

OCR GCSE IN INFORMATION AND COMMUNICATION TECHNOLOGY A **1994**

OCR GCSE (SHORT COURSE) IN INFORMATION AND COMMUNICATION TECHNOLOGY A **1094**

Foreword to Third Edition

This specification has been revised to include minor amendments notified to centres in June 2004. Changes to the first and second editions have been sidelined.

Key Features

- A clear progression route to the OCR AS/A Level Information and Communications Technology specifications.
- A flexible format.
- Permits candidates to certificate a Short Course level and continue to full GCSE without duplication.
- Re-sit opportunities of individual modules.
- Coverage of Key Skills IT evidence and proxy for Key Skills for IT.
- Supported by a specifically written OCR endorsed GCSE textbook published Spring 2001.

Support and In-Service Training for Teachers

- A full programme of In-Service training meetings arranged by the Training and Customer Support Division (telephone 01223 552950).
- Specimen question papers and mark schemes, available from the Publications Department (telephone 0870 870 6622; fax 0870 870 6621).
- Past question papers and mark schemes, available from the Publications Department (telephone 0870 870 6622; fax 0870 870 6621).
- A free consultancy service on setting coursework tasks.
- Coursework guidance materials.
- Written advice on coursework proposals.
- A report on the examination, compiled by senior examining personnel after each examination session.
- Individual feedback to each Centre on the moderation of internally assessed work.


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Throughout the specification the following icons are used to signpost teaching and learning opportunities in:

 Citizenship

 ICT

 Key Skills

OCR GCSE IN INFORMATION AND COMMUNICATION TECHNOLOGY A (1994) AND GCSE SHORT COURSE (1094)

SECTION A: SPECIFICATION SUMMARY

TIERS

The scheme of assessment consists of two tiers: Foundation Tier and Higher Tier. Foundation Tier assesses grades G to C and Higher Tier assesses grades D to A*.

The specification permits staged assessment within each tier and operationally uses a modular model.

Units 1 and 3 have papers at both the Foundation Tier and the Higher Tier. It is not obligatory for candidates to enter units 1 and 3 at the same tier.

At certification there are no specific tiers of entry. A candidate's overall grade is determined by the uniform mark scores they achieve for the units.

ASSESSMENT UNITS

The specification content is set out in the form of teaching modules in Sections 5.1, 5.2, 5.3 and 5.4. Each teaching module has its own associated Assessment Unit as detailed below:

Assessment Unit	Entry code	Title	Duration	Short Course Weighting	Full Course Weighting
1	2357F	ICT: Paper 1 (Foundation)	1 hr	40%	20%
	2357H	ICT: Paper 1 (Higher)	1 hr 15 m		
2	2358	ICT: Coursework Projects 1a/1b	-	60%	30%
3	2359F	ICT: Paper 3 (Foundation)	1 hr		20%
	2359H	ICT: Paper 3 (Higher)	1 hr 15 m		
4	2360	ICT: Coursework Project 2	-		30%

Rules of Combination

Short Course

Candidates take Unit 1 and Unit 2.

Full Course

Candidates take all four units.

Aggregation

Aggregation is available in January and June. Candidates may enter for:

- GCSE Short Course aggregation;
- GCSE Short Course aggregation, bank the result, and complete the GCSE Full Course assessment at a later date;
- GCSE Full Course aggregation.

QUESTION PAPERS

The questions will mainly require short responses, single word answers or one or two sentences, although candidates will be required to give extended responses in questions targeted at the higher grades.

Information and Communication Technology (Short Course)

Candidates must complete a single question paper, Paper 1. This will test knowledge and understanding of “Computer systems, communications technology and information management” (Module 1) and the theoretical aspects of Module 2.

Information and Communication Technology (Full Course)

Candidates must complete two question papers. One paper will test knowledge and understanding of ‘Computer systems, communications technology and information management’ (Module 1) and the theoretical aspects of Module 2. The second paper will test knowledge and understanding of ‘ICT applications, systems, networks and computer technology’ (Module 3) and the theoretical aspects of Module 4.

INTERNAL ASSESSMENT

Assessment Units 2 and 4 are based on coursework, which is internally assessed by the Centre and externally moderated by OCR.

SECTION B: GENERAL INFORMATION

1 Introduction

1.1 RATIONALE

The world is becoming increasingly dominated by the use of Information and Communication Technology systems, which influence every aspect of our everyday lives. Today's citizens need to be equipped with knowledge and skills to enable them to participate in a technological society. They need technological and information handling skills that include the ability to gather, process, and manipulate data. These skills are now as essential as traditional numeracy and literacy.

Few aspects of our society have not been influenced by the Information and Communication Technology revolution. Information and Communication Technology is also quickly changing the way we work: traditional jobs, such as those in the banking industry, are disappearing while new areas of economic activity, such as e-commerce, are growing rapidly. The citizen of tomorrow needs to be computer literate and able to take advantage of the opportunities afforded, as the use of communication networks becomes common and Information and Communication Technologies provide new opportunities for learning and living.

Our age is marked by constant and rapid change. In the lifetime of this specification, technology will continue to make advances and much of what is now considered state-of-the-art will be obsolete.

As well as the rapid development of new technologies that gather, organise, and share information, familiar technologies like telephone, television, and computers are evolving and are converging.

The challenge is to develop an understanding of the fundamentals of information technology and the tools required for preparing and participating in an evolving information-based society. Students need to have a firm grounding in Information and Communication Technology for their careers, for lifelong learning, and for recreation. It is hoped that the study of Information and Communication Technology will also help provide students with the analytical, communication and technical skills they require to be active participants in an exciting and dynamic world.

Opportunities for progression

Today new and exciting career opportunities are available to those with the knowledge and skills to use Information and Communication Technology creatively, with whole industries emerging around the Information and Communication Technology revolution.

To meet career challenges, students must be self-reliant as well as good communicators and problem solvers. They must be able to apply their knowledge and skills in Information and

Communication Technology in a discriminatory and ethical manner. Employers are looking for workers who are adaptable and are committed to lifelong learning. It is hoped that the skills and knowledge covered by this specification will provide students with the level of information technology they need to succeed in the study of the subject at a higher level.


The successful completion of a course of study leading to **GCSE Information and Communication Technology (Short Course)** will provide a suitable basis for continuation into study for a full GCSE in Information and Communication Technology. Alternatively progression could be to another ICT qualification within the National Qualification Framework at an equivalent level.

The successful completion of a course of study leading to **GCSE Information and Communication Technology (Full Course)** will provide a suitable basis for higher studies at AS or A level in Information and Communications Technology or in a related discipline.

Students of both the Full and Short Course ICT may wish to utilise the knowledge and insight gained into Information and Communication Technology to inform and guide their use of such technologies in support of their academic, vocational and future personal development.

Citizenship

To be responsible members of society, students must be aware of the ever-growing impact of Information and Communication Technology. They need to reflect critically on the role of Information and Communication Technology in society and to consider its positive and negative effects. The study of Information and Communication Technology supports the development of skills and attitudes that increase students' abilities to address the social and ethical issues of technological advancements.

Several areas exist within the Specification where “Skills” outlined in the KS4 Citizenship programme of study may be developed by appropriate tailoring of the scheme of work to provide these opportunities. These opportunities are indicated within the content Section 5 by a  symbol.

OCR has taken great care in the preparation of this specification and assessment material to avoid bias of any kind.

1.2 CERTIFICATION TITLE

These specifications will be shown on a certificate as:

- OCR GCSE in Information and Communication Technology A
- OCR GCSE (Short Course) in Information and Communication Technology A

1.3 LEVEL OF QUALIFICATION

The regulatory authorities (QCA, ACCAC and CCEA) approve this qualification as part of the National Qualifications Framework.

Candidates who gain grades G to D will have achieved an award at Foundation Level.

Candidates who gain grades C to A* will have achieved an award at Intermediate Level.

Two GCSEs at grade G to D and two GCSEs at grade C to A* are equivalent to one three-unit GNVQ at Foundation and Intermediate Level respectively.

Four GCSEs at grade G to D and four GCSEs at grade C to A* are equivalent to one six-unit GNVQ at Foundation and Intermediate Level respectively.

1.4 RECOMMENDED PRIOR LEARNING

Candidates who are taking courses leading to Information and Communication Technology GCSE should normally have followed the National Curriculum Key Stage 3 programme of study for Information and Communication Technology.

Candidates entering this course should have achieved a general educational level equivalent to National Curriculum Level 3, or a distinction at Entry Level within the National Qualifications Framework.

1.5 PROGRESSION

GCSE qualifications are general qualifications, which enable candidates to progress either directly to employment, or to proceed to further qualifications.

Many candidates who enter employment with one or more GCSEs would undertake training or further part-time study with the support of their employer.

Progression to further study from GCSE will depend upon the number and nature of the grades achieved. Broadly, candidates who are awarded mainly grades G to D at GCSE could either strengthen their base through further study of qualifications at Foundation Level within the National Qualifications Framework or could proceed to Intermediate level. Candidates who are awarded mainly grades C to A* at GCSE would be well prepared for study at Advanced Level within the National Qualifications Framework.

This specification is closely linked to the OCR Certificate of Achievement in ICT and provides a suitable progression from this qualification.

1.6 OVERLAP WITH OTHER QUALIFICATIONS

The content of GCSE ICT overlaps the GNVQ at Foundation and Intermediate Level in ICT although the teaching and assessment methods are significantly different. Details of equivalence are given in section 1.3 Level of Qualification.

Overlaps also exist between this specification and vocational qualifications including NVQ IT.

This qualification can be taken alongside CLAIT, IBT II, CIT and other IT skills-based qualifications.

1.7 RESTRICTIONS ON CANDIDATE ENTRIES

Candidates who enter for this GCSE Short or Full Course specification **may not** also enter for any other GCSE specification with the certification title **Information and Communication Technology** in the same examination series.

Candidates who enter for this GCSE Short or Full Course specification **may** however also enter for any GNVQ specification with the certification title **Information and Communication Technology** in the same examination series. They may also enter for any Certificate of Achievement or NVQ qualification.

