Specification

Edexcel GCSE in Information & Communication Technology (1185)

First examination 2003

November 2000

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Acknowledgements

This specification has been produced by Edexcel on the basis of consultation with teachers, examiners, consultants and other interested parties. Edexcel recognises and values all those who contributed their time and expertise to the development of GCSE specifications.

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Contents

Introduction

Edexcel GCSE Information and Communication Technology (ICT) is a modern specification that recognises the essential practical nature of the subject area.

Students experience a range of practical activities from which a body of skills and knowledge will develop. The learning context of this specification is based upon the four Strands of Progression as defined in the Key Stage 4 Programme of Study.

These strands are:

- finding things out
- developing ideas and making things happen
- exchanging and sharing information
- reviewing, modifying and evaluating work as it progresses.

This specification develops this Programme of Study for ICT, to provide the substance and range to merit a GCSE award.

Key features

- Development of Edexcel's existing GCSE Information Technology specifications.
- Practical approach used to develop a body of skills and knowledge.
- 60% coursework assessment with considerable flexibility in choice of coursework problems.
- Innovative coursework marking criteria with extensive guidance and exemplar material provided.
- External examination composed of a range of assessment styles, including multiple-choice questions, general structured questions and structured questions based around a pre-released case study.
- ICT work carried out by students in other areas of the curriculum can be used as the basis of coursework tasks.
- Can be taught alongside the Edexcel GCSE (Short Course) in Information & Communication Technology (3185).
- Proxy arrangements for awarding IT key skill units at key skills level 1 and 2.

Summary of the specification content

The body of skills and knowledge required of students is defined by the list of learning outcomes provided on pages 10-14. These learning outcomes detail the ICT skills and knowledge that might be assessed during external assessment, although much of this knowledge will also underpin the tasks undertaken for internal assessment.

This GCSE specification has been written against the Key Stage 4 Programme of Study for England. Students entering for this GCSE in Wales and Northern Ireland must be taught all the material required by the national curriculum in their own country.

Summary of scheme of assessment

GCSE ICT Full Course

Paper or component	Mode of assessment	Weighting	Length
Paper 1	Four coursework projects	60%	
Paper 2	Section A – Multiple-choice answer questions Section B – Structured questions based on an annually pre-released case study Section C – Structured questions	40%	2 hours

GCSE ICT Short Course

Paper or component	Mode of assessment	Weighting	Length
Paper 1	Two coursework projects	60%	
Paper 2	Section A – Multiple-choice answer questions Section B – Structured questions based on an annually pre-released case study	40%	1 hour

Availability of external assessment

First assessment of this specification will be in June 2003. Assessment will be available in each summer examination session thereafter.

Prior learning and progression

This specification builds on the knowledge, understanding and skills that students have established through the National Curriculum at Key Stages 1, 2 and 3, and is a QCA-accredited GCSE course, based on the Key Stage 4 Programme of Study for ICT. It provides a foundation for further study at levels 2 and 3 in the National Qualifications Framework, including:

- AS and Advanced GCE in Computing
- AS and Advanced GCE in ICT
- Advanced VCE in ICT
- BTEC Nationals in Computing
- NVQ in IT at level 3.

Forbidden combinations and links with other subjects

Every specification is assigned a national classification code indicating the subject area to which it belongs. Centres should be aware that students who enter for more than one GCSE qualification with the same classification code will have only one grade (the highest) counted for the purpose of the school and college performance tables.

The classification code for this specification is 2650.

Candidates entering for this specification may not, in the same series of examinations, enter for any other specification with the title 'GCSE in Information & Communication Technology' or 'GCSE (Short Course) in Information & Communication Technology'.

Specification aims and assessment objectives

National Qualifications Framework criteria

This specification is based on the common criteria and the GCSE criteria, which are prescribed by the regulatory authorities, including QCA, and are mandatory for all awarding bodies. This specification is also derived from the prescribed Subject Criteria for Information & Communication Technology.

Aims

This specification aims to:

- encourage students to gather, store, process, present and communicate information through activities in a range of contexts
- encourage students to solve problems through the use of ICT systems and associated principles and techniques
- develop a broad and balanced view of the range of applications of ICT systems including modelling, data logging and control
- give students opportunities to design, implement and document ICT systems
- develop understanding of the wider applications and effects of ICT
- foster an awareness of what characterises information, information processing and ICT systems
- develop an awareness of ethical, social, economic and political consequences of the use of ICT systems for individuals, organisations and society through the study of meaningful applications.

Assessment objectives

Students should demonstrate the ability to work with ICT to:

AO 1	apply their knowledge, skills and understanding of ICT to a range of situations
AO 2	analyse, design, implement, test, evaluate and document ICT systems for use by others and develop understanding of the wider applications and effects of ICT
AO 3	reflect critically on the way they and others use ICT
AO 4	discuss and review the impact of ICT applications in the wider world
AO 5	consider the social, economic, political, legal, ethical and moral issues and security needs for data which surround the increasing use of ICT.

Scheme of assessment

Entry tiers

Students for this qualification must be entered for one of two tiers. The Higher Tier is targeted at grades A* to D, and the Foundation Tier is targeted at grades C to G. A safety net is provided for students entered for the Higher Tier in this specification, and an allowed grade E can be awarded on the Higher Tier. Students failing to achieve grade E on the Higher Tier will be reported as Unclassified (U).

For **both** tiers of entry, there will be an internal **and** external assessment component. All candidates will be required to take Papers 1 and 2.

There will be a Foundation Tier (F) and a Higher Tier (H) version of Paper 2.

Some parts of the specification content are only assessed in the Higher Tier Paper 2. Clarification of exactly what knowledge is expected for Foundation and Higher Tier candidates can be found on pages 10-14.

Internal assessment – Paper 1 – coursework collection

The planning and realisation of responses to distinct problems, centred around practical ICT skills, is fundamental to the learning approach of this specification. Each candidate is required to identify and solve **four** distinct problems, to be chosen from a list of prescribed problem types, producing documented evidence of their efforts along the way. Coursework is centre-assessed, using the criteria on pages 15-27, and is externally moderated by Edexcel.

It is important to note that **none** of the coursework tasks is intended to be a major project. They should be concise and relevant problems. Where appropriate, candidates should attempt their solutions via the five process headings, Identify, Analyse, Design, Implement, and Evaluate. More detailed explanation can be found on pages 15-27.

External assessment – Paper 2 – terminal written examination

The questions set on the terminal examination address a selection of the learning outcomes outlined on pages 10-14.

Paper 2 is scheduled for a two hour examination session. The paper is divided into three sections **A**, **B and C**. Full course candidates will sit all **three** sections.

*(Short Course candidates will leave the examination room after one hour, completing sections **A and B only**.)*

Section A – Multiple-choice answer questions

The questions set will address a selection of **all the learning outcomes**, and the compulsory processes and opportunities allowed by the software listed in *Appendix 3*, on page 55. All questions are compulsory.

Section B – Systems design

Structured questions based on a pre-released case study

Each year Edexcel will publish, early in year 10, a case study that will form the framework for a series of structured questions in section B of Paper 2.

During the examination candidates will be given a number of compulsory questions that require them to complete a selection of design tasks relating to the stated problem.

In addition, candidates may be asked questions that relate to aspects of the implementation and testing of a solution to the stated problem.

A sample case study can be found in the specimen papers published with this specification.

Section C – Structured questions

The questions set will address a selection of **all the learning outcomes**, and the compulsory processes and opportunities allowed by the software listed in *Appendix 3*. Questions will typically be set in a meaningful context, which relates to a sensible use of ICT. All questions will be compulsory.

Please refer to the complete learning outcomes table on pages 10-14, to see in which sections of the terminal examination specific learning outcomes might be assessed.

Relationship of assessment objectives to external assessment

To help teachers plan students' work, the following table is offered as a guide to the relationships between assessment objectives and assessment components.

This table will be used by examiners to ensure that appropriate weightings are given to the assessment objectives within the terminal papers. (The sample papers are presented with analysis tables to show which learning outcomes have been considered.)

		Percentage of assessment objective Assessed per assessment component	
	Assessment objective	**Coursework**	**Terminal Paper 2**
AO 1	applying knowledge, skills and understanding of ICT to a range of situations	**25**	10 **13** 15
AO2	analyse, design, implement, test, evaluate and document ICT systems for others' use, and develop understanding of the wider applications and effects of ICT	**25**	10 **13** 15
AO 3	reflect critically on the way they and others use ICT	**10**	3 **5** 7
AO 4	discuss and review the impact of ICT applications in the wider world	**0**	2 **4** 6
AO 5	consider social, economic, political, legal, ethical and moral issues and data security needs surrounding the increasing use of ICT	**0**	3 **5** 7
	Totals	**60%**	**40%**

Note that the figures in bold give the preferred weightings. The other figures for the terminal paper give a permissible range.

