>4 marks: a complete plan which tests the solution in relation to the requirements, pathways through the system and validation routines. Normal, erroneous, extreme data are considered where relevant.</p> <p>2-3 marks: test plan covers most aspects of the system against all three points above. Consideration of one or two of normal, erroneous, extreme data but probably not all three.</p> <p>1 mark: a basic plan which does not consider extreme/erroneous data or have specific inputs and expected outputs identified.</p>	

(ii) Project plan

[2 marks]

2 marks	<p>Clear description, diagrammatic or otherwise, of the different tasks necessary to complete the solution and a clear timetable.</p> <p>2 marks: a complete task model (e.g Gantt Chart, Pert Chart, CPA, table, calendar) which is progressive and covers all of the software development section. There will be consideration of predecessors and successors. It is accepted that, at this level, pupils will not necessarily judge timings accurately.</p> <p>1 mark: a basic model with occasional gaps or with some tasks out of order.</p>	
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(c) Software Development, Testing and Installation**[21 marks]****(i) Software Development and Testing****[14 marks]**

8 marks	<ul style="list-style-type: none"> • 6-8 marks: the candidate has solved a problem that has needed a level of complexity greater than a simple linear type solution; • 3-5 marks: the candidate has attempted to solve a problem that has needed a level of complexity greater than a simple linear type solution and has been successful in some aspects; • 0-2 marks: the candidate has produced a solution that is a linear style of solution in the use of software; <p>General Notes on this section: <i>This section should include printouts/screen shots of every screen in the system and all code written by the candidate should be identified and annotated.</i> <i>For a database this might include: tables, forms, queries, reports, macros, code. For a spreadsheet: all worksheets, formula view, macros, users forms, named ranged. For a website: all pages, associated data, structure (e.g. database/spreadsheet/text files attached), macro code, HTML code, CSS code, directory structure printout.</i></p>	
2 marks	<p>evidence of the development of one aspect of the system that processes data;</p> <p>2 marks: <i>detailed annotated evidence of the development of one aspect of the system that involves the processing of data. The detail is sufficient for the aspect to be recreated</i></p> <p>1 mark: <i>annotated evidence of the development of one aspect of the system that involves the processing of data. There may be gaps in the evidence provided.</i></p>	
2 marks	<p>hard-copy evidence of an effective HCI with annotations explaining its effective solutions for problems that had been highlighted in the requirements specification;</p> <p>2 marks: <i>annotated evidence of a HCI and how it meets user requirements. Evidence of customisation of the interface, for example, of changing colours, adding images/logos or removal of record selectors.</i></p> <p>1 mark: <i>annotated evidence of a HCI which meets some but not all requirements. Limited additional customisation of the interface.</i></p>	
2 marks	<p>evidence that each of the tests specified in the test plan have been carried out, that they are linked to the hard copy evidence, that the results have been analysed and that any necessary action has been identified;</p> <p>2 marks: <i>Screenshot evidence of all tests in the test plan being carried out. Actual input and output data as specified in the test plan is clearly identified. Any failed tests are documented, corrected and retested. There is clear evidence of user testing of the system.</i></p> <p>1 mark: <i>Most tests are carried out, but inputs and outputs may not always be clearly identified. Failed tests are not always corrected and/or retested. There is some evidence of user testing being attempted.</i></p>	

(ii) Installation**[7 marks]**

3 marks	details of the training that will need to be available for the staff who must use the new system; 3 marks: <i>detailed description of training with a plan of training required by staff including where, when, by whom and the data needed. There will be full consideration of different groups of users, where relevant, and what their training needs will be.</i> 2 marks: <i>may be missing some of the above elements but must cover all areas of administration and an basic plan of training needs.</i> 1 mark: <i>basic description of training needs with little or no specific detail.</i>	
2 marks	details of the means by which the new files are going to be created, including some indication of the scale of the problem, and also the possible need for hardware installation and the installation of the software on the hardware; 2 marks: <i>consideration of the volume of data, numbers of people involved, timescales, how data will be created or transferred.</i> 1 mark: <i>basic consideration of data files but with few specific details.</i>	
2 marks	details of appropriate, different, methods of changeover explained so that the client can make a reasoned decision. 2 marks: <i>detailed consideration of the different methods of changeover related to the system being installed</i> 1 mark: <i>basic consideration different methods of changeover</i>	