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 GCSE Short or Full Course 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 these specifications is 2650.

1.8 KEY SKILLS PROXY

A grade in the range G-D in the full GCSE provides full exemption for the IT Key Skill at Level 1.

A grade in the range C-A* in the full GCSE provides full exemption for the IT Key Skill at Level 2.

A grade in the range G-D in the short course GCSE provides exemption for the external test and for one of the two specified purposes of the internal Key Skill component for the IT Key Skill at Level 1.

A grade in the range C-A* in the short course GCSE provides exemption for the external test and for one of the two specified purposes of the internal Key Skill component for the IT Key Skill at Level 2.

1.9 CODE OF PRACTICE REQUIREMENTS

These specifications will comply in every respect with the revised Code of Practice requirements for courses starting in September 2001.

1.10 STATUS IN WALES AND NORTHERN IRELAND

These specifications have been approved by ACCAC for use by Centres in Wales and by CCEA for use by Centres in Northern Ireland.

Terms, legislation or aspects of government that are different from those in England should not disadvantage candidates in Wales and Northern Ireland. Where such situations might occur, including the external assessment, the terms used have been selected as neutral, so that candidates may apply whatever is appropriate to their own situation.

OCR will provide specifications, assessments and supporting documentation only in English.

Further information on the provision of assessment materials in Welsh and Irish may be obtained from the OCR Information Bureau (telephone 01223 553998).

1.11 TECHNICAL LANGUAGE

The world of ICT is fast moving and keeping abreast with current terminology presents a constant challenge. The terminology used within these specifications and its associated assessment units will comply with the definition and usage of terms as outlined in the British Computer Society "A Glossary of Computing Terms". Further details may be found in Section 10 (Reading List).

2 Specification Aims

Candidates who undertake a course following these specifications should be able to:

- (i) choose, use and design information and communication systems to carry out a range of tasks and to solve problems, making effective use of appropriate principles and techniques;
- (ii) develop a broad and balanced experience of the range of information and communication systems and their applications and an understanding of their capabilities and limitations.

3 Assessment Objectives

Information and Communication Technology (Short Course)

This comprises Modules 1 and 2 and their associated assessment units.

Candidates should be able to demonstrate their ability to:

- AO1 apply their knowledge, skills and understanding of ICT to a range of situations;
- AO2 analyse, design, implement and test information and communication systems and develop understanding of the wider applications and effects of ICT;
- AO3 reflect critically on the way they and others use ICT;
- AO4 consider the impact of ICT applications in the wider world;
- AO5 consider the social, economic, political, legal, ethical and moral issues and security needs for data, which surround the increasing use of ICT.

Information and Communication Technology (Full Course)

This comprises Modules 1, 2, 3 and 4 and their associated assessment units.

Candidates should be able to demonstrate their ability to:

- AO1 apply their knowledge, skills and understanding of ICT to a range of situations;
- AO2 analyse, design, implement, test, evaluate and document information and communication systems for use by others and develop understanding of the wider applications and effects of ICT;
- AO3 reflect critically on the way they and others use ICT;
- AO4 discuss and review the impact of ICT applications in the wider world;
- AO5 consider the social, economic, political, legal, ethical and moral issues and security needs for data which surround the increasing use of ICT.

4 Scheme of Assessment

4.1 TIERS

The scheme of assessment consists of two tiers: Foundation Tier and Higher Tier. Foundation Tier assesses grades G to C and Higher Tier assesses grades D to A*.

The specification permits staged assessment within each tier and operationally uses a modular model.

Units 1 and 3 have papers at both the Foundation Tier and the Higher Tier. It is not obligatory for candidates to enter Units 1 and 3 at the same tier.

At certification there are no specific tiers of entry. A candidate's overall grade is determined by the uniform mark scores they achieve for the units.

4.2 TEACHING MODULES AND ASSESSMENT UNITS

The content of these specifications is divided into coherent Modules for teaching purposes. These modules are assessed through appropriate assessment units. Such units may assess more than one module.

The scheme of assessment for GCSE ICT (Short Course) comprises two assessment units.

Unit 1 covers computer systems, communications technology and information management as taught in Module 1 and the theoretical aspects of Module 2.

Unit 2 covers practical skills and understanding relating to the use of ICT applications.

The scheme of assessment for GCSE ICT (Full Course) comprises four assessment units: Short Course assessment Units 1 and 2 **plus** assessment Units 3 and 4 detailed below:

Unit 3 covers ICT applications, systems, networks and computer technology as taught in Module 3 and the theoretical aspects of Module 4.

Unit 4 covers problem solving using ICT.

Summary Grid

Assessment Unit	Entry Code	Title	Duration	Short Course Weighting	Full Course Weighting
1	2357F	ICT: Paper 1 (Foundation)	1 hr	40%	20%
	2357H	ICT: Paper 1 (Higher)	1 hr 15 m		
2	2358	ICT: Coursework Projects 1a/1b	-	60%	30%
3	2359F	ICT: Paper 3 (Foundation)	1 hr		20%
	2359H	ICT: Paper 3 (Higher)	1 hr 15 m		
4	2360	ICT: Coursework Project 2	-		30%

Unit Entry Options

All candidates for Units 1 and 3 must select a single entry option and be entered under the relevant entry code.

Entry Code	Components to be Taken	
2357F	01	ICT: Paper 1 (Foundation)
2357H	02	ICT: Paper 1 (Higher)
2359F	01	ICT: Paper 3 (Foundation)
2359H	02	ICT: Paper 3 (Higher)

Sequence of Assessment

The normal sequence in which the units of assessment could be taken is assessment Units 1 and 2 in the first year of a course of study, leading to the GCSE (Short Course) award. Then assessment Units 3 and 4 in the second year leading to the GCSE (Full Course) award if required. However, the units of assessment may be taken in other sequences.

Alternatively, candidates may take all units of assessment at the end of their GCSE course.

4.3 RE-SIT RULES

Candidates may re-sit any unit or option within a unit once only prior to certification. The better score will be used in the aggregation. Individual unit results will have a shelf-life limited only by that of the qualification.

4.4 CERTIFICATION

Short Course

Candidates must be entered for certification code 1094 to claim their overall grade for the Short Course.

Full Course

Candidates must be entered for certification code 1994 to claim their overall grade for the Full Course.

Candidates may enter Units 1 and 2 and apply for GCSE Short Course certification then go on to enter Units 3 and 4 and apply for GCSE Full Course certification. The results of Units 1 and 2 that were encashed towards the Short Course may be re-used towards the Full Course.

Candidates may take all units at the end of their GCSE course in a linear fashion if desired.

Rules of Combination

Short Course

Candidates take Unit 1 and Unit 2.

Full Course

Candidates take all four units.

Candidates are **not** required to take papers of the same tier in Unit 1 and Unit 3.

4.5 UNIT AVAILABILITY

There are two assessment sessions each year, in January and June.

Units 1 and 2 will be first available in June 2002. No other units will be available in 2002.

In 2003 and subsequent years, availability will be as shown in the table below.

Unit	Title	January	June
1	ICT: Paper 1	✓	✓
2	ICT: Coursework Projects 1a/1b	✓	✓
3	ICT: Paper 3	✓	✓
4	ICT: Coursework Project 2	✓	✓

4.6 QUESTION PAPERS

The papers, taken at either Foundation or Higher Tier, test understanding in the areas of subject content of the appropriate teaching module. The written assessment for Module 3 assumes knowledge of the content of Module 1 and questions may be included in this paper that draw on the content of this module.

The questions will mainly require short responses, single word answers or one or two sentences, although candidates will be required to give extended responses in questions targeted at the higher grades.

Information and Communication Technology (Short Course)

Candidates must complete a single question paper, Paper 1. This will test knowledge and understanding of Computer systems, communications technology and information management (Module 1) and the theoretical aspects of Module 2.

Information and Communication Technology (Full Course)

Candidates must complete two question papers. One paper will test knowledge and understanding of Computer systems, communications technology and information management (Module 1) and the theoretical aspects of Module 2. The second paper will test knowledge and understanding of ICT applications, systems, networks and computer technology (Module 3) and the theoretical aspects of Module 4.

4.7 WEIGHTING OF ASSESSMENT OBJECTIVES

The relationship between the assessment units and the assessment objectives is shown in the following grid.

Foundation Tier and Higher Tier

Unit	Short Course	Full Course	Assessment Objectives	Short Course assessment Objective weighting	Full Course Assessment Objective Weighting	Teaching Module
1	Yes	Yes	AO3, AO4, AO5	20%	10%	1. Computer systems, communications, technology and information management
			AO1, AO2	20%	10%	2. Practical skills and understanding relating the use of ICT applications
2	Yes	Yes		60%	30%	
3		Yes	AO3, AO4, AO5		10%	3. ICT applications, systems, networks and computer technology
			AO1, AO2		10%	4. Problem solving using ICT
4		Yes			30%	

4.8 INTERNAL ASSESSMENT (COURSEWORK)

Two assessment units are based on internally assessed coursework.

Unit 2 (Teaching Module 2 - Practical skills and understanding relating to the use of ICT applications)

Unit 4 (Teaching Module 4 - Problem solving using ICT)

Examples of appropriate tasks are given in **Section 6**.

Full details of internal assessment can be found in **Section 7**.

4.9 UNIFORM MARKS

The Full Course will be graded on a Uniform Mark Scale out of 400. The short course will be graded on a Uniform Mark Scale out of 200. The uniform mark thresholds for each of the units are shown below:

Entry Code	2357/F	2357/H	2358	2359/F	2359/H	2360
Max. mark available	55	80	120	55	80	120
A*	N/A	72	108	N/A	96	108
A	N/A	64	96	N/A	64	96
B	N/A	56	84	N/A	56	84
C	48	48	72	48	48	72
D	40	40	60	40	40	60
E	32	32	48	32	32	48
F	24	N/A	36	24	N/A	36
G	16	N/A	24	16	N/A	24

The overall uniform mark grade thresholds for the Full Course are as follows:

Max	A*	A	B	C	D	E	F	G	U
400	360	320	280	240	200	160	120	80	0

The overall uniform mark grade thresholds for the Short Course are as follows:

Max	A*	A	B	C	D	E	F	G	U
200	180	160	140	120	100	80	60	40	0

4.10 ASSESSMENT OF WRITTEN COMMUNICATION

Candidates are expected 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.