Thus, by reference to the bold figures, it is seen that the preferred weighting of objectives 1 and 2 combined is 76% and the weighting of 3, 4 and 5 combined is 24%.

Internal assessment moderation procedures

To assist centres, detailed internal assessment moderation procedures are given in *Appendix 2*. If it proves necessary to amend these details in any way in the future, centres will receive separate notification.

Quality of written communication (QoWC)

The quality of candidates' written communication (QoWC) will be assessed in both the coursework (Paper 1) and the terminal examination (Paper 2).

Candidates will be assessed on their ability to:

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

For the terminal examination, marks will be awarded where there are opportunities for extended writing, namely Sections B and C for Full Course candidates, and Section B only for those taking the Short Course.

For the coursework component, a maximum eight extra marks may be awarded for the quality of written communication evidenced by the candidate **across the complete coursework collection**. This is in addition to the 160 marks available for the four coursework problems. Full details of the performance criteria are provided in the guidance for marking the coursework collection, on page 27. Please also refer to the Coursework Collection Cover Sheet (CCCS 1) on page 53, where the awarding of these marks must be recorded.

Awarding, reporting and equivalence

The grading, awarding and certification of this specification will comply with the requirements of the GCSE and GCE A/AS Code of Practice for courses starting in September 2001, which is published by QCA. Qualifications will be graded and certificated on an eight-grade scale from A* to G.

GCSEs have broad equivalence to General National Vocational Qualifications in the following terms:

- two GCSEs at grade D to G and two GCSEs at grade A* to C are equivalent to one three-unit GNVQ at Foundation and Intermediate level respectively
- four GCSEs at grades D to G and four GCSEs at grade A* to C are equivalent to one six-unit GNVQ at Foundation and Intermediate level respectively.

Assessment language

Assessment of this specification will be available in English only. Assessment materials will be published in English only and all written work submitted for examination and moderation must be produced in English.

Students with particular requirements

Regulations and guidance relating to students with special requirements are published annually by the Joint Council for General Qualifications and are circulated to examinations officers. Further copies of guidance documentation may be obtained from the address below or by telephoning 0870 240 9800.

Edexcel will assess whether or not special consideration or concession can be made for students with particular requirements. Requests should be addressed to:

Special Requirements
Edexcel Foundation
Stewart House
32 Russell Square
London WC1B 5DN

Private candidates

This specification is not available to private candidates.

Specification content

The learning outcomes

These learning outcomes define the content of the whole specification, both coursework and terminal examination.

Details provided in the 'To include' column should be seen as examples and not as a closed list. **It is important to note that the learning outcomes are *not* of equal substance and the amount of time that should be dedicated to each will depend on its content**.

In the terminal examination, the parts emboldened will be addressed **only** at the Higher Tier of entry. This emboldening should be consulted when considering examination entry.

The candidates should be able to:

Code	Learning outcome	To include	Paper in which outcome may be examined
LO1	Identify the constituent parts of an ICT system and their functions.	*Hardware*: input and output devices, backup storage, central processing unit, memory (ROM, RAM). *Software*: operating system, applications packages.	2A/2B/2C
LO2	Explain the key role of the central processing unit.	Carrying out instructions within the software, **handling control signals**, **performing arithmetic operations**, **storing data**.	2A/2B/2C
LO3	Interpret the internal representation of data in an ICT system.	Use the terms bit, byte and multiples of these units. **Interpret a bit pattern as a character using an internal code (ASCII)**.	2C
LO4	Describe the key functions of the operating system.	Input/output control, file management, peripheral management, resource allocation, **command interpreting**.	2C
LO5	Use major applications packages to solve problems and describe their purpose and key features.	*Word processing*: editing, cut and paste, formatting, spellcheck, mail merge. *Database*: record, field, key field, file, sorting, searching (including use of AND, OR and NOT), updating, reports. *Spreadsheet*: cell, row, column, formulae, recalculation, replication, cell format, graph plotting.	1/2A/2B/2C

Code	Learning outcome	To include	Paper in which outcome may be examined
LO5 (cont'd)		*Desktop publishing*: frames, fonts, text size, styles, import of text and graphics, sources of graphics, re-sizing of graphics. *Graphics*: drawing, painting, CAD, bitmapped images, vector graphics.	
LO6	Identify appropriate uses for, and evaluate, software.	Application packages, operating system utilities (eg backup utility).	1/2A/2B/2C
LO7	**Recognise and use file handling terms**.	**Transaction file**, **master file**, **update**, **merge**, **file generations**, **serial/direct access**, **batch processing**.	2C
LO8	Select appropriate input, output and storage media and devices for a given application.	*Input*: keyboard (QWERTY, concept), mouse, tracker ball, graphics tablet, scanner, digital camera, touch screen, OMR, OCR, bar code scanner, magnetic stripe reader, microphone. *Output*: monitor (CRT and LCD), printer (dot matrix, ink jet, laser), plotter, speakers, motors. *Storage*: floppy disk, hard disk, CD, magnetic tape.	1/2A/2B/2C
LO9	Encode data and information for computer processing and relate this operation to a given application.	*Benefits of*: reduction in space required for storage and display, ease of data entry and validation.	1/2A/2B/2C
LO10	Describe and use data capture operations and relate these to a given application.	Collection, preparation, input, verification performed by operator. Design of data capture forms and input screens.	1/2A/2B/2C
LO11	Describe and use input validation techniques and relate these to a given application.	Validation performed by software. Range, field type and field length checks, check digits.	1/2A/2B/2C
LO12	Specify the output for a given application.	Design of output screens and printed reports.	1/2A/2B/2C
LO13	Present results for different target audiences **and justify the methods selected**.	Tables, diagrams, graphs.	1/2C
LO14	Specify and create the files necessary for a given application.	Record structure in terms of fields. Defining the necessary fields in terms of their length, type and validation. Showing typical values for fields.	1/2A/2B/2C
LO15	Explain the need for backup procedures and identify suitable techniques.	Frequency, quantity of data, compression, duration, choice of media.	1/2C

Code	Learning outcome	To include	Paper in which outcome may be examined
LO16	List and describe in outline the main aspects of systems analysis and relate these to a given application.	Investigation, analysis, design, implementation, monitoring.	2C
LO17	Develop an algorithm (series of commands) to solve a problem.	Describing or interpreting an algorithm in the form of a flowchart.	1/2A/2B/2C
LO18	Describe methods of system security.	Personal and file passwords, levels of access, restricted physical access.	2C
LO19	Choose appropriate ICT systems, software tools and techniques to solve a problem.	See discussion of the coursework collection on pages 15–26.	1/2A/2B/2C
LO20	Explain the need for testing **and design the testing procedures** for a given application.	**Use of typical**, **extreme and invalid data**.	1/2A/2B/2C
LO21	Evaluate the solution to a problem.	Identification of existing shortcomings and possible future improvements.	1/2A/2B/2C
LO22	Document the solution to a problem.	Using appropriate methods of communication eg sketches, diagrams, tables, graphs, flowcharts, photographs.	1/2A/2B/2C
LO23	Demonstrate an appreciation that ICT systems should be designed to communicate with humans.	Evaluation and design of user interface. Command line, menu driven, GUI.	1/2C
LO24	Describe the social, economic, legal, ethical and moral effects of using ICT systems.	The role of government legislation regarding ICT use. Potential benefits and drawbacks of ICT usage in a wide context, including: commerce, industry, home, school, leisure and government. Health and safety issues. Internet use: undesirable material, child access, filtering, junk E-mail, copyright issues, accessibility for all members of society. Unauthorised computer access – 'hacking'.	2A/2B/2C
LO25	Describe the nature of a real or imaginary system that has been modelled in an ICT system.	Flight simulators, games, science experiments, weather forecasting, economic models, virtual reality.	2A/2B/2C
LO26	State the benefits and limitations of models and simulations.	*Benefits*: safety, economic, variety of possible experiences/situations. *Limitations*: differences between simulation and reality.	2A/2B/2C