(d) Documentation**[10 marks]****Manual**

8–10 marks	Candidates will produce detailed and accurate documentation. The manual will be presented in a well-structured and coherent format. Subject specific terminology will be used accurately and appropriately. The documentation will include a complete and detailed user guide covering all operations that the user would be required to perform. The on-screen guide should be well presented and easy to follow. There will be few if any errors in spelling, grammar and punctuation.	
4–7 marks	Candidates will provide clear documentation. The documentation will be well presented. There is clear on-screen help to support the end user. The supporting documentation and on-screen help is well presented and covers most aspects of the operations that the user would be required to perform. Some subject specific terminology will be used. There may be occasional errors of spelling, grammar and punctuation.	
0–3 marks	Candidates will provide a superficial documentation with weak supplementary user documentation covering few aspects of the operations that the user will be required to perform. The information will be poorly expressed and limited technical terms will be used. Errors of spelling, grammar and punctuation may be intrusive.	

(e) Evaluation**[8 marks]**

4 marks	<p>evaluation of each of the requirements from the requirements specification including showing how the completed solution meets the requirements. Areas from the requirements specification that have not been met are discussed;</p> <p>4 marks: <i>a detailed evaluation of the system which includes a description of whether the requirements specification was met or not met. Any shortfalls are explained in detail.</i></p> <p>2-3 marks: <i>an evaluation of the system, which may lack specific detail but should include a description of whether the requirements specification was met. Shortfalls are mentioned but there is limited depth in the discussion of why they were not achieved</i></p> <p>1 mark: <i>some material which attempts to evaluate whether the solution meets the requirements specification.</i></p>	
2 marks	<p>details of extensions to the project and how these might be completed;</p> <p>2 marks: <i>detailed descriptions of extensions to the system and consideration of how they might be implemented</i></p> <p>1 mark: <i>basic consideration extensions with no details on how they could be implemented</i></p>	
2 marks	<p>evaluation of the finished development against the project plan from design</p> <p>2 marks: <i>detailed evaluation comparing the actual development against the project plan giving reasons for any differences</i></p> <p>1 mark: <i>basic evaluation identifying the differences between the development and the project plan</i></p>	

(f) Presentation of report**[3 marks]**

3 marks	The candidate has provided a detailed and accurate means of navigation of the report and has tailored the language used, both technical and non-technical, to the audience for which the parts of the report were aimed. Subject-specific terminology will be used correctly. A professional approach to the presentation will be expected and a clearly understandable, dated log of events will be kept. The information will be presented in an ordered and well structured manner. There are few if any errors of grammar or spelling.	
2 marks	The candidate will produce a navigable report. The contents will be determined by the requirements of the candidate rather than the reader. A log of events will have been kept. The information is presented in an ordered fashion that maintains some coherence. There may be some occasional errors of grammar or spelling.	
0–1 mark	The candidate has produced some material that explains part of the solution attempted. It will be difficult to navigate and will assume much knowledge of the solution that the reader will probably not possess. The information may be expressed without a structure. Errors of grammar or spelling may be intrusive.	

Appendix C: Instructions For Teachers Unit G062: *Structured ICT Tasks*



ADVANCED GCE

INFORMATION AND COMMUNICATION TECHNOLOGY

G062/IT

Unit 2 Structured ICT Tasks

INSTRUCTIONS FOR TEACHERS

To be opened on receipt

INFORMATION FOR CANDIDATES

- The total number of marks available for the paper is **80**.
- There are no restrictions on computing facilities, hardware or software that may be used.
- You must set an internal deadline for candidates to complete and submit their work. This must allow time for marking the work, before the deadline set by OCR.
- All work must be the candidates' own work.
- This document consists of **4** pages. Any blank pages are indicated.