Where appropriate they should also use a suitable structure and style of writing.

Opportunity is given to use extended prose in the coursework components of this course. Therefore written communication will be assessed in the candidates' coursework documentation.

4.11 DIFFERENTIATION

Differentiation will be achieved by tiered question papers and by task and outcome in the coursework. The coursework tasks undertaken by each candidate should reflect their capabilities.

4.12 AWARDING OF GRADES

The written papers will have a total weighting of 40% and internal assessment a weighting of 60%.

The candidate's mark for each assessment unit will be converted into a uniform mark. The sum of the uniform marks will determine the candidate's grade. Candidates achieving less than the minimum marks for grade G will not be awarded a grade.

4.13 GRADE DESCRIPTIONS

Grade descriptions are provided to give a general indication of the standards of achievement likely to have been shown by the candidates awarded particular grades. The descriptions must be interpreted in relation to the content specified in Section 5; they are not designed to define that content. The grade awarded will depend in practice upon the extent to which the candidate has met the assessment objectives overall. Shortcomings in some aspects of the assessment may be balanced by better performance in others.

The Grade descriptors detailed are common to both Short and Full Course ICT. However, allowance should be made for the depth and breadth of evidence produced by the candidate which will reflect the course of study followed. Full Course candidates are required to cover more subject content and extend their knowledge and understanding of analysing, designing, implementing and evaluating information systems. The evidence for compliance with the grade descriptors should be interpreted with this in mind.

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. They 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.

Candidates understand the need for precision in framing questions when finding, selecting and collecting information. They use ICT to explore, develop and interpret information. They develop, test and modify sets of instructions to automate processes and to make things happen and use computer models to detect patterns and relationships.

Candidates use ICT to share, exchange and present work and demonstrate how it contributes to the development of their ideas and 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. They show a good understanding of basic ICT terms and definitions and are able to contrast and compare related ideas.

Candidates identify needs and opportunities and analyse, design and evaluate appropriate ways of addressing these using information and communication systems. They use complex lines of enquiry to find and select information, from a wide range of sources, and explore, develop and interpret information to carry out a range of tasks and produce appropriate solutions to problems.

Candidates 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. They use computer models to investigate and test hypotheses.

Candidates use ICT to share, exchange and present work, demonstrating a consideration of audience and purpose. They show awareness of the need to detect the loss or corruption of information and to prevent the abuse of personal information and 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. They use ICT terms and definitions appropriately and are able to contrast and compare related ideas.

Candidates apply general principles of information processing to given situations and abstract general principles from given examples. They identify a range of needs and opportunities, carry out systematic analysis, and design and evaluate effective ways of using information and communication systems. Candidates 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.

Candidates use complex lines of enquiry to find and select information, using a wide range of sources. They 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.

Candidates 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.

They use and develop computer models to investigate and test hypotheses.

Candidates use ICT to share, exchange and present work, demonstrating a clear sense of audience and purpose. They discuss methods of detecting the loss or corruption of information and describe steps, which can minimise the likelihood of the abuse of personal information and reflect critically on their use of ICT and show understanding of the effects of its use in the wider world.

SECTION C: SPECIFICATION CONTENT

5 Specification Content

This specification is set out in the form of teaching modules. The relationship of the assessment units to the teaching modules is described in Section 4.2.

5.1 and 5.2 form the basis of assessment for the Short Course GCSE ICT. They are:

- 5.1 - Computer systems, communications technology and information management
- 5.2 - Practical skills and understanding relating to the use of ICT applications

5.1 and the theoretical concepts in 5.2 are examined in the tiered papers of assessment Unit 1.

5.2 skills are assessed by practical coursework projects 1a and 1b.

Two additional modules form the basis of assessment for the Full Course GCSE ICT. They are:

- 5.3 - ICT applications, systems, networks and computer technology
- 5.4 - Problem solving using ICT

5.3 and the theoretical concepts in 5.4 are examined in the tiered papers of assessment Unit 3.

5.4 skills are assessed by practical coursework project 2.

5.1, 5.2, 5.3 and 5.4 form the study for the Full Course GCSE in ICT.

5.1 COMPUTER SYSTEMS, COMMUNICATIONS TECHNOLOGY AND INFORMATION MANAGEMENT (SHORT & FULL COURSE MODULE)

Candidates should study a range of applications found in the home, at school and general everyday life, in order to fully understand some of the basic concepts of ICT.

Assessment Unit 1 will address the following subject matter in the context of applications listed below, together with the more theoretical issues from Section 5.2.

Examples of Applications for the Short Course

Newsletters, publicity and corporate image such as business card/letterhead/flyer/brochure

Room layouts, websites, multimedia presentations

Music scores, cartoons

Surveys, address lists, tuck shop records, clubs and society records

Range of CD-ROM material including computer based training/Computer Assisted Learning

Personal finance

School reports

School library

Scientific experiments, electronic timing, environmental monitoring

Turtle graphics, control of lights, buzzers and motors

Automatic washing machines, automatic cookers, toys, central heating controllers, burglar alarms, video recorders/players, microwave ovens, digital watches

Costing of materials, 3D modelling, simulation e.g. flight or driving

Content

- Computer systems: components and types of system
- Input and output devices
- Storage devices and media
- Introductory communications
- Data: types and terminology
- Information management and effects of IT: legal issues, implications, health and safety

5.1.1 Computer Systems: Components and Types of System

- (a) Hardware components of a computer system
- (b) Software: definition and examples
- (c) Laptops/notebooks, palmtops and other portable systems
- (d) Desk-top computers

Learning Outcomes

Candidates should be able to:

- (i) define hardware, giving examples;
- (ii) define software, giving examples;
- (iii) describe the difference between hardware and software;
- (iv) identify the main components of a general purpose computer: Central Processing Unit, Main/Internal Memory, Input Devices, Output Devices and Secondary/Backing Storage;
- (v) describe the difference between portable (including laptops/notebooks and palmtops) and desktop computers.

5.1.2 Input and Output Devices

- (a) Input devices: identification and use
- (b) Output devices: identification and use
- (c) Advantages and disadvantages of different types of input/output device

Learning Outcomes

Candidates should be able to:

- (i) identify the following input devices: keyboards, pointing devices (including mouse, touch pad and tracker ball), video digitisers, remote controls, joysticks, magnetic stripes, scanners, digital cameras, microphones, sensors, MIDI instruments;
- (ii) identify suitable uses of the input devices in (i) above, stating the advantages and disadvantages of each;
- (iii) identify the following output devices: monitors, printers (laser, ink jet and dot matrix), plotters, speakers, control devices (including lights, buzzers, robotic arms and motors);
- (iv) identify suitable uses of the output devices in (iii) above, stating the advantages and disadvantages of each;
- (v) identify relative purchase costs, running costs, quality and speed of different types of printers.

5.1.3 Storage Devices and Media

- (a) Backing/Secondary storage devices and media: different types and uses
- (b) Advantages and disadvantages of different types of backing storage media
- (c) Importance of backups
- (d) Difference between main/internal memory and backing storage

Learning Outcomes

Candidates should be able to:

- (i) describe common backing storage media (such as magnetic tape, CD-ROM, floppy disc and hard disc) and their associated devices;
- (ii) identify typical uses of the storage media in (i) above;
- (iii) describe the comparative advantages and disadvantages of using different backing storage media;
- (iv) define the term backup and describe the need for taking backups;
- (v) define the difference between main/internal memory and backing storage, stating the relative benefits of each in terms of speed and permanence.

5.1.4 Introductory Communications

- (a) Modems and digital telephone lines
- (b) Analogue to digital conversion and digital to analogue conversion
- (c) Advantages and disadvantages of using computer networks
- (d) User ids and passwords
- (e) Communication media

Learning Outcomes

Candidates should be able to:

- (i) describe a modem, its purpose and how it is used with analogue telephone lines;
- (ii) state why it is not necessary to use a modem when using digital telephone lines;
- (iii) state the difference between analogue data and digital data;
- (iv) describe the need for conversion between analogue and digital data;
- (v) identify the advantages and disadvantages of using common network environments such as the Internet;
- (vi) describe what is meant by the terms user ids and passwords, stating their purpose and use;
- (vii) identify a variety of communication media such as fax, e-mail, bulletin boards, and tele/video conferencing.

5.1.5 Data: Types and Terminology

- (a) Types of data – alphanumeric/text, numeric (real and integer), date, logical/Boolean
- (b) Definition of file, record, field and key field

Learning Outcomes

Candidates should be able to:

- (i) identify different data types: logical/Boolean, alphanumeric/text, numeric (real and integer) and date;
- (ii) select appropriate data types for a given set of data: logical/Boolean, alphanumeric/text, numeric and date;
- (iii) describe the terms: file, record, field, and key field.

5.1.6 Information Management and Effects of IT: Legal Issues, Implications, Health and Safety



WO1.1, WO1.2, WO2.1, WO2.2

- (a) Software copyright
- (b) Hacking
- (c) Viruses
- (d) Social effects of ICT
- (e) Health
- (f) Safety

Learning Outcomes

Candidates should be able to:

- (i) describe what is meant by software copyright;
- (ii) describe what is meant by hacking;
- (iii) describe what a computer virus is;
- (iv) explain the measures which must be taken in order to protect against hacking and viruses;
- (v) describe the changing patterns of employment including areas of work where there is increased unemployment;
- (vi) describe the effects of microprocessor-controlled devices in the home including effects on leisure time, social interaction and the need to leave the home;
- (vii) describe the use of photo editing software to distort reality;

- (viii) describe the effects of variation in computer access and ICT skills between different people;
- (ix) describe the capabilities and limitations of ICT and how communications systems have changed our use of ICT;
- (x) discuss the issues relating to information found on the Internet, for example unreliability, undesirability and security of data transfer;
- (xi) describe the potential health problems related to the prolonged use of ICT equipment, for example RSI, back problems, eye problems and some simple strategies for preventing these problems;
- (xii) describe a range of safety issues related to using computers (electrical, heat, light related) and measures for preventing accidents, particularly in the work place such as not overloading electrical sockets, no trailing wires, no food and drink around the computer, installing fire extinguishers etc.