Code	Learning outcome	To include	Paper in which outcome may be examined
LO27	Design and perform experiments that involve modifying the data used by a model **and the rules that define a model**.	For example, *data*: speed at which collision of cars occurs; *rules*: effect of collision at different speeds.	2C
LO28	Describe the concepts of data logging and control technology.	Specify the input, processing, output and storage required for a stated data-logging or control application. Range of sensors available. Need for appropriate interface. **Interpret a bit pattern as a collection of control signals**. **The concept of real time processing**.	2C
LO29	Use the terms local area network (LAN) and wide area network (WAN).	*LAN*: computers on one site, connected using own cabling. *WAN*: computers on different sites, connected using telephone/satellite links.	2A/2B/2C
LO30	**Explain the hardware and software requirements for the formation of a LAN**.	**Cabling**, **network interface card**, **server**, **operating system**.	2C
LO31	Explain the advantages and disadvantages of networked ICT systems compared to stand-alone ICT systems.	*Advantages*: access from any workstation, central storage of data and software, sharing of expensive peripherals, control of users' access rights. *Disadvantages*: cost of installation, reliance on server, need for security, need for network manager.	2A/2B/2C
LO32	Identify differences between network topologies.	Bus, star. Greater fault tolerance of star networks.	2C
LO33	Identify the advantages and disadvantages of different communication methods.	Post, telephone, fax, E-mail, video conferencing.	2A/2B/2C
LO34	State how data transfer speeds are apparent to the user.	Response time, download time.	2C
LO35	Identify requirements for connecting to the Internet.	*Hardware*: modem. *Software*: web-browser, E-mail package. Internet Service Provider (ISP).	2A/2B/2C

Code	Learning outcome	To include	Paper in which outcome may be examined
LO36	Describe and use the key features of communications software to access the Internet.	*Web-browser*: storing links (shortcuts, favourites), history, navigation, cache ('temporary' pages). *E-mail*: on-line/off-line use, reply, forward, address book, mailing lists, attachments.	2A/2B/2C
LO37	Identify the features of common Internet services.	World Wide Web, E-mail, news groups, chat rooms. Describe the wide range of services available on the World Wide Web: advertising, customer support, distribution of software, e-commerce.	2C
LO38	**Identify the advantages and disadvantages of the Internet as a source of information**.	***Advantages***: **readily accessible from any computer**, **up to date, multi-media**, **huge amounts of available data**, **search engines**, **E-mail response**. ***Disadvantages***: **cost of equipment/connection**, **difficulty of finding information required from all that is suggested in searches**.	2C

Internal assessment

Paper 1 – The coursework collection

The production of the coursework collection is the key to the learning approach of this whole specification.

Each candidate will be expected to identify and solve **four** distinct problems.

These ICT activities include the necessary aspects of 'Systems Analysis' followed by the use of ICT implementation techniques demanded by the design.

It is stressed that candidates should be given access to the most powerful appropriate tools that can be made available. For guidance, please refer to *Appendix 3*, *Facilities required*.

Evidence required to assess the coursework collection

For each of the four problems, students should present documentation of their solution to the problem being addressed. This documentation should include:

- a cover page, detailing the candidate's name, candidate number and the type of problem being addressed
- detailed evidence of the research, activities and processes (including analysis, evaluation and testing) that have been undertaken, including any appropriate rough notes
- hard-copy evidence of the final solution.

Where possible these problems should be presented under the following process headings:

Process heading	Maximum mark
Identify	5
Analyse	9
Design	9
Implement	12
Evaluate	5
Total	**40**

The maximum possible number of marks available in each of the sections is outlined. In addition to these, there are a **further possible eight marks** available for the quality of written communication (QoWC) displayed by the candidate, considering the four projects as one collection. Further details and the criteria for marking quality of written communication can be found on page 29.

Differentiation is one of the major problems with regard to the assessment of coursework because of the need to distinguish between good work that is based upon an exacting task, as compared with very good work based upon a less demanding task. To help teachers and moderators, the assessment guidance gives two mark ranges – **Standard and Extension**.

When marking coursework, teachers will have to exercise judgement, based on the guidance provided, as to what level of task the student has attempted. Having decided this, the teacher must then use the appropriate mark range in the Assessment Criteria when assigning marks for the project in question. Teachers must record their judgement of the complexity level of individual problems in the space provided on the Coursework Collection Marking Sheet (CCMS 1 – page 53).

It should be noted that in the Identify and Evaluate sections it is possible for Standard problems to gain all of the available marks; however, **in the Analyse**, **Design and Implement sections**, **the maximum number of marks that can be gained by Standard problems is reduced**.

Prescribed problem types

Four distinct problem types must be addressed.

Two of these must be:

a Creation and Manipulation of Databases

b Creation and Manipulation of Spreadsheets

The **remaining two** must be chosen from the following:

c Data Logging and Control

d Word Processing

e Desk Top Publishing

f Website Publishing

g Multi-media

h Programming

i Free Choice 1

j Free Choice 2.

The Free Choices are designed to give students and centres the opportunity to use all areas of ICT. Students and teachers must be sure that the problems chosen will allow them to demonstrate the necessary skills required.

Students may only attempt both a Word Processing **and** a Desk Top Publishing project when the nature of the two projects is **significantly different**. Please refer to page 28 for guidance.

None of the coursework tasks is intended to be a major project. They should be small, yet worthwhile, problems. It is important that, where appropriate, students attempt the solution via the five process headings given on page 15, so that they have the experience of an organised approach.

It is essential to ensure that careful attention is paid to the choice of problem in the initial Identify section, **as this will seriously influence the opportunities for students to score highly in the Analyse**, **Design**, **Implement and Evaluate sections**, **where real ICT skills are evidenced**.

Coursework guidance – internal assessment

The following table gives an indication of the ICT techniques that would be expected to be used in problems of varying scope.

It must be stressed that these skills must be relevant to the solution of the initial problem and not used in isolation. It is also not necessary for a student to evidence all of the skills at a given level.

The problem chosen should be realistic, **with an attainable solution from the student's point of view**.

The higher levels will also include the processes in the lower ones.

Levels of response – a general guide

Problem type	Standard problems will involve the use of the following skills	Extension problems will involve the use of the following skills
General	General input, editing, processing and formatting associated with the software	More complex processes associated with the software including importing data from another package and customising the software for easy use

Levels of response for specific problem types

Problem type	Standard	Extension
Creation and Manipulation of a Database	Create the data files Search the database Sort the database Generate reports	Complex searches (eg and/or) Reports from more than one file Related tables Macros
Creation and Manipulation of a Spreadsheet	Enter text and numeric data Use of formulae Multiple sheets Printing Generate graphs	Multiple sheets with automatic transfer of data Complex formulae (eg if…) Look up tables Macros
Word Processing	Enter and edit text Font type and size Inserting clip art Page set up Columns Printing	Importation of data from another application Mail merge Setting up templates Macros
Desk Top Publishing	Enter and edit text Font type and size Inserting clip art Page set up Columns Printing	Importation of data from another application Text flow between blocks Image manipulation
Website Publishing	Enter and edit text Insert clip art Hyperlinks Font type and size Background	Importation of data from another application Image manipulation Web bots Forms CGI scripts Use of tables for layout

When marking, teachers should use the examples above as a guide to justify their marking for problem types not listed.

Assessment criteria for the coursework collection

Identify (5 marks)

Standard and Extension	Assessment criteria	Evidence	Notes
0 –1	A statement of the problem which is unclear or lacks detail.	*In order to do this, a student should provide*: Written evidence that outlines the problem that needs to be solved.	• The 'real' user may need to be fictitious, but it should not be the student themselves. Role-play can be useful here with other students playing the role of 'real' users. • Possible solutions could include a comparison of 'manual' methods with an ICT solution, stating why the ICT solution is preferred. In some cases it may be possible to suggest other software packages that could have been used to solve the problem. • Quantitative objectives, that can be measured, are much better for testing than objectives which are very general. *For example*: 'The user needs to be able to print out a list of stock that is out of date'. 'The user needs to send a letter to customer who has not paid his bill this week'. *Are preferable to*: 'The solution must be easy to use'.
2 – 3	A clear statement of the problem which identifies the user(s). Consideration of possible alternative solutions. Objectives or user requirements should be stated.	Written evidence that clearly identifies the problem that needs to be solved and the user(s). Alternative solutions need to be considered. Objectives are stated in general terms.	
4 – 5	A clear statement of the problem, giving some background detail and identifying the 'real' user(s). Consideration of possible alternative solutions with adequate justification given for the chosen method. Quantitative objectives or user requirements.	Written evidence that provides comprehensive details of the problem that needs to be solved and the 'real' user(s). Alternative solutions should be considered with justification for the proposed solution. Objectives will be quantitative. At least three quantitative objectives should be identified for the top marks.	