Instructions for Teachers

1 Pre-release tasks

The set of pre-release tasks provide the external assessment for the following unit:

G062: Structured ICT Tasks

The pre-release tasks do not replace the teaching of the unit. To achieve the assessment requirements, candidates need to take part in a planned learning programme which covers the knowledge and skills specified in the content and learning outcomes section of the unit.

The pre-release comprises of:

- information on a fictional company
- a set of pre-release tasks relating to the company.

2 Time Allocation

The nominal time allowance for the G062 unit is 72 hours. The external assessment (pre-release tasks) should represent approximately one-third of the unit time.

Some tasks may take longer to complete than others and candidates can be guided on the amount of time to take for each task.

3 Delivery patterns

Candidates can be given the pre-release tasks at any time once they have been released onto the OCR website, but it is essential that candidates are adequately prepared before starting the pre-release tasks.

4 Supervision of pre-release tasks

- Teachers are not required to supervise candidates directly when they are carrying out the pre-release tasks. However, the tasks **must** be carried out under conditions that enable the teacher to be confident that the work is the candidate's own.
- Candidates **must not** be given, either individually or as a group, any assistance, verbal or written, in the carrying out of the tasks or evidence to produce.

Examples of unacceptable assistance include:

- indication of errors or omissions
- advice on improvements needed to meet the criteria
- the provision of outlines, paragraph or section headings, or writing frames specific to these structured tasks
- personal intervention to improve the presentation or content of the structured tasks.
- Supervision of the use of ICT and control of access to files must be sufficient to ensure that the material submitted for marking is the authentic original work of the individual candidate.
- Teachers must take the steps necessary to satisfy themselves that the work submitted is solely that of the candidate concerned. Information taken from other sources, such as the Internet, must be reworked such that it is the candidate's own wording. It is not acceptable or advisable for candidates to copy large parts of material from other sources as the tasks require candidates to apply their knowledge to the pre-release tasks.

5 Candidate Submission of pre-release tasks

- The work produced in response to the pre-release tasks must be submitted to the teacher when it is completed.
- Once submitted to the teacher, tasks cannot be returned to the candidates.
- Candidates must present their work as a hard copy. They should use a treasury tag to secure the work together.
- The work must be collated so that it is presented in task order.
- Candidates **must not** submit any material other than their response to the pre-release tasks.
- The work produced for the tasks should be kept secure within the centre. It should **not** be published on a website to be available for viewing by those external to the centre.
- Each task must be marked clearly with the candidate's name, Centre number and task number.

6 Assessing the pre-release tasks

- The work must be assessed against the structured tasks mark scheme.
- One mark scheme per candidate is required.
- The mark scheme for a task can only be looked at once all work for that task has been submitted by the candidates.
- Marks can only be awarded if every criterion for that mark is met.
- Internal moderation is required if more than one teacher has marked the same task.
- The mark for each task needs to be transferred to the front of the mark booklet and a total for all tasks given.
- Candidates must not be given feedback on the tasks or the content of the mark scheme until after the publication of results.

7 Centre submission of pre-release tasks

- Marks must be submitted by 15 May.
- If the centre has 11 candidates or less then all work should be sent to the moderator.
- If the centre has more than 11 candidates then they only need to send the requested work (centres notified by email).
- The centre must submit the work for the requested candidates, one mark scheme per requested candidate and a completed centre authentication form within three working days of receipt of email request.

8 Authentication

Candidates must sign a candidate authentication form to indicate that the work they submit in response to the pre-release tasks is their own work. The teacher must collect in the candidate authentication forms and store them securely before they authenticate that the material submitted in response to the pre-release tasks is the candidate's own work.

The Centre Authentication form should be completed and sent with the tasks and mark booklets for those candidates whose work has been requested to the moderator.