5.2 PRACTICAL SKILLS AND UNDERSTANDING RELATING TO THE USE OF ICT APPLICATIONS (SHORT AND FULL COURSE MODULE)

The purpose of this module is to develop practical skills and understanding of a range of standard application packages. Assessment Module 2 (practical tasks) will assess this module although some of the more theoretical issues will be examined by Assessment Unit 1.

Content

- Word processing, desk-top publishing and other presentation software
- Graphics production and image manipulation
- Spreadsheets, modelling and databases
- Data logging and control software
- Systems tasks and software

5.2.1 Word Processing, Desk-top Publishing and Other Presentation Software

  IT1.1, IT1.2

- (a) Common features of a word processor and desk-top publisher
- (b) Differences between a word processor and desk-top publisher
- (c) Basic tasks and uses of word processors and desk-top publishers
- (d) Use basic features of a variety of different types of software used for presenting information in textual, graphical or multimedia format

Learning Outcomes

Candidates should be able to:

- (i) identify the common features found in word processors, desk-top publishers and other presentation software such as left/right/full justification, centring, indentation, boldening, italics, underlining, copy, cut and paste, bullets, numbering, font selection, point size, font highlight and colour, borders, page and line breaks, columns, tabs, tables, spelling and grammar, word count, inserting pictures and drawing or other objects, grouping, ungrouping, layering, sound effects, animation etc;
- (ii) identify basic tasks which can be carried out by word processors and desk-top publishers such as letter writing, memos, theses, reports, flyers, brochures, posters, business cards, interactive presentations, web pages etc;
- (iii) use basic features of word processors, desktop publishers and other presentation software in order to create documents such as letters, posters, leaflets, essays, interactive (multimedia) presentations.

5.2.2 Graphics Production and Image Manipulation

  IT1.1, IT1.2



- (a) Common features of graphics manipulation software
- (b) Common features of scanning software
- (c) Basic tasks and uses of graphics packages

Learning Outcomes

Candidates should be able to:

- (i) identify common features of basic graphics packages, for example: fill, shade, layering, size, orientation, repeating pattern;
- (ii) identify basic tasks which can be carried out using graphics manipulation packages including changing the look of scanned, drawn or photographed images;
- (iii) identify the features of scanning software;
- (iv) use the basic features of a single graphics package to create or modify an image.

5.2.3 Spreadsheets, Modelling and Databases

  N1.1, N1.2, N1.3, N2.1, N2.2, N2.3, IT1.1, IT1.2, IT2.1, IT2.2



- (a) Collect/enter data
- (b) Verification and validation
- (c) Format data
- (d) Write rules and formulas
- (e) Sort and search data
- (f) Create graphs and charts
- (g) Features of spreadsheets and databases
- (h) Typical tasks for spreadsheets and databases
- (i) Use a spreadsheet for a typical modelling task
- (j) Use a database for a typical data handling task

Learning Outcomes

Candidates should be able to:

- (i) Design and use a data capture form;
- (ii) understand the need for validation and verification;
- (iii) apply the concepts of validation and verification in a practical context;
- (iv) describe the basic features of spreadsheet software such as cells, rows, columns, replication, formatting, formulae, functions, automatic recalculation, sorting and graph creation;
- (v) describe the basic features of database software such as fields, records, files, validation, sorting, searching using the Boolean expressions NOT, AND & OR, creation of charts and graphs, different output formats;
- (vi) describe how a data model may be used for answering 'what-if' questions and explain the benefit of being able to answer such questions using a data model;
- (vii) identify typical tasks for which spreadsheet and other modelling software can be used;
- (viii) identify typical tasks for which databases can be used;
- (ix) use software to carry out a task which will allow modification of rules and testing of hypotheses;
- (x) use data handling software to manipulate and present data.

5.2.4 Data Logging and Control Software

  IT1.1, IT1.2

- (a) Data logging
- (b) Program instructions
- (c) Control of devices

Learning Outcomes

Candidates should be able to:

- (i) identify different types of sensor and suitable uses;
- (ii) identify the advantages and disadvantages of computerised data logging rather than logging data manually;
- (iii) create instructions to respond to data from sensors;
- (iv) write a sequence of instructions to control a screen image or external device such as lights, buzzers, sound or turtle, using repeated instructions, procedures and variables as appropriate;
- (v) identify typical applications involving the use of control and data logging software.

5.2.5 Systems Tasks and Software

IT1.1

- (a) Interface software
- (b) Electronic mail and Internet browsing
- (c) Saving, copying and troubleshooting
- (d) Other software tasks
- (e) Designing, documenting and implementing IT solutions

Learning Outcomes

Candidates should be able to:

- (i) describe the basic features of good interface software;
- (ii) describe the basic features of an electronic mail package;
- (iii) use electronic mail facilities, including attaching documents;
- (iv) identify and use basic features of an Internet browser and a variety of CD-ROMs;
- (v) search for information using key words, including searching the Internet and CD-ROMs;
- (vi) create, edit, save and copy files on a typical computer system;
- (vii) carry out basic troubleshooting activities: e.g. solving why a print instruction produced no printout;
- (viii) identify tasks that may be carried out using other software e.g. using a Computer Aided Design package for designing a house;
- (ix) write a report detailing how a practical solution implemented on the computer relates to a defined task;
- (x) document a solution which has been implemented using an appropriate piece of software, for example describing the purpose of the system and how to use it;
- (xi) produce annotated evidence that a system, which has been implemented, meets user requirements.

5.3 ICT APPLICATIONS, SYSTEMS, NETWORKS AND COMPUTER TECHNOLOGY (FULL COURSE MODULE)

Examples of applications for the Full Course

All the examples of applications for the Short Course, together with the items below, should be studied for the Full Course.

Electronic communications	Internet, www, electronic mail, fax, electronic conferencing, portable telephones
Process control	robotics in manufacture, production line control
Billing	electricity/gas, mail order
Crime	electronic fraud, police systems, tagging, security systems
Retailing	sales, stock control, purchasing, payroll
School Management Systems	registration, records, reports,
Booking Systems	travel, theatre, cinema
Money and Banking	Electronic Funds Transfer (EFT), cash machines, cheque clearing, home banking, personal finance systems
Medical applications	General Practitioners' information systems, hospital and pharmacy records, monitoring, expert systems in medicine
Libraries	records of books and borrowers, issue of books
Assistance for people with disabilities	communication and control devices
Expert Systems/IKBS	medical diagnosis, mineral prospecting, chess playing, tax system/benefits advice

Content

- Computer Technology
- Legal, Economic and Political Issues Relating to the Use of ICT
- Information Systems and Applications
- Networks (Wide and Local Area Networks)

5.3.1 Computer Technology

- (a) Types of hardware
- (b) Relationship of hardware and software to a variety of applications
- (c) Types of software
- (d) Interface software features

Learning Outcomes

Candidates should be able to:

- (i) identify the fundamental differences between microprocessor technology and mainframe technology;
- (ii) describe a range of applications at home and in everyday life where microprocessor technology is used;
- (iii) describe a range of applications in the workplace where either microprocessor technology is used or where mainframe technology is used;
- (iv) identify a range of data collection methods additional to those listed in 5.1.2 i.e. OMR, OCR, MICR, bar-code reader, touch screens, graphics tablet, voice input;
- (v) identify common uses of different data collection methods e.g. MICR in banking, Bar-code reader in supermarket stock control;
- (vi) describe the comparative advantages and disadvantages of using the range of different data collection methods in iv and 5.1.2;
- (vii) identify a range of storage devices or media additional to those listed in 5.1.3 i.e. DVD, CD-R, CD-RW and Zip drives;
- (viii) describe situations when each of the devices/media in vii may be used;
- (ix) describe the comparative advantages and disadvantages of using storage media identified in vii and 5.1.3;
- (x) identify the difference between RAM and ROM, describing their uses;
- (xi) describe voice output, sound, video, animation and how they are used in multimedia systems, identifying typical applications where their use is particularly beneficial;
- (xii) identify different types of software (operating systems, user interfaces, utilities, applications software, programming languages);
- (xiii) identify the main features of a graphical user interface;
- (xiv) identify the main difference between a graphical user interface (GUI) and command line interface, explaining their relative benefits and drawbacks.

5.3.2 Legal, Economic and Political Issues Relating to the Use of ICT



C1.1, C1.2, C2.1a

Content

- (a) Data Protection Act
- (b) Computer Misuse Act
- (c) Unauthorised access
- (d) Electronic fraud
- (e) Changing pattern of commerce and industry due to increased use of ICT
- (f) Changing pattern of employment due to increased use of ICT

Learning Outcomes

Candidates should be able to:

- (i) describe the main aspects of the Data Protection Act and any subsequent amendments;
- (ii) describe the purpose of the Computer Misuse Act and any subsequent amendments;
- (iii) describe a range of methods for preventing unauthorised access to computer systems;
- (iv) describe what is meant by data encryption and identify when it is used;
- (v) describe the changes to the way businesses work due to the introduction of ICT e.g. automated production lines with less workers and more standard products, automated stock control ensuring stock is kept at correct levels, shopping on the Internet reducing necessity for premises etc;
- (vi) discuss the changes caused by increased use of IT in industry such as size of business/workforce, type of workforce, siting of offices/manufacturing plant;
- (vii) discuss the changes in employment due to the introduction of computers and the increasing use of network technology such as teleworking, flexible hours, job satisfaction, ease of tasks, training, re-training, work monitoring.