Analyse (9 marks)

Standard	Extension	Assessment criteria	Evidence	Notes
			In order to do this, a student should provide:	
0 – 2	0 – 3	Software identified. Raw data required has been partially identified. The output required has been identified. There is some explanation of how the data will be manipulated to solve the problem.	• Software and hardware – explanation of what software is going to be used and why it is suitable for this problem.	• A complete list of hardware is not necessary, only the hardware especially relevant to the problem, eg a scanner and colour printer for producing a magazine.
3 – 4	4 – 6	Software and hardware identified. The raw data required has been identified and its source and method of collection partially explained. Some explanation of the processing required. Flow of data through the system has been partially identified. Alternative forms of output have been considered and appropriate choices made. Backup and security strategies have been considered.	• Analysis of the input data required, including source and methods of collection and error checking. • Processing – how the data will be manipulated to solve the problem. Explanation of the flow of data through the system.	• Inclusion of details of any preparation of the data required before input and verification and/or validation procedures used. • Diagrams may be a useful means of explanation. The flow of data through the system must be clear and explicit for full marks to be awarded.
5 – 6	7 – 9	Appropriate software and hardware identified. Data collection and input has been fully explained. Ways in which the data will be manipulated to solve the problem have been fully explained. The flow of data through the system is clear and explicit. Alternative forms of output have been considered and appropriate choices made and justified. Appropriate backup and security strategies have been identified and fully explained.	• Analysis of output requirements and formats. • Analysis of strategies for backups and security.	• What output is going to be screen based and what data needs to be printed? Will different output be required at different times or in different situations? Will the output be sorted or a sub set of the data? What layout is needed? • A backup strategy suitable for the user should be clearly explained. Frequency, media, amount of data and time required to perform backup should be considered.

Further guidance on 'Analyse'

Data required and its source

Examples

- Database — Part numbers, descriptions and prices from a catalogue
- Spreadsheet — Dates, customer names and total bill from invoices
- Desk Top Publishing — Information about planets from encyclopaedia, picture of each from NASA website
- Website Publishing — Details of car models from brochure and images obtained at club meeting with digital camera.

Data collection

This could be achieved using a form or questionnaire or by copying from the original source.

Data input

Selection of an appropriate method, eg keyboard, scanning and any verification or validation that is needed.

Data manipulation

Examples

- Database — Fields required, outline of updates, searches, sorts, reports that will be needed
- Spreadsheet — Calculations that need to be performed
- Desk Top Publishing — Number of pages, columns, text required, graphics required
- Website Publishing — Number of pages, links, text required, graphics required.

Flow of data

What is the sequence of operations needed to solve the problem? Flowcharts or other diagrams should normally be included. Reference should be made to the objectives/user requirements previously identified.

Output

What output is going to be screen based and what data needs to be printed? Alternative forms of output should be considered. Will different output be required at different times or in different situations? Will the output be sorted or a sub-set of the data?

Backup/security strategy

Examples

- A weekly backup to floppy disk if the user has a simple set of accounts that they only update once a week; a daily backup to tape for a large database that has changes made to it every day.
- The importance of security procedures will depend on the nature of the data being stored and the user. When password use is recommended, the user needs to be given guidelines about the effective use of this method of security.

Design (9 marks)

Standard	Extension	Assessment criteria	Evidence	Notes
			In order to do this, a student should provide:	
0 – 2	0 – 3	Initial designs do not have enough detail for the user to make a judgement as to their suitability. No user's comments have been recorded. The final design contains little detail and the student would be unable to repeat the solution at a later date. No test plan.	• Initial designs. • User feedback on the initial designs. • Final designs. • Test plans.	• Initial designs concentrating on look and feel. • Comments from the user could be written on the initial design, or be in the form of a letter. If there were several users, a questionnaire could be used. • Final designs should now take into account the user comments and contain all the detail needed to complete the task. • The test plan devised should be linked to the objectives described in the 'Identify' section and any validation techniques used.
3 – 4	4 – 6	Initial designs are adequate for the user to get an idea of how the problem is to be solved. The user's comments have been recorded. The final design has enough detail for the student to carry out the solution, but not a competent third party. A test plan is present but does not fully test the problem.		
5 – 6	7 – 9	Initial designs are accurate enough for the user to make a reasoned judgement as to their suitability. The user's comments have been accurately recorded and acted on in the final design. The final design is described in such detail that a competent third party could implement the design. The proposed solution is broken down into manageable sub-tasks. A full and effective test plan has been devised, based on the previously identified objectives. Where validation techniques are planned, a full set of suitable test data has been devised.		

Further guidance on 'Design'

Initial designs would typically be handwritten sketches without a lot of detail. They would be used to check with the user that the design roughly met their requirements. At this stage they would not be expected to include details such as formulae, search instructions or font sizes.

Taking the user's comments into account the student can then go on to put further detail into the design.

For example:

- Database — File structures, validation details, clearly defined updates, sorts, searches, layout of screen forms and reports
- Spreadsheet — Layout, formulae, validation details, macros
- Desk Top Publishing — Page layout – positions of frames/columns/lines, fonts, text size, paragraph styles, position/size of graphics and blocks of text, links between frames
- Website Publishing — Page layout, position of graphics/lines/tables, navigation buttons, clearly defined map of links.

Test plans

Database and Spreadsheet

Details of test data and a quantitative test plan are required. Tests with typical, extreme and invalid data.

For example:

- Database — Test plan for searches, sorts and reports.
- Spreadsheet — Test plan for formulae.

Word Processing and Desk Top Publishing

The method of testing will be more descriptive, detailing the use of spellchecker, print preview, proof reading and aesthetic testing.

Website Publishing

Many of the tests for Word Processing and Desk Top Publishing are also suitable for this problem type. In addition, a test plan for links would be required.

Implement (12 marks)

Standard	Extension	Assessment criteria	Evidence	Notes
			In order to do this, a student should provide:	
0 – 2	0 – 3	A project that provides evidence that the software has been used, but bears little or no resemblance to the design and there is little or no evidence of testing.	**Annotated** hardcopy evidence of both implementation and testing, showing full details of the implementation process.	• Whenever appropriate, the hardcopy evidence should be presented as if it had been produced by the user(s) using the system that has been implemented. • It is not necessary to enter large amounts of data to simulate use of the implemented system, eg stock control with thousands of records. Approximately 20 realistic records should be adequate to demonstrate the system's use. • If the final version differs from the original design, students should include some notes as to why the changes were necessary. • Students should annotate their hardcopies to show the sequence of development, errors and areas for improvement. • Testing should be annotated to show how the expected and actual results compare.
3 – 4	4 – 6	A project that provides evidence that the design has been implemented with some omissions. There is evidence that errors have been corrected and some unstructured testing has taken place.		
5 – 6	7 – 9	A project that provides evidence that the design has been implemented. Error correction has taken place and a test plan has been partially implemented or the test plan is not relevant to the problem.		
7 – 8	10 – 12	A project with evidence that the design has been fully implemented showing clearly that the problem has been solved. Evidence that all errors have been corrected and that a relevant test plan has been fully implemented.		

Evaluate (5 marks)

Standard and Extension	Assessment criteria	Evidence	Notes
0 –1	Evaluation is non-existent or weak with only general comments.	*In order to do this, a student should provide*: • Written evidence of an evaluation of each of the objectives in the 'Identify' section. • Evidence that the user has seen the problem's solution. • Written evidence of further improvements.	• Each of the original objectives should be evaluated as to whether they have been solved. Any problems the student had such as major changes to their design also need to be mentioned. • Comments should be based on solving the problem not on the student's ability to use the software, etc. • User feedback could be in the form of a letter or a questionnaire if there are multiple users. Critical and honest answers are much more useful to the student. • The user feedback should lead the student into identifying further enhancements to the solution.
2 – 3	Evidence of evaluation against the objectives. User comments may be present but are too general.		
4 – 5	Original objectives are fully evaluated and the user comment is critical and relevant. There is evidence that the student has understood the user's comments and has suggested changes for the future.		

Free Choice tasks

Any 'Free Choice' task **must be different from any other task that is presented for assessment**.

This would usually mean using a different software package. However, it is possible to use the same software package to solve two different problems.

The following example indicates how the different facilities of a software package can make the project different. A student could:

- use a spreadsheet for the collection of data and the presentation of computed results
- use a spreadsheet to contribute towards the solution of a financial or mathematical problem.

Word Processing and Desk Top Publishing use very similar software packages, therefore if they are both used they must solve different tasks. A student could use:

- word processing to produce a mail-merged letter using data imported from a database
- desk top publishing to produce a programme for a sports day.

The Free Choices allow the teacher and the student freedom to exploit their own interests and the use of the wide range of software that may come their way.

The teacher must make an informed judgement as to whether any proposed problem is sensible for the student and compatible with the specification requirements.

The potential range of problem types is vast, spanning such areas as graphics software (eg video image transformations), windows programming, multimedia systems using objects, or even assembly language programming if the problem demands such an approach.

On the other hand, the power and facilities of the software listed in *Appendix 3* (page 55) are more than sufficient to meet the needs of this specification at the highest level.

Marking the coursework collection

1 For each student, four Coursework Collection Marking Sheets (one for each problem) should be completed. The sheet is shown in *Appendix 2*, on page 52. Centres should copy this as required.