5.3.3 Information Systems and Applications



Content

- (a) Backups vs archiving of data
- (b) Verification and validation methods
- (c) Batch processing, on-line and real-time processing
- (d) Systems cycle
- (e) Control-feedback loop
- (f) Information systems investigation methods
- (g) Form design
- (h) File design
- (i) Output design
- (j) System implementation strategies
- (k) Information Knowledge Based Systems (IKBS) and expert systems
- (l) Mail merging

Learning Outcomes

Candidates should be able to:

- (i) describe the difference between data which is backed up and data which is archived;
- (ii) describe verification methods: double entry and visual checks;
- (iii) describe a range of validation checks and their suitability in certain circumstances: including range checks, invalid character checks, member lists, check digits;
- (iv) define batch processing, real-time processing and on-line processing identifying the circumstances when it is necessary to adopt each different method of processing;
- (v) identify the main stages of the systems cycle: investigation and analysis, design, development and testing of a working system, implementation, monitoring, maintenance;
- (vi) describe the main components of the control-feedback loop of a closed system: input, process, output, feedback, identifying a typical application using physical variables such as controlling a greenhouse environment or using documents as feedback such as utility billing systems;
- (vii) identify a range of systems investigation methods such as questionnaires, data capture forms, interviews, observations, suggesting situations when each might be appropriate;
- (viii) discuss the advantages and disadvantages of different systems investigation methods;
- (ix) identify the main issues governing design of suitable data capture forms;
- (x) identify the main issues governing the design of screens and reports;
- (xi) identify the main issues governing the design of files: data types, selection of fields, coding of data, validation rules;
- (xii) describe different systems implementation strategies: direct, phased, pilot or parallel running;
- (xiii) describe the purpose of IKBS/expert systems and how they are used for diagnostic work and decision making;
- (xiv) describe the steps necessary to create an IKBS/expert system;
- (xv) describe the steps necessary when mail merging;
- (xvi) describe the advantages and disadvantages of the use of mail merge.

5.3.4 Networks



Content

- (a) Methods of communication
- (b) Network topologies
- (c) Difference between LANs and WANs
- (d) Common network environments

Learning Outcomes

Candidates should be able to:

- (i) describe different methods of communication such as satellite, cable, radio, optical;
- (ii) describe different network topologies, identifying briefly the relative advantages of each such as star, ring, bus;
- (iii) define the terms Local Area Network (LAN) and Wide Area Network (WAN);
- (iv) describe the difference between LANs and WANs, identifying their main characteristics;
- (v) describe the characteristics and purpose of common network environments, such as intranets and the Internet;
- (vi) discuss the problems of confidentiality of data, including problems surrounding common network environments;
- (vii) identify the need for encryption and authentication techniques when using common network environments like the Internet.

5.4 PROBLEM SOLVING USING ICT (FULL COURSE MODULE)

Content

- Analysis
- Design
- Development, Testing and Implementation
- Documentation
- Evaluation

5.4.1 Analysis

IT2.1

- (a) Researching a situation using observation, interviews and/or questionnaires and/or data capture forms
- (b) Recording information
- (c) Identifying problems
- (d) Establishing the information, input, output and processing required
- (e) Identify suitable hardware and software for developing a new system

Learning Outcomes

Candidates should be able to:

- (viii) identify methods by which to investigate the problem including questionnaires, data capture forms, observation and structured interviews;
- (ix) record information/data;
- (x) analyse the data and tasks carried out, identifying problems with the current methods and procedures;
- (xi) work out the user and information requirements necessary to resolve the identified problems;
- (xii) specify the required hardware and software;
- (xiii) document the system requirements for later reference during evaluation.

5.4.2 Design

IT2.2

- (a) Designs for documents and files
- (b) Design forms/inputs
- (c) Design outputs
- (d) Validation
- (e) Use of diagrams to describe system processing

Learning Outcomes

Candidates should be able to

- (i) design and document data capture forms and screen layouts;
- (ii) design and document report layouts, screen displays and other forms of output (e.g. audio output);
- (iii) specify any verification and validation required and interactive feedback required if any data is input in error;
- (iv) design the required data/file structures necessary to solve the inefficiencies/problems indicated in the requirements specification;
- (v) design the new methods/procedures/processing required to meet the user requirements, drawing diagrams to represent the new design.

5.4.3 Development, Testing and Implementation

IT2.3



- (a) Create the required data/file structures
- (b) Create inputs/outputs and set up any validation specified in the design
- (c) Designing test data to test normal, abnormal and extreme circumstances
- (d) Test the system
- (e) Specify implementation method: direct changeover, phased implementation or parallel running

Learning Outcomes

Candidates should be able to

- (i) develop the data structures of the design using the appropriate features of a software package;
- (ii) develop the input/outputs and validation checks for their user using the appropriate features of the chosen software;
- (iii) identify, develop and document a test strategy for the design, ensuring that normal, abnormal and extreme circumstances are tested;
- (iv) test the new system, illustrating how improvements are carried out as a result of testing;
- (v) produce detailed and annotated output from the testing to show how the system works;
- (vi) devise a strategy for system implementation.

5.4.4 Documentation

  C1.3, C2.3, IT2.3

- (a) The purpose and limitations of the system
- (b) The hardware and software requirements of the system
- (c) How to use the system
- (d) Input and output formats
- (e) Sample runs
- (f) Error messages

Learning Outcomes

Candidates should be able to

- (i) describe the purpose of the system and its limitations to the user;
- (ii) describe the hardware and software required to run the system;
- (iii) describe how to use the system, illustrating the system in use by providing annotated output;
- (iv) describe the inputs, validation and any outputs from the system;
- (v) produce a section on troubleshooting errors for the user;
- (vi) produce documented evidence that the system works as part of the project report.

5.4.5 Evaluation

- (a) Comparing the solution with the original design
- (b) Conclusions drawn from the testing and any modifications and improvements made

Learning Outcomes

Candidates should be able to

- (i) evaluate the final system against the criteria described in the requirements specification;
- (ii) evaluate the users' responses to testing the system or end results of testing;
- (iii) identify the good and bad points of the final system highlighting any limitations and necessary extensions to the system, indicating how the extensions could be carried out.

SECTION D: COURSEWORK

6 Coursework Tasks

6.1 NATURE OF COURSEWORK

Two teaching modules are assessed by internally marked coursework. These are:

Module 2: Practical skills and understanding relating to the use of ICT applications

Module 4: Problem solving using ICT

Candidates must submit coursework to be assessed against criteria descriptors for the appropriate unit i.e. Project 1a and Project 1b for assessment Unit 2 and Project 2 for assessment Unit 4.

Candidates are not allowed to submit work in any form other than paper and photographs.

Candidates will produce two pieces of coursework for assessment unit 2 and one piece of work for assessment unit 4. The work submitted for moderation must be shown on copies of the appropriate coversheets. The pieces of coursework will be:

Title	Topic	Course	Course	Mark
Project 1a	Mostly communication and directly related to the Key Skills.	Short	Full	28
Project 1b	A piece of work related to Handling Data, Modelling, Measurement or Control.	Short	Full	28
Project 2	A piece of work related to Systems Design.	-	Full	56

Up to 4 marks must also be awarded for quality of written communication (Section 7.6) and applied to the work as a whole (Projects 1a and 1b or project 2) making a total of 60 for each of the 2 units of assessment.

Candidates will not be allowed to submit for assessment any project work which has already been assessed against the assessment criteria of any other project e.g. a Project 1a task cannot be subsumed in the Project 1b task.

Candidates may undertake a task which they have developed themselves or they may choose from the coursework exemplar tasks suggested by OCR. Teachers may prefer to compose tasks of their own from which candidates will choose. OCR offers a consultancy service on task setting.

Candidates are not required to complete any board set projects.

6.2 EXEMPLAR* COURSEWORK TASKS

* These are for illustrative purposes only.

EXEMPLAR SHORT COURSEWORK TASKS INFORMATION AND COMMUNICATION TECHNOLOGY PROJECT 1a

These are just ideas for coursework and should not be taken as everything the candidate has to do to earn full marks. The candidate's work should be marked using the criteria from the specification.

- 1 Produce a short, illustrated children's book.
To include:
 - a suitable cover;
 - an advert for the writer on the back cover;
 - a simple story in a suitable easy to read font;
 - illustrations which could be clip art.
- 2 Produce a programme for a school performance.
To include:
 - photographs of scenes from the production;
 - a list of performers;
 - timings of performances;
 - details of play/concert etc.
 - admission prices to various parts of the theatre/hall..
- 3 Create a web site to advertise your school.
To include:
 - text which tells visitors about the school;
 - photographs of the school;
 - music made by the school orchestra;
 - links to other pages.
- 4 Produce the advertising material for a car showroom.
To include:
 - a brochure describing the main features of the cars being sold - make, model, age, engine size etc.;
 - this brochure should show pictures of the cars on sale;
 - a list of prices of the cars.
- 5 Create a presentation using a computer on a topic of your choice.
To include:
 - animated text;
 - pictures where appropriate;
 - suitable video;
 - running headers and footers;
 - a presentation to an audience;
 - a guide to how the presentation was created.

EXEMPLAR SHORT COURSEWORK TASKS
INFORMATION AND COMMUNICATION TECHNOLOGY
PROJECT 1b

These are just ideas for coursework and should not be taken as everything the candidate has to do to earn full marks. The candidate's work should be marked using the criteria from the specification.

- 1 Conduct an analysis within the school so that you can determine the between-meals eating habits of pupils.

To include:

- design and production of a data capture sheet;
- collection and input of data;
- sorting and searching data;
- presentation of results in the form of graphs/charts;
- a written conclusion.

- 2 Compile a database of second-hand vehicles using current information from local garage advertisements, leaflets and newspapers. This database will act as a vehicle location service for a someone wishing to obtain details on the availability of certain models.

To include:

- a data capture sheet;
- collection and input of data;
- sorting and searching of data;
- presentation of results;
- written conclusion;
- an instruction sheet to enable another person to use the system to search for information on a specific type of vehicle.

- 3 Design a spreadsheet, which will model the trajectory of a projectile.

To include:

- research to determine the correct formulae;
- a spreadsheet which displays the distance from the start and the height of the object;
- single cells which contain the values of velocity and angle which can be changed to experiment with the model;
- a graph which displays the path of the projectile.