2 Up to eight marks are awarded by the teacher for quality of written communication (QoWC), examining the entire collection of coursework as a whole. The criteria for the award of these marks is as follows:

Quality of Written Communication – assessment criteria

Level 1	Information given has limited relevance and is presented with a little clarity. Students spell, punctuate and use the rules of grammar with some accuracy.	1-2 marks
Level 2	Some relevant information is presented, with varying degrees of clarity. Students spell, punctuate and use the rules of grammar with reasonable accuracy; they use words and phrases – including specialist terms – with some accuracy.	3-5 marks
Level 3	Relevant information is presented with clarity of expression. Students spell and punctuate with considerable accuracy, and use a range of grammatical constructions, competently employing specialist and ICT terms.	6-8 marks

It is mandatory for teachers to annotate and give evidence when marking coursework. For guidance, please refer to the GCSE and GCE A/AS Code of Practice, which is published by the Qualifications and Curriculum Authority (QCA).

Similarly, when awarding marks for QoWC, the 'comments' column on the CCCS 1 sheet (page 53) should be completed.

3 The totals for each of the four problem types will be transferred to an Optically-read Teacher Examiner Mark Sheet (OPTEMS), which is issued in the spring term of the year of the examination.

Grade descriptions

The following grade descriptions indicate the level of attainment characteristic of the given grade at GCSE. They give a general indication of the required learning outcomes at each specified grade. The descriptions should be interpreted in relation to the content outlined in the specification; they are not designed to define that content. The grade awarded will depend in practice on the extent to which the student has met the assessment objectives overall. Shortcomings in some aspects of the examination may be balanced by better performances in others.

Grade F

Candidates:

- show a basic knowledge of familiar, simple information processing and communication applications and of the techniques and systems needed to support them
- show knowledge of some of the basic ICT terms and definitions
- respond to needs and opportunities and evaluate ways of addressing these using information and communication systems
- understand the need for precision in framing questions when finding, selecting and collecting information
- use ICT to explore, develop and interpret information
- develop, test and modify sets of instructions to automate processes and to make things happen
- use computer models to detect patterns and relationships
- use ICT to share, exchange and present work and demonstrate how it contributes to the development of their ideas
- reflect on their use of ICT and show some knowledge of its use in the wider world.

Grade C

Candidates:

- show some knowledge and understanding of the range and scope of information processing and communication applications and of the techniques and systems, including the software and hardware sub-systems, needed to support them
- show a good understanding of basic ICT terms and definitions and are able to contrast and compare related ideas
- identify needs and opportunities and analyse, design and evaluate appropriate ways of addressing these using information and communication systems
- use complex lines of enquiry to find and select information, from a wide range of sources
- explore, develop and interpret information to carry out a range of tasks and produce appropriate solutions to problems
- show awareness of efficiency and economy in developing, testing and refining sets of instructions to automate processes and to make things happen, including responding to external events

- use computer models to investigate and test hypotheses
- use ICT to share, exchange and present work, demonstrating a consideration of audience and purpose
- show awareness of the need to detect the loss or corruption of information and to prevent the abuse of personal information
- reflect critically on their use of ICT and consider the effects of its use in the wider world.

Grade A

Candidates:

- show a good knowledge and understanding of the range and scope of information processing and communication applications and of the techniques and systems, including the software and hardware sub-systems, needed to support them
- use ICT terms and definitions appropriately and are able to contrast and compare related ideas
- apply general principles of information processing to given situations and abstract general principles from given examples
- identify a range of needs and opportunities, carry out systematic analysis, and design and evaluate effective ways of using information and communication systems
- evaluate information sources, software packages and computer models, analysing the situations for which they were developed and assessing their efficiency, appropriateness and ease of use
- use complex lines of enquiry to find and select information, using a wide range of sources
- explore, develop and interpret information to carry out a range of tasks and produce effective working solutions to a range of problems, including designing and implementing systems for others to use
- show efficiency and economy in developing, testing and refining sets of instructions to automate processes and to make things happen, including responding to external events
- use and develop computer models to investigate and test hypotheses
- use ICT to share, exchange and present work, demonstrating a clear sense of audience and purpose
- discuss methods of detecting the loss or corruption of information and describe steps which can minimise the likelihood of the abuse of personal information
- reflect critically on their use of ICT and show understanding of the effects of its use in the wider world.

The wider curriculum

Key skills

This qualification will provide opportunities, as appropriate, to develop the key skills of communication, information technology, application of number, improving own learning and performance, working with others and problem solving. In particular, this qualification provides **full exemption** from all the assessment requirements of the IT key skill. Candidates achieving grades G to D will be eligible for IT key skill level 1 certification. In the same way, grades C to A* in the GCSE provide eligibility for IT key skill level 2 certification.

It is important that these opportunities fall naturally into a programme of study, and it may be that not all the examples are appropriate for all programmes. The examples offered may be adapted to suit particular situations, and it will be possible to devise many alternative opportunities and approaches. The development of key skills can enhance teaching and learning strategies and can be a stimulus to new approaches, and increase levels of student involvement.

Key skills opportunities are detailed more fully in *Appendix 1*.

Moral, ethical, social and cultural issues

This specification contributes to an understanding of:

- **moral and ethical issues** surrounding the adoption and use of ICT in a variety of contexts, including – patterns of employment, data protection, security issues, Internet use and abuse
- **social issues** associated with the adoption and use of ICT in a variety of contexts, including – education, training, patterns of employment, data protection, Internet use and abuse, use of leisure time, availability of information, changes in communications
- **cultural issues** surrounding the adoption and use of ICT in a variety of contexts, including appreciation of differing attitudes to technology, availability of information, suitability of content and accessibility for all, as well as language issues.

Education for citizenship

This specification contributes towards students acquiring knowledge and understanding relevant to responsible use of ICT systems and the ability to critically appraise the use of ICT systems by others. In addition, it will:

- encourage students to make sensible value judgements about the use of ICT systems and equip them to contribute to technological debates as informed citizens
- show why and how technology is developed for individuals and organisations, eg control systems and interface design for those with disabilities
- make students aware of the legal implications of acquiring, processing, storing, and transmitting digital information within the framework of legislation defining these activities, eg Data Protection Act, Computer Misuse Act and copyright
- make students aware of the impact of technology on the political, economic and leisure spheres locally, nationally and globally, eg use of e-business in global design and development, and working from home.

Environmental education, health and safety education and the European and global dimension

Students should be made aware of the environmental implications of the adoption and use of ICT, including the use of scarce resources, energy requirements, changes in working practices, communications and transport.

Health and safety issues associated with the use of ICT and the responsibilities of employers and employees should be considered. In particular, students will have the opportunity to learn about the health implications that accompany the extended or repeated use of computer systems. These include injuries arising from repetitious activities; the importance of good posture; the necessity of taking regular breaks; the general need for ICT systems-users to customise their workstation and working environment to their individual bodies' requirements, comprehending details such as seating height, VDU situation and orientation, and the positioning of keyboards and other input devices. Additionally, through using bulky, electrical ICT equipment, students will become aware of the importance of keeping a safe, orderly working environment.

Students need to recognise the importance of ICT internationally, in establishing links between the countries of Europe and the growth of ICT networks across Europe and the rest of the world.

Textbooks and other teaching resources

For this GCSE, the following titles are suggested as possible teaching aids only. It should be noted that they are not required reading for the course. In addition, students and teachers are reminded of the value of the Internet as a tool for research and learning.

A more comprehensive list of teaching resources can be found in the *Specification Guide* which supports this specification. It is available from Edexcel Publications, see page 33 for contact details.

Student Handbook for Information Technology
Gareth Williams
Pearson Publishing
Chesterton Mill
French's Road
Cambridge
CB4 3NP

01223 350555
ISBN 1 85749 534 9
www.pearson.co.uk/education/

GCSE IT Companion Two
(disk-based 'textbook' with on-line quizzes, worksheets and marking schemes)
P Meakin
Cedar Education
14 Newfield Court
Lymm
Cheshire
WA13 9QU

01925 759583
www.cedar.u-net.com

Information Systems for You
Stephen Doyle
Stanley Thorne
Ellenborough House
Wellington Street
Cheltenham
GL50 1YW

ISBN 0748744592

Support and training

Training

A programme of INSET courses covering various aspects of the specification and assessment will be arranged by Edexcel each year on a regional basis. Full details may be obtained from:

INSET
Edexcel Foundation
Stewart House
32 Russell Square
London WC1B 5DN

Tel: 020 7758 5620
Fax: 020 7758 5950
020 7758 5951 (second fax number)
E-mail: inset@edexcel.org.uk

Website

www.edexcel.org.uk

Please visit the Edexcel website, where further information about training and support for all qualifications, including this GCSE, can be found.

The website is regularly updated, and an increasing amount of support material and information will become available through it.

Edexcel Publications

Support materials and further copies of this specification can be obtained from:

Edexcel Publications
Adamsway
Mansfield
Notts NG18 4FN

Tel: 01623 467467
Fax: 01623 450481
E-mail: publications@linneydirect.com

The following support materials will be available from spring 2001 onwards:

- specimen papers
- specification guide.

Regional offices and Customer Response Centre

Further advice and guidance is available through a national network of regional offices. For general enquiries and for details of your nearest office please call the Edexcel Customer Response Centre on 0870 240 9800.

Appendices

Appendix 1 – Key skills

The GCSE in Information & Communication Technology offers a range of opportunities for students to:

- develop their key skills
- generate assessed evidence for their portfolio.

In particular, the following key skills can be developed and assessed through this qualification at level 2:

- application of number
- communication
- improving own learning and performance
- working with others
- problem solving.

Copies of the key skills specifications can be ordered from Edexcel Publications. The individual key skills units are divided into three parts:

- Part A: What you need to know – this identifies the underpinning knowledge and skills required of the student
- Part B: What you must do – this identifies the evidence that students must produce for their portfolio
- Part C: Guidance – this gives examples of possible activities and types of evidence that may be generated.

This GCSE specification signposts development and internal assessment opportunities which are based on Part B of the level 2 key skills units.

The evidence generated through this GCSE will be internally assessed and will contribute to the student's key skills portfolio. In addition, in order to achieve The Key Skills Qualification, students will need to take the additional external tests associated with communication, information technology and application of number. Centres should check the current position on proxy qualifications, as some students may be exempt from part or all of the assessment of a specific key skill.

The content of this GCSE will provide opportunities for the development of all six of the key skills. This appendix identifies the key skills evidence requirements and also provides a mapping of those opportunities. Students will need to have opportunities to develop their skills over time before they are ready for assessment. This appendix contains illustrative activities for each key skill that will aid development and facilitate the generation of appropriate portfolio evidence. To assist in the recording of key skills evidence Edexcel has produced recording documentation which can be ordered from Edexcel Publications.

The 'Mapping of key skills: summary table' on page 39 is designed to enable students to claim key skills through evidence that will normally be produced throughout the life of the course. Centres can assess key skills in a variety of ways and the practical nature of ICT allows students to claim key skills through evidence generated from coursework.

Proxy arrangements for the IT key skills units

Achievement of grades G to D in the GCSE (Full Course) provides exemption from all the assessment requirements of the IT key skills unit at level 1. Candidates achieving grades G to D will, therefore, in addition, be eligible for IT key skill level 1 certification. In the same way, grades C to A* in the GCSE (Full Course) provide eligibility for IT key skill level 2 certification.

Please note that the achievement of grades G to D in the GCSE (Short Course) provides exemption from both the external assessment component of the IT key skill unit and one of the specified two purposes of the internal assessment component. Candidates achieving grades G to D will, therefore, in addition, be eligible for IT key skill level 1 certification on satisfactory completion of an additional portfolio of evidence covering requirements for the second of the specified two purposes. In the same way, grades C to A in the GCSE (Short Course) provide eligibility towards IT key skill level 2 certification. IT key skill certification will follow submission of the additional portfolio of evidence and this must take place within three years of the GCSE (Short Course) award.*

Mapping of key skills: summary table

The map below is designed to show how students can claim key skills through evidence that will normally be produced throughout the life of the course. Centres can assess key skills in a variety of ways and the practical nature of ICT will allow students to claim key skills through evidence generated from coursework.

The map below is designed to show how students can claim key skills through the learning outcomes outlined in pages 10 – 14 of this specification.

Key skill	**Communication**				**Application of number**			**Improving own learning and performance**			**Working with others**			**Problem solving**		
Level 2	*2.1a*	*2.1b*	*2.2*	*2.3*	*2.1*	*2.2*	*2.3*	*2.1*	*2.2*	*2.3*	*2.1*	*2.2*	*2.3*	*2.1*	*2.2*	*2.3*
Learning outcome																
OC1																
OC2	S	S														
OC3					S	S										
OC4			S											S	S	
OC5			S											S		
OC6			S													
OC7																
OC8			S	S												
OC9																
OC10														S		
OC11														S	S	
OC12														S	S	
OC13					S									S	S	
OC14														S	S	
OC15												S	S	S	S	
OC16		S	S													
OC17			S	S							S	S	S			

Key: **S: Signposting**
Learning outcomes in bold can also contribute to Citizenship at KS4

Key skill	Communication				Application of number			Improving own learning and performance			Working with others			Problem solving		
Level 2	*2.1a*	*2.1b*	*2.2*	*2.3*	*2.1*	*2.2*	*2.3*	*2.1*	*2.2*	*2.3*	*2.1*	*2.2*	*2.3*	*2.1*	*2.2*	*2.3*
Learning Outcome																
OC18			S											S	S	S
OC19					S	S	S									
OC20			S											S		
OC21																S
OC22			S	S			S									
OC23	S			S								S				
OC24	S			S	S											
OC25							S									
OC26					S	S		S	S	S	S	S		S		S
OC27	S	S														
OC28				S			S							S		
OC29			S	S												
OC30	S	S														
OC31				S	S	S	S									
OC32						S	S									
OC33					S											
OC34																
OC35				S												
OC36				S												
OC37				S												
OC38				S												

Key: S: Signposting
Learning outcomes in bold can also contribute to Citizenship at KS4

Key skill		Internal assessment or classwork that supports evidence of achievement
Communication at level 1		
C1.1	Take part in a one-to-one discussion and a group discussion about different, straightforward subjects.	Take part in discussion about the advantages and disadvantages of electronic data.
C1.2	Read and obtain information from two different types of documents about straightforward subjects, including at least one image.	Read and annotate: • an article from a computer magazine • review of a film or computer game from the Internet. One of these must contain at least one image.
C1.3	Write two different types of documents about straightforward subjects. Include at least one image in one of the documents.	Write a review of: • a website they have visited • a piece of software used.

Application of number at level 1		
N1.1	Interpret straightforward information from two different sources. At least one source should be a table, chart, diagram or line graph.	Choose information needed to meet the purpose: eg a spreadsheet and a table containing numerical data.
N1.2	Carry out calculations to do with: • amounts and sizes • scales and proportion • handling statistics.	Use application software to carry out a variety of calculations.
N1.3	Interpret the results of your calculations and present your findings. You must use one chart and one diagram.	Integrate calculations into a PowerPoint presentation or a Desk Top Publishing application.

Improving own learning and performance at level 1		
LP1.1	Confirm understanding of your short-term targets, and plan how these will be met, with the person setting them.	Students can use electronic organiser software such as Microsoft Outlook, or Lotus Organiser can be used to monitor targets, meetings and activities.
LP1.2	Follow your plan, using support given by others to help meet targets. Improve your performance by: • studying a straightforward subject • learning through a straightforward practical activity.	Use electronic action plan to monitor changes.
LP1.3	Review your progress and achievements in meeting targets, with an appropriate person.	Use the completed electronic action plan to review success of project or coursework with appropriate person. The electronic action plan can be E-mailed to appropriate person where necessary.

Working with others at level 1		
WO1.1	Confirm what needs to be done to achieve given objectives, including your responsibilities and working arrangements.	Use E-mail to identify with others objectives and responsibilities for team members.
WO1.2	Work with others towards achieving given objectives, carrying out tasks to meet your responsibilities.	Use appropriate software to organise tasks. Use appropriate software to carry out tasks. Use appropriate software to support others.
WO1.3	Identify progress and suggest ways of improving work with others to help achieve given objectives.	Use E-mail to exchange relevant information. Create a website to exchange information or use a shared drive to store shared information. Coursework collection.

Problem solving at level 1		
PS1.1	Identify a problem and come up with two options for solving it.	Coursework collection.
PS1.2	Plan and try out at least one option for solving the problem, obtaining support and making changes to your plan when needed.	Use E-mail to communicate and reach confirmation from appropriate person on how problem will be solved. Use an electronic action plan to monitor changes and confirm changes.
PS1.3	Check if the problem has been solved by applying given methods, describe results and explain your approach to problem solving.	Use appropriate software/hardware to check if problem has been solved, or discuss how software/hardware would have solved or tackled problem.

Key skills at level 2

Key skill		**Internal assessment or classwork that supports evidence of achievement**
Communication at level 2		
C2.1a	Contribute to a discussion about a straightforward subject.	Class discussion on an aspect of ICT that allow students to: make clear and relevant contribution in a way that suits the purpose and situation; listen and respond appropriately to what others say; and help to move the discussion forward. For example, a discussion about the advantages and disadvantages of e-commerce.
C2.1b	Give a short talk about a straightforward subject, using an image.	PowerPoint presentation about a subject the student is working on.
C2.2	Read and summarise information from two extended documents about a straightforward subject. One of the documents should include at least one image.	Read and summarise an article from: • a computer magazine • a review of a recent film or computer game from the Internet. One of these must contain at least one image.
C2.3	Write two different types of documents about straightforward subjects. One piece of writing should be an extended document and include at least one image.	Write a review of a website visited or a piece of software used.