- 4 Use suitable data logging equipment with a variety of sensors to conduct an investigation to determine the effect that age, gender and weight has on heart rate after mild exercise.

To include:

- a detailed description of how the investigation was carried out;
- a printout of the results;
- a conclusion supported by graphs and charts;
- an evaluation of the investigation.

- 5 Carry out a series of tests on insulating materials such as paper, metal and polystyrene that could be used for drink containers in order to keep a drink warm for the maximum amount of time.

To include:

- a detailed description of how the investigation was carried out;
- a printout of the results;
- a conclusion supported by graphs and charts;
- an evaluation of the investigation.

- 6 Design a control system for the local Leisure Centre which has a large enclosed water slide as a feature of the swimming pool and wish to install an automatic control system to ensure its safe use.

To include:

- a red and green light at the top of the slide to show when the slide is clear and ready for use;
- an audible warning to sound if a person attempts to use the slide before the last person is safely clear of the splash down area;
- a counting device that will record the number of people who have used the slide in any one session.

- 7 Compile a database of videotapes using current information from local video stores, leaflets and newspapers. This database will act as the basis for a store assistant finding a specified video tape as well as keeping a record of whether it is in stock or not.

To include:

- a data capture sheet;
- collection and input of data;
- sorting and searching of data;
- presentation of results;
- an instruction sheet to enable another person to use the system to search for information on a specific type of videotape.

8 Create a burglar alarm system, which can be used in a house.

To include:

- sensors to detect movement;
- sensors to detect if a window has been opened;
- sensors to detect if someone has walked on the floor;
- an alarm system;
- an emergency button to set off the alarm immediately;
- an off button to switch off the alarm;
- documentation of the system.

9 Create an interrogation system for a historian to enable them to find out various facts about monarchs.

To include:

- a data capture sheet;
- collection and input of data – e.g. who they were, when they were born, when they were crowned, how long they reigned, how they died, age they died, which family they were in etc;
- sorting and searching of data;
- presentation of statistics in the form of graphs/charts;
- an instruction sheet to enable another person to use the system to search for information on a specific monarch.

EXEMPLAR FULL COURSEWORK TASKS
INFORMATION AND COMMUNICATION TECHNOLOGY
PROJECT 2

These are just ideas for coursework and should not be taken as everything the candidate has to do to earn full marks. The candidate's work should be marked using the criteria from the specification.

- 1 Devise a system which would help the owner of a car dealership to organise the business. There are several aspects to the business, which the owner needs help with.
- A record of all the stock has to be kept so that if a customer comes in and make enquiries about a specific car, salesmen can immediately inform them whether the dealership has such a car.
 - A record of customers has to be kept for further mailings about special offers.
 - The servicing department has to keep a record of all the parts in the stores.
 - Itemised bills have to be prepared for customers when they have their cars serviced (certain customers are allowed a discount).

Choose one or more of these aspects of the business when devising your solution. In order to gain high marks, at least two aspects of the business will need to be considered.

Your solution should include the following.

- Identification of problems with the current system.
- Interviews with possible users of such a system.
- Documents and forms in use in the current system.
- Identification of the inputs, outputs and processing currently employed.
- Designs of the structure of databases/spreadsheets/word processing documents required.
- Design of the input screens and the output documents/screens of the new computerised system.
- Documentation of how the databases/spreadsheets/word processing documents and how the associated input screens and output documents/screens were created.
- The combination of the outputs from one piece of software into another.
- Evidence of testing.
- A User Guide showing how to use the new system.
- An evaluation of the final system compared with their original design.

2 Devise a system that would help the organisers of a weight-watchers club to assist their members in the various aspects of their activities. There are several aspects of the club, which they need help with.

- Help their members to calculate their daily energy and protein levels based on their food intake.
- Help their members predict the effect of changes to their diet.
- Keep a record of every member's details for sending information about changes in meetings or special events.
- Keep a record of their member's weight to produce charts showing their progress.

Choose one or more of these aspects of the activities of the organisers when devising your solution. In order to gain high marks, at least two aspects of the club will need to be considered.

Your solution should include the following.

- Identification of problems with the current system.
- Interviews with possible users of such a system.
- Documents and forms in use in the current system.
- Identification of the inputs, outputs and processing currently employed.
- Designs of the structure of databases/spreadsheets/word processing documents required.
- Design of the input screens and the output documents/screens of the new computerised system.
- Documentation of how the databases/spreadsheets/word processing documents and how the associated input screens and output documents/screens were created.
- The combination of the outputs from one piece of software into another.
- Evidence of testing.
- A User Guide showing how to use the new system.
- An evaluation of the final system compared with their original design.

3 Devise a system that would help the managers of a leisure centre/fitness club to provide a more efficient service to their members. There are several aspects of the leisure centre/fitness club, which they need help with.

- Keep a record of every member's details.
- Measure the heart rate, blood pressure and other physiological measures of their members after various set exercises.
- Compare these measures with national norms and advise their members on their fitness levels.
- Keep a record of their members' fitness levels to produce charts showing their progress.
- Send details of centre/club activities

Choose one or more of these aspects of the activities of the organisers when devising your solution. In order to gain high marks, at least two aspects of the centre/club will need to be considered.

Your solution should include the following.

- Identification of problems with the current system.
- Interviews with possible users of such a system.
- Documents/forms and methods of measuring blood pressure etc. in use in the current system.
- Identification of the inputs, outputs and processing currently employed.
- Designs of the structure of databases/spreadsheets/word processing documents/data-logging equipment required.
- Design of the input screens and the output documents/screens of the new computerised system.
- Documentation of how the databases/spreadsheets/word processing documents/data logging systems and how the associated input screens and output documents/screens were created.
- The combination of the outputs from one piece of software into another.
- Evidence of testing.
- A User Guide showing how to use the new system.
- An evaluation of the final system compared with their original design.

4 Devise a system, which would help the owner of a video rental shop to organise his business. There are several aspects to the business, which he needs help with.

- A record of all the videos has to be kept so that if a customer comes in and make enquiries about a specific video, shop assistants can immediately inform them whether they have it in the shop at that time.
- A record of customers has to be kept with the videos they have on hire so that overdue notices can be sent if required.
- The various pricing strategies have to be calculated so that special offers such as 'hire three get one free' and others can be applied.
- Letters can be sent to customers if a new film, which matches their particular preferences, comes into the shop.

Choose one or more of these aspects of the business when devising your solution. In order to gain high marks, at least two aspects of the business will need to be considered.

Your solution should include the following.

- Identification of problems with the current system.
- Interviews with possible users of such a system.
- Documents and forms in use in the current system.
- Identification of the inputs, outputs and processing currently employed.
- Designs of the structure of databases/spreadsheets/word processing documents required.
- Design of the input screens and the output documents/screens of the new computerised system.
- Documentation of how the databases/spreadsheets/word processing documents and how the associated input screens and output documents/screens were created.
- The combination of the outputs from one piece of software into another.
- Evidence of testing.
- A User Guide showing how to use the new system.
- An evaluation of the final system compared with their original design.

5 Devise a system, which would help the owners of a small hotel, organise their business. There are several aspects to the business, which they need help with.

- A record of all the hotel rooms, their type and their occupancy has to be kept. If somebody wishes to book a room they can be advised with regard to availability.
- A record of the details of the hotel guests has to be kept.
- Bills have to be calculated so that meals taken etc. can be included.
- Letters can be sent to former guests advertising special offers.
- A booking system for evening meals has to be organised in the hotel restaurant to avoid seating problems.

Choose one or more of these aspects of the business when devising your solution. In order to gain high marks, at least two aspects of the business will need to be considered.

Your solution should include the following.

- Identification of problems with the current system.
- Interviews with possible users of such a system.
- Documents and forms in use in the current system.
- Identification of the inputs, outputs and processing currently employed.
- Designs of the structure of databases/spreadsheets/word processing documents required.
- Design of the input screens and the output documents/screens of the new computerised system.
- Documentation of how the databases/spreadsheets/word processing documents and how the associated input screens and output documents/screens were created.
- The combination of the outputs from one piece of software into another.
- Evidence of testing.
- A User Guide showing how to use the new system.
- An evaluation of the final system compared with their original design.

7 Regulations for Internal Assessment

7.1 SUPERVISION AND AUTHENTICATION OF COURSEWORK

OCR expects teachers to supervise and guide candidates who are undertaking work that is internally assessed (e.g. coursework). The degree of teacher guidance in candidates' work will vary according to the kinds of work being undertaken. It should be remembered, however, that candidates are required to reach their own judgements and conclusions.

When supervising internally assessed tasks, teachers are expected to:

- offer candidates advice about how best to approach such tasks;
- exercise continuing supervision of work in order to monitor progress and to prevent plagiarism;
- ensure that the work is completed in accordance with the specification requirements and can be assessed in accordance with the specified marking criteria and procedures.

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

7.2 PRODUCTION AND PRESENTATION OF INTERNALLY ASSESSED WORK

Candidates must observe certain procedures in the production of internally assessed work.

- Any copied material must be suitably acknowledged.
- Quotations must be clearly marked and a reference provided wherever possible.
- Work submitted for moderation must be marked with the:
centre number
centre name
candidate number
candidate name
specification code and title
assignment title.
- All work submitted for moderation must be kept in a flat card file (not a ring binder).

7.3 MODERATION

All internally assessed work is marked by the teacher and internally standardised by the Centre. Marks are then submitted to OCR by a specified date, after which moderation takes place in accordance with OCR procedures. The purpose of moderation is to ensure that the standard of the award of marks for internally assessed work 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, which is presented to the moderator for moderation, must show how the marks have been awarded in relation to the marking criteria.

The teacher responsible for marking of coursework is encouraged to indicate by appropriate marking or supportive annotation areas within the candidate's coursework where credit has been given in order to assist the moderation process.

A separate cover sheet containing reference to the criteria applied and their location within the project is recommended.

7.4 MINIMUM REQUIREMENTS FOR INTERNALLY ASSESSED WORK

There should be clear evidence that work has been attempted and some work produced.

If a candidate submits no work for an internally assessed component, then the candidate should be indicated as being absent from that component on the mark sheets submitted to OCR. If a candidate completes any work at all for an internally assessed component then the work should be assessed according to the criteria and marking instructions and the appropriate mark awarded, which may be zero.

7.5 MARKING CRITERIA AND NOTES FOR GUIDANCE

Coursework should be assessed against the Assessment Criteria. The marks should be recorded on a copy of the Coursework Assessment Form. Once the work for an Assessment Unit has been assessed, assess communication, applying the criteria in Appendix E3 to the work as a whole (Projects 1a, 1b and 2) and record the mark on the Coursework Assessment Form.

The total mark must then be submitted to OCR. Full details of the moderation procedure will be sent to Centres. Forms should be sent to the Moderator and to OCR by the date published in the General Examinations Timetable.

The total mark will eventually be transferred to another mark sheet and sent to OCR according to the instructions on moderation provided to Centres.

Project 1a (FULL AND SHORT COURSE)

To assess the project.

- For the Key Skills marks choose the box which best describes the candidate's achievement making sure that all the criteria in the box have been met.
- Identify the mark range allocated to that box.
- Choose a mark within the range according to how well the criteria have been achieved.
- Record the mark on the Coursework Summary Form and the candidate's coversheet.
- For the Additional Skills marks choose the box which best describes the candidate's achievement making sure that all the criteria in the box have been met.
- Identify the mark range allocated to that box.
- Choose a mark within the range according to how well the criteria have been achieved.
- Record the mark on the Coursework Summary Form and the candidate's coversheet.
- Produce a total out of 28.
- Record the total mark for Project 1a on the Coursework Summary Form and the candidate's coversheet.

Project 1b (FULL AND SHORT COURSE)

To assess the project.

- Select the strand to be assessed.
- Choose the box which best describes the candidate's achievement making sure that all the criteria in the box have been met.
- Identify the mark range allocated to that box.
- Choose a mark within the range according to how well the criteria have been achieved.
- Produce a total out of 28.
- Record the total mark for Project 1b on the Coursework Assessment Form and the candidate's coversheet.

Project 2 (FULL COURSE)

To assess the project.

- For the section headed 'Identify a problem' choose the box which best describes the candidate's achievement making sure that all the criteria in the box have been met.
- Record the mark on the Coursework Assessment Form and the candidate's coversheet.
- Repeat the process for each subsequent section to be assessed.
- Produce a total out of 56.

Record the total mark for Project 2 on the Coursework Assessment Form and the candidate's coversheet.

Assessment Unit 2: Practical skills and understanding relating to the use of ICT applications

Project 1a (FULL AND SHORT COURSE)

Marks	Criteria – Key Skills
0-2	<p>Find different types of information from an IT source and non-IT sources.</p> <p>Use a computer to create a piece of work.</p> <p>Use editing techniques to bring in some of the information.</p>
3-4	<p>Find different types of information from an IT source and non-IT sources.</p> <p>Use a computer to develop a piece of work.</p> <p>Use editing techniques to bring in some of the information.</p> <p>Include text, images and numbers in the work.</p>
5-7	<p>Find different types of information from an IT source and non-IT sources.</p> <p>Use a computer to develop a piece of work.</p> <p>State the purpose of the work.</p> <p>Use editing techniques to bring in some of the information.</p> <p>Experiment with layouts and choose an appropriate layout for the selected information.</p> <p>Include text, images and numbers in the work.</p>
8-10	<p>Find different types of information from an IT source and non-IT sources.</p> <p>Use a computer to develop a piece of work.</p> <p>State the purpose of the work.</p> <p>Write down how the development matches the purpose of the work.</p> <p>Use editing techniques to bring in some of the information.</p> <p>Experiment with layouts and choose an appropriate layout for the selected information.</p> <p>Include text, images and numbers in the work.</p> <p>Show consistency throughout the work.</p>
11-13	<p>Find different types of information from an IT source and non-IT sources.</p> <p>Use a computer to develop a significant piece of work.</p> <p>State the purpose of the work.</p> <p>Write down how the development matches the purpose of the work.</p> <p>Use editing techniques to bring in some of the information.</p> <p>Experiment with layouts and choose an appropriate layout for the selected information.</p> <p>Include text, images and numbers in the work.</p> <p>Show consistency throughout the work.</p> <p>Use a spell checker or proof reader to check the accuracy of the work.</p> <p>Save information using appropriate folders and file names.</p>

Marks	Criteria – Key Skills
14-16	<p>Use a computer to develop a significant piece of work using different types of information from a range of IT sources and non-IT sources.</p> <p>State the purpose of the work.</p> <p>Write down how the development matches the purpose of the work.</p> <p>Search for information using multiple criteria.</p> <p>Use editing techniques to bring in some of the information.</p> <p>Experiment with layouts and choose an appropriate layout for the selected information.</p> <p>Include text, images and numbers in the work.</p> <p>Show consistency throughout the work.</p> <p>Use a spell checker or proof reader to check the accuracy of the work.</p> <p>Save information using appropriate folders and file names.</p>
17-19	<p>Use a computer to develop a significant piece of work using different types of information from a range of IT sources and non-IT sources.</p> <p>State the purpose of the work.</p> <p>Write down how the development matches the purpose of the work.</p> <p>Search for information using multiple criteria.</p> <p>Use hyperlinks or refined searches to identify information which is suitable for the purpose of the work.</p> <p>Use editing techniques to bring in some of the information.</p> <p>Use formatting techniques to bring in some of the information.</p> <p>Experiment with layouts and choose an appropriate layout for the selected information.</p> <p>Include text, images and numbers in the work.</p> <p>Show consistency throughout the work.</p> <p>Use a spell checker or proof reader to check the accuracy of the work.</p> <p>Save information using appropriate folders and file names.</p>
20-21	<p>Use a computer to develop a significant piece of work using different types of information from a range of IT sources and non-IT sources.</p> <p>State the purpose of the work.</p> <p>Write down how the development matches the purpose of the work.</p> <p>Search for information using multiple criteria.</p> <p>Use hyperlinks or refined searches to identify information which is suitable for the purpose of the work.</p> <p>Use editing techniques to bring in some of the information.</p> <p>Use formatting techniques to bring in some of the information.</p> <p>Derive new information for inclusion in the work.</p> <p>Experiment with layouts and choose an appropriate layout for the selected information.</p> <p>Include text, images and numbers in the work.</p> <p>Show consistency throughout the work.</p> <p>Use a spell checker and a proof reader to check the accuracy of the work.</p> <p>Save the work using appropriate folders and file names.</p>

Marks	Criteria – Key Skills
0-2	Is able to compare own use of IT with other methods. Can work safely and take care of equipment and avoid losing information Knows how to get help when dealing with errors.
3-4	Can write about the advantages and disadvantages of using IT. Can work safely and take care of equipment and avoid losing information Knows how to get help when dealing with errors. Knows when it is necessary to observe copyright or confidentiality.
5-7	Can write about the advantages and disadvantages of using IT. Can work safely and take care of equipment and avoid losing information. Can identify errors and their causes. Knows how to minimise risks from viruses. Knows how to work safely and minimise health risks.

NOTES FOR GUIDANCE ON PROJECT 1a (FULL AND SHORT COURSE)

In order to obtain a mark in any of the available mark ranges, candidates need to produce a piece of work which consists of at least one document or presentation. Marks can only be awarded where work is appropriately annotated by the candidate. This annotation can take the form of a written report.

Key Skills Marks

- 0-2** The candidate creates a piece of work using information from a source such as clipart, scanned images, CD ROMs or the Internet and sources such as newspapers and magazines. They use simple editing techniques like copy and paste to include information from these sources into their work.
- 3-4** The candidate uses **all** three types of data i.e. text, numbers and images.
- 5-7** The candidate states the reason why they are doing the work. This can be done by identifying a specific target audience. They provide examples of different possible layouts.
- 8-10** The candidate shows development of the work and writes about how this development matches the purpose of the work. The use of fonts and layout should be consistent.
- 11-13** The task must involve the production of a booklet with several pages or a presentation with several slides. There must be evidence that their booklet/presentation has been spell checked or proof read. There must be evidence that errors have been corrected.
- 14-16** Up until now candidates have only been required to use one IT source. For this mark range and all subsequent mark ranges more than one IT source must be used. Using the Internet only counts as one source. Evidence that complex searches have been used must be evidenced by screen dumps.
- 17-19** Candidates must provide evidence that they have refined searches or visited a number of Internet sites or CD ROM pages using hyperlinks. They must give reasons related to purpose why they investigated certain sites and not others. Having found suitable information they should then change the format of the information for inclusion in their work.
- 20-21** Candidates must derive new information from the information found as a result of their search and include it in their piece of work.

Additional Skills marks

- 0-2** Candidates must write a report comparing how they produced their piece of work using IT with other ways they could have produced their work. In their report they write about how they have worked safely, looked after the equipment and used some form of backup system. They write about how they got help when the computer reported errors in their work.
- 3-4** They include the advantages and disadvantages of using IT to produce their work and how they dealt with copyright or confidentiality in the production of their work.
- 5-7** In their report they write about what caused the errors the computer reported in their work. They write about the precautions they took to guard against the introduction of viruses into their work. They write about the safety and health precautions they took whilst producing their work.

Project 1b (FULL AND SHORT COURSE)

The candidate must choose a piece of coursework, which follows **one** of the strands.

- Handling Data
- Modelling
- Control
- Measurement

Handling Data

The candidate should be able to:

Marks	Criteria
0-2	look at the data stored in a database; find answers to questions using the data in the database.
3-4	look at the data stored in a database; find answers to questions using the data in the database; sort the database into order.
5-7	look at the data stored in a database; find answers to questions using the data in the database; change some of the data in the database when appropriate.
8-10	look at the data stored in a database; find answers to questions using the data in the database; ask people questions to get more data to add to the database; add this new data to the database.
11-13	develop a method of collecting data; create a database using this data; visually check the database for accuracy; search the database for answers to specific questions.
14-16	develop a method of collecting data; collect a range of data; create a database using selected data; visually check the database for accuracy; edit the database in light of the mistakes found; search the database, using the results of previous searches, for answers to specific questions.
17-19	develop a method of collecting data; collect a range of data; create a database using selected data; visually check the database for accuracy; check the database for accuracy using validation routines; edit the database in light of the mistakes found; using more than one condition, search the database for answers to specific questions.