Application of number at level 2		
N2.1	Interpret information from two different sources, including material containing a graph.	Choose information needed to meet the purpose of: • a spreadsheet containing a graph • a table containing numerical data.
N2.2	Carry out calculations to do with: • amounts and sizes • scales and proportion • handling statistics • using formulae.	Use application software to carry out a variety of calculations. Use a spreadsheet to create formulas and graphs to show scale and proportion and handle statistics, eg a spreadsheet showing the peak times a computer room is used.
N2.3	Interpret the results of your calculations and present your findings. You must use at least one graph, one chart and one diagram.	Integrate spreadsheet into a PowerPoint presentation or a desk top publishing application.

Improving own learning and performance at level 2		
LP2.1	Help set short-term targets with an appropriate person and plan how these will be met.	Create an electronic action plan with agreed targets and signposts for a project or coursework.
LP2.2	Take responsibility for some decisions about your learning, using your plan and support from others to help meet targets. Improve your performance by: • studying a straightforward subject • learning through a straightforward practical activity.	Use electronic action plan to monitor changes.
LP2.3	Review progress with an appropriate person and provide evidence of your achievements, including how you have used learning from one task to meet the demands of a new task.	Use the completed electronic action plan to review success of project or coursework with appropriate person. The electronic action plan can be E-mailed to appropriate person where necessary.

Working with others at level 2		
WO2.1	Plan straightforward work with others, identifying objectives and clarifying responsibilities, and confirm working arrangements.	Use E-mail to identify with others objectives and responsibilities for team members.
WO2.2	Work co-operatively with others towards achieving identified objectives, organising tasks to meet your responsibilities.	Use appropriate software to organise tasks. Use appropriate software to carry out tasks. Use appropriate software to support others.
WO2.3	Exchange information on progress and agree ways of improving work with others to help achieve objectives.	Use E-mail to exchange relevant information. Students can create a website to exchange information or use a shared drive to store shared information.

Problem solving at level 2		
PS2.1	Identify a problem and come up with two options for solving it.	Use appropriate software/hardware to solve or tackle problem or discuss how software/hardware can solve or tackle problem.
PS2.2	Plan and try out at least one option for solving the problem, obtaining support and making changes to your plan when needed.	Use E-mail to communicate and reach confirmation from appropriate person on how problem will be solved. Use an electronic action plan to monitor changes and confirm changes.
PS2.3	Check if the problem has been solved by applying given methods, describe results and explain your approach to problem solving.	Student can use appropriate software/hardware to check if problem has been solved or discuss how software/hardware would have solved or tackled problem.

Appendix 2 – Procedures for moderation of internal assessment

All centres will receive Optically-read Teacher Examiner Mark Sheets (OPTEMS) for each coursework component.

Centres will have the option of:

EITHER

recording marks on an Optically-read Teacher Examiner Mark Sheet (OPTEMS), Section 1

OR

recording marks on computer for transfer to Edexcel by means of Electronic Data Interchange (EDI), Section 2.

Sections 3 and 4 apply whichever option is selected and deal with Coursework Record Sheets and the sample of work required for moderation.

1 Centres using OPTEMS

1.1 OPTEMS will be pre-printed on three-part stationery with unit and paper number, centre details and candidate names in candidate number order. A number of blank OPTEMS for candidates not listed will also be supplied.

The top copy is designed so that the marks can be read directly by an Optical Mark Reader. It is important therefore to complete the OPTEMS carefully in accordance with the instructions below. **Please do not fold or crease the sheets**.

1.2 Before completing the OPTEMS please check the subject, paper and centre details, to ensure the correct sheet is being completed.

1.3 All candidates entered by the deadline date will be listed on the OPTEMS, except those carrying forward their centre-assessed marks from the previous year. Such candidates will be listed on a separate OPTEMS coded T for Transferred. Any OPTEMS coded T should be checked, signed to confirm the transfer, and the top copy returned to Edexcel. No mark should be entered.

1.4 Late entries will need to be added in pencil either in additional spaces on the pre-printed OPTEMS or on one of the blank OPTEMS which will be supplied. Please note that full details of the centre, specification/unit, paper, candidates' names and candidate numbers must be added to ALL blank OPTEMS.

1.5 The OPTEMS should be completed **using an HB pencil**. Please ensure that you work on a firm flat surface and that figures written in the marks box go through to the second and third copies.

1.6 For each candidate, first ensure you have checked the arithmetic on the Coursework Record Sheet, then transfer the **Total Mark** to the box of the OPTEMS labelled 'Marks' for the correct candidate (please see exemplar).

1.7 Encode the component mark on the right-hand side by drawing a line to join the two dots inside the ellipses on the appropriate marks. Clear, dark **HB pencil** lines must be made but they must not extend outside the ellipses on either side of the two dots. Take care to remember the trailing zeros for candidates scoring 10, 20 etc and the leading zero for single figures, as shown.

1.8 If you make a mistake rub out the incorrect marks completely. Amend the number in the marks box and in the encoded section, but **please remember to amend separately the second and third copies** to ensure that the correct mark is clear.

1.9 Every candidate listed on the OPTEMS must have either a mark or one of the following codes in the marks box.

a 0 (zero marks) should be entered only if work submitted has been found to be worthless. It should **not** be used where candidates have failed to submit work.

b ABS in the marks box and an A in the encoded section for any candidate who has been absent or has failed to submit any work, even if an aegrotat award has been requested.

c W should be entered in the marks box and the encoded section where the candidate has been withdrawn.

Exemplar

			Encoded section											
Candidate name	**Number**	**Marks**												
New Alan JB	3200*	0	~~(•0•)~~ (•0•)	(•10•) (•1•)	(•20•) (•2•)	(•30•) (•3•)	(•40•) (•4•)	(•50•) (•5•)	(•60•) (•6•)	(•70•) (•7•)	(•80•) (•8•)	(•90•) (•9•)	(•100•) (•A•)	(•200•) (•W•)
Other Amy JB	3201*	5	~~(•0•)~~ (•0•)	(•10•) (•1•)	(•20•) (•2•)	(•30•) (•3•)	(•40•) (•4•)	(•50•) ~~(•5•)~~	(•60•) (•6•)	(•70•) (•7•)	(•80•) (•8•)	(•90•) (•9•)	(•100•) (•A•)	(•200•) (•W•)
Smith John PN	3202	ABS	(•0•) (•0•)	(•10•) (•1•)	(•20•) (•2•)	(•30•) (•3•)	(•40•) (•4•)	(•50•) (•5•)	(•60•) (•6•)	(•70•) (•7•)	(•80•) (•8•)	(•90•) (•9•)	(•100•) ~~(•A•)~~	(•200•) (•W•)
Watts Mark JB	3203*	20	(•0•) ~~(•0•)~~	(•10•) (•1•)	~~(•20•)~~ (•2•)	(•30•) (•3•)	(•40•) (•4•)	(•50•) (•5•)	(•60•) (•6•)	(•70•) (•7•)	(•80•) (•8•)	(•90•) (•9•)	(•100•) (•A•)	(•200•) (•W•)
Steven Jane PN	3204	49	(•0•) (•0•)	(•10•) (•1•)	(•20•) (•2•)	(•30•) (•3•)	~~(•40•)~~ (•4•)	(•50•) (•5•)	(•60•) (•6•)	(•70•) (•7•)	(•80•) (•8•)	(•90•) ~~(•9•)~~	(•100•) (•A•)	(•200•) (•W•)
Jones Ann PN	3205*	100	~~(•0•)~~ ~~(•0•)~~	(•10•) (•1•)	(•20•) (•2•)	(•30•) (•3•)	(•40•) (•4•)	(•50•) (•5•)	(•60•) (•6•)	(•70•) (•7•)	(•80•) (•8•)	(•90•) (•9•)	~~(•100•)~~ (•A•)	(•200•) (•W•)
Patel Raj PN	3206*	115	(•0•) (•0•)	~~(•10•)~~ (•1•)	(•20•) (•2•)	(•30•) (•3•)	(•40•) (•4•)	(•50•) ~~(•5•)~~	(•60•) (•6•)	(•70•) (•7•)	(•80•) (•8•)	(•90•) (•9•)	~~(•100•)~~ (•A•)	(•200•) (•W•)
West Sara JB	3207	W	(•0•) (•0•)	(•10•) (•1•)	(•20•) (•2•)	(•30•) (•3•)	(•40•) (•4•)	(•50•) (•5•)	(•60•) (•6•)	(•70•) (•7•)	(•80•) (•8•)	(•90•) (•9•)	(•100•) (•A•)	(•200•) ~~(•W•)~~

Some marks shown in the 'Marks' column of this general exemplar may be greater than the maximum possible for a particular syllabus. If so, please ignore them.

1.10 Where more than one teacher has assessed the work, the teachers' initials should be given to the right of each candidate's name as illustrated.

1.11 The authentication and internal standardisation statement on the OPTEMS must be signed. **Centres are reminded that it is their responsibility to ensure that internal standardisation of the marking has been carried out**.

1.12 Once completed and signed the three-part sets should then be divided and despatched, or retained as follows:

a **Top copy** to be returned direct to Edexcel in the envelope provided **to be received by 1 May for the May/June examination series**. Please remember this form **must not be folded or creased**.

b **Second copy** to be sent **with the sampled coursework** as appropriate (see Section 4) to the moderator. The name and address of the moderator will either be printed on the OPTEMS or supplied separately.

c **Third copy** to be retained by the centre

2 Centres using EDI

Marks must be recorded on computer and transmitted to Edexcel by **1 May for the May/June examination series**. They must be recorded in accordance with the specifications in the booklet 'Formats for the Exchange of Examination Related Data using Microcomputers'. Each mark has a status as well as a value. Status codes are:

V – valid non-zero mark recorded; candidate not pre-selected as part of the sample for moderation

S – valid non-zero mark recorded and candidate included in sample for moderation (refer to OPTEMS and Section 4)

Z – zero mark recorded for work submitted

N – no work submitted but candidate **not** absent

A – absent for component

M – missing mark; no information available about the candidate's previous performance

F – mark carried forward from a previous examination series. (If the mark status is 'F', then no mark follows.)

The OPTEMS provided will indicate, with asterisks, the candidates whose work is to be sampled, where this is pre-selected (see Section 4).

2.2 Printout

Centres are required to produce a printout of the centre-assessed marks and annotate it as described below, before forwarding it **together with the sampled coursework** as appropriate (see Section 4) to the moderator, **to be received by 1 May for the May/June examination series**. The name and address of the moderator will either be printed on the OPTEMS or supplied separately.

ABS – absent

W – withdrawn

* – sampled candidate

✓ – additional sampled candidates.

Where more than one teacher has assessed the work the teachers' initials or the set number should be given beside each candidate's name.

Centres are reminded that it is their responsibility to ensure that internal standardisation of the marking is carried out. The following **authentication** and internal standardisation statement should be written at the bottom of the printout and signed by the teacher responsible:

'*I declare that the work of each candidate for whom marks are listed is, to the best of my knowledge, the candidate's own and that where several teaching groups are involved the marking has been internally standardised to ensure consistency across groups*.'

Signed . . . . . Date . . . . . .

Centres are advised to retain a copy of the annotated printout.

3 Coursework Collection Marking Sheets and Cover Sheets

Copies of the Coursework Collection Marking Sheets and Coursework Collection Cover Sheets are given on pages 53 and 54, for centres to photocopy. These sheets, to be completed for each candidate, provide details for the moderator of how each candidate's mark for each item in the coursework collection is reached. It is the teachers responsibility to ensure that:

- all marks are recorded accurately and that the arithmetic is correct
- the total mark is transferred correctly onto the OPTEMS or via EDI
- any required authentication statement is signed by the teacher.

Where a candidate's work is included in the sample the Coursework Collection Marking Sheets and Cover Sheet should be attached to the work.

4 Sample of work for moderation

4.1 **Where the pre-printed OPTEMS is asterisked** indicating the candidates whose work is to be sampled, this work, together with the second copy of the OPTEMS, should be posted to reach the moderator by 1 May for candidates seeking certification in the summer series. The name and address of the moderator will either be printed on the OPTEMS or supplied separately.

In addition, the centre must send the work of the candidate awarded the **highest** mark and the work of the candidate awarded the **lowest** mark, if these are not already included within the initial samples selected. The centre should indicate the additional samples by means of a tick (✓) in the left-hand column against the names of each of the candidates concerned.

For all sampled work the associated record sheet must be attached to each candidate's work.

If the pre-selected sample does NOT adequately represent ALL parts of the entire mark range for the centre, additional samples in the range(s) not covered should also be sent to the moderator. As above, additional samples should be indicated by means of a tick (✓).

For centres submitting marks by EDI the candidates in the sample selected on the OPTEMS should be marked with an asterisk (*) or a tick (✓), as appropriate, on the EDI printout. The annotated printout must be sent to the moderator with the sample of work.

4.2 **Where the pre-printed OPTEMS is not asterisked and:**

- **there are eleven or fewer candidates**, the coursework of ALL candidates together with the second copy of the OPTEMS should be posted to reach the moderator by **1 May for the May/June examination series**. The moderator's name and address will either be printed on the OPTEMS or supplied separately. The associated record sheet must be attached to each candidate's work.
- **there are more than eleven candidates**, the centre should send the second copy of the OPTEMS or the annotated EDI printout to reach the moderator by **1 May for the May/June examination series**. The moderator's name and address will either be printed on the OPTEMS or supplied separately. The moderator will advise the centre of the candidates whose work, with the associated record sheet, should be posted to him/her by return.

4.3 **In all cases** please note that the moderator may request further samples of coursework, as required and the work of all candidates should be readily available in the event of such a request.

Internal standardisation

Centres are reminded that it is their responsibility to ensure that where more than one teacher has marked the work, internal standardisation has been carried out. This procedure ensures that the work of all candidates at the centre is marked to the same standards. The statement confirming this on the OPTEMS or the EDI printout must be signed.

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COURSEWORK COLLECTION MARKING SHEET 1 (CCMS 1)

CENTRE NAME ……..

CENTRE NUMBER ……

CANDIDATE NAME ……

CANDIDATE NUMBER …….

PROBLEM TYPE
(Circle round the appropriate code – see below for key)

CMD CMS DLC WP DTP MM WSP PG FC1 FC2

PROBLEM COMPLEXITY LEVEL
(Circle round the appropriate level) **STANDARD EXTENSION**

Process	**Mark**	**Comments**
Identify (5)		
Analyse (9)		
Design (9)		
Implement (12)		
Evaluate (5)		
Total (40)		

Key

CMD Creation and Manipulation of Databases
CMS Creation and Manipulation of Spreadsheets
DLC Data Logging and Control
WP Word Processing
DTP Desk Top Publishing
MM Multi–media
WSP Website Publishing
PG Programming
FC1 Free Choice 1
FC2 Free Choice 2

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CCCS 1
Full Course

GCSE (FULL COURSE)
INFORMATION AND COMMUNICATION TECHNOLOGY (1185)

COURSEWORK COLLECTION COVER SHEET 1

CENTRE NAME .....

CENTRE NUMBER .....

CANDIDATE NAME .....

CANDIDATE NUMBER .....

PROBLEM TYPE (see Key below)	MARK	EDEXCEL USE				
		I	A	D	I	E
1	/ 40					
2	/ 40					
3	/ 40					
4	/ 40					
QoWC	/ 8	Comments:				
Overall total	/ 168					

Key

CMD Creation and Manipulation of Databases
CMS Creation and Manipulation of Spreadsheets
DLC Data Logging and Control
WP Word Processing
DTP Desk Top Publishing
WSP Website Publishing
MM Multimedia
PG Programming
FC1 Free Choice 1
FC2 Free Choice 2

Appendix 3 – Facilities required

Teaching requirements

ICT work carried out by students in other areas of the curriculum can be used as the basis of coursework tasks, but it must be stressed that students are almost certain to require contact with a specialist ICT teacher in the context of a structured course.

ICT hardware and software requirements

The implementation of this specification is largely dependent upon the student being able to solve problems using a modern ICT system. The term 'modern' refers essentially to the software available, but there are hardware implications to the exploitation of 'modern' software.

It is assumed that students will have access to the following pieces of software, allowing all four Strands of Progression to be addressed in a practical fashion.

Either discrete or integrated packages which in total offer the following:

- database
- spreadsheet (including graphical representation of data, ie graphs and charts)
- word processing
- desk top publishing
- communications software (web browser and E-mail software)
- at least one modelling or simulation package which allows the student to perform experiments by the considered control of parameters, eg modelling of a simple spending cycle, simulation of a queue, simulation of random events that can be compared with physical experiments
- data logging and control software that provides the facility to use commands.

It is also assumed that students will be using a wide range of other software across the curriculum. This might include:

- CAD
- art – frame grabbing – image transformation
- website publishing
- music – analysis/composition
- multi-media
- presentation software
- statistics
- maths functional analysis – numerical techniques
- programming languages.

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