Marks	Criteria
20-22	<p>develop a method of collecting data; collect a range of data; create a database using selected data; visually check the database for accuracy; check the database for accuracy using validation routines; edit the database in light of the mistakes found; using more than one condition, search the database for answers to specific questions; give reasons for the choice of software.</p>
23-25	<p>develop a method of collecting data; collect a range of data; create a database using selected data; give reasons for the choice of fields, field types and lengths; visually check the database for accuracy; check the database for accuracy using validation routines; edit the database in light of the mistakes found; using more than one condition, search the database for answers to specific questions; give reasons for the choice of software.</p>
26-28	<p>identify the required output for a given task; construct a method of collecting data based on this output; collect a range of data; create a database using selected data; give reasons for the relevance of their choice of software to the required output; give reasons for the relevance of their choice of fields, field types and lengths to the required output; visually check the database for accuracy; check the database for accuracy using validation routines; edit the database in light of the mistakes found; using more than one condition, search the database to produce the required output; comment upon how easy it is to use the software to produce the required output; comment upon how easy it is to produce the required output in different forms of tables and</p>

Modelling

The candidate should be able to:

Marks	Criteria
0-2	write about the workings of a model, which they have used.
3-4	write about the workings of a model, which they have used. write about how they have used the different options available within the model.
5-7	write about the workings of a model, which they have used. write about how they have used the different options available within the model; write about how they have used a model to make decisions; write about the consequences of these decisions.
8-10	use a model to discover the patterns within it; understand how the model operates; make simple predictions.
11-13	use a model to discover the patterns within it; understand how the model operates; explore the effects of changing the data within the model; make simple predictions about some of the effects of these changes.
14-16	use a complex model to discover the patterns within it; explore the effects of changing the data within the model; change the rules of the model; make simple predictions about some of the effects of these changes; write about how valid the model is.
17-19	use a complex model to discover the patterns within it; explore the effects of changing the data within the model; make simple predictions about some of the effects of these changes; develop the model by changing the rules to solve a given task; write about how valid this model is in solving the task.

Marks	Criteria
20-22	<p>design a complex computer model to provide the solution to a given task; give reasons, related to the task, for choosing a piece of software for the solution; use the software to construct the computer model; use the software to provide the answers required to solve the problem; write about how valid this model is in solving the task.</p>
23-25	<p>design a complex computer model to provide the solution to a given task; give reasons, related to the task, for choosing a piece of software for the solution; use the software to construct the computer model; use the software to provide the answers required to solve the problem; write about how valid this model is in solving the task; write about how the model was created.</p>
26-28	<p>design a complex computer model to provide the solution to a given task; give reasons, related to the task, for choosing a piece of software for the solution; use the software to construct the computer model; use the software to provide the answers required to solve the problem; write about how valid this model is in solving the task; write about how the model was created; write about how suitable the software was for this purpose.</p>

Measurement

The candidate should be able to:

Marks	Criteria
0-2	write about how everyday devices contain equipment which measure or monitor events.
3-4	write about how everyday devices contain equipment which measure or monitor events; give examples of some everyday devices that contain equipment which measure or monitor events.
5-7	write about how everyday devices contain equipment which measure or monitor events; give examples of some everyday devices which contain equipment which measure or monitor events; write about how they have connected computers to external devices that contain equipment which measure or monitor events.
8-10	write about how everyday devices contain equipment which measure or monitor events; give examples of some everyday devices which contain equipment which measure or monitor events; write about how they have connected computers to external devices which contain equipment which measure or monitor events; provide printouts and write about how they got the computer to display the results of the measurements.
11-13	write about how everyday devices contain equipment which measure or monitor events; give examples of some everyday devices which contain equipment which measure or monitor events; write about how they have connected computers to external devices which contain equipment which measure or monitor events; provide printouts and write about how they got the computer to display the results of the measurements; explain the meaning of the displayed results.
14-16	write about how everyday devices contain equipment which measure or monitor events; give examples of some everyday devices which contain equipment which measure or monitor events; describe how they have used computers to measure or monitor external events; provide printouts and write about how they got the computer to display the results of the measurements; explain the meaning of the displayed results.
17-19	write about how everyday devices contain equipment which measure or monitor events; give examples of some everyday devices which contain equipment which measure or monitor events; describe how they have used computers to measure or monitor external events; provide printouts and write about how they got the computer to display the results of the measurements; explain the meaning of the displayed results; explain why they have used a computer for this purpose.

Marks	Criteria
20-22	<p>write about how everyday devices contain equipment which measure or monitor events; give examples of some everyday devices which contain equipment which measure or monitor events; describe how they have used computers to measure or monitor external events; design an experiment which uses measuring equipment to provide the solution to a given task; construct the experiment and measure at least two different physical variables; provide printouts and write about how they got the computer to display the results of the measurements; explain the meaning of the displayed results; use a file to store the displayed results; explain why they have used a computer for this purpose.</p>
23-25	<p>write about how everyday devices contain equipment which measure or monitor events; give examples of some everyday devices which contain equipment which measure or monitor events; describe how they have used computers to measure or monitor external events; design an experiment which uses measuring equipment to provide the solution to a given task; construct the experiment and measure at least two different physical variables; provide printouts and write about how they got the computer to display the results of the measurements; describe the types of sensors used; explain the meaning of the displayed results; store the displayed results using more than one file format; explain why they have used a computer for this purpose.</p>
26-28	<p>write about how everyday devices contain equipment which measure or monitor events; give examples of some everyday devices which contain equipment which measure or monitor events; describe how they have used computers to measure or monitor external events; design an experiment which uses measuring equipment to provide the solution to a given task; construct the experiment and measure at least two different physical variables; provide printouts and write about how they got the computer to display the results of the measurements; describe the types of sensors used; explain the meaning of the displayed results; store the displayed results using more than one file format; explain why they have used a computer for this purpose; give reasons for their choice of hardware and software.</p>

Control

The candidate should be able to:

Marks	Criteria
0-2	write about how some everyday devices respond to signals and commands.
3-4	specify an outcome; write down how they controlled a screen turtle or robot to achieve this outcome.
5-7	specify an outcome; write down how they controlled a screen turtle or robot to achieve the specified outcome by a series of instructions; write down the instructions used.
8-10	specify an outcome; write down how they controlled a screen turtle or robot to achieve the specified outcome by a series of instructions; save the instructions as a program; print out the program; annotate the program.
11-13	specify an outcome; write down how they controlled a screen turtle or robot to achieve the specified outcome by a series of instructions; write about how they used precision in forming instructions; write about how they used precision in sequencing instructions; save the instructions as a program; print out the program; annotate the program.
14-16	specify an outcome involving the production of complex manoeuvres or patterns; write down how they controlled a screen turtle or robot to achieve the specified outcome by a series of instructions; write about how they used precision in forming instructions; write about how they used precision in sequencing instructions; save the instructions as a program; write about how they tested the program; write about how they refined the program; print out the program; annotate the program.
17-19	specify an outcome involving the production of complex manoeuvres or patterns; write down how they controlled a screen turtle or robot to achieve the specified outcome by a series of instructions; write about how they used precision in forming instructions; write about how they used precision in sequencing instructions; write about how they used efficiency and economy in framing instructions; save the instructions as a program; write about how they tested the program; write about how they refined the program; print out the program; annotate the program.

Marks	Criteria
20-22	<p>design an experiment which uses control equipment to provide the solution to a given task; construct the experiment and use at least two different sensors; write about how they connected all the equipment to a computer; provide diagrams or photographs showing the constructed equipment;</p> <p>write about how they used precision in sequencing instructions; write about how they used efficiency and economy in framing instructions;</p> <p>write about how they trialled the program; write about how they refined the program; print out the program; annotate the program.</p>
23-25	<p>design an experiment which uses control equipment to provide the solution to a given task; construct the experiment and use at least two different sensors; write about how they connected all the equipment to a computer; provide diagrams or photographs showing the constructed equipment; describe the sensors and what they are sensing; write about how they used precision in forming instructions; write about how they used precision in sequencing instructions; write about how they used efficiency and economy in framing instructions; save the instructions as a program; write about how they tested the program; write about how they refined the program; print out the program; annotate the program; give reasons for their choice of software.</p>
26-28	<p>design an experiment which uses control equipment to provide the solution to a given task requiring the use of feedback; construct the experiment and use at least two different sensors; write about how they connected all the equipment to a computer; provide diagrams or photographs showing the constructed equipment; describe the sensors and what they are sensing; write about how they used precision in forming instructions; write about how they used precision in sequencing instructions; write about how they used efficiency and economy in framing instructions; save the instructions as a program; write about how they tested the program; write about how they refined the program; print out the program; annotate the program indicating exactly where feedback takes place; give reasons for their choice of software.</p>

NOTES FOR GUIDANCE ON PROJECT 1b (FULL AND SHORT COURSE)

HANDLING DATA

- 0-2** The candidate looks at information in a database and finds answers to questions about the database.
- 3-4** The candidate looks at information in a database and finds answers to questions about the database.
Sort the database into ascending or descending order.
- 5-7** The candidate looks at information in a database and finds answers to questions about the database.
Change some of the content means to change some content of at least two records.
- 8-10** The candidate looks at information in a database and finds answers to questions about the database.
The questions should be sensible.
When adding a record the data used should be valid and relevant.
- 11-13** Collecting data could be done by using either a questionnaire or a data capture form. Data should not be thought up and entered. This is purely a means of collecting the data, which is to be entered into the database.
Below this level the candidate may work on a database that has been created for them. The most suitable database would be one that uses the information collected from the questionnaires or data capture forms.
Evidence must be provided that visual verification has taken place i.e. a printout of the database with the errors highlighted
'Specific questions' means that the candidate asks a question before the search is carried out. The questions should be sensible.
- 14-16** Collecting data could be done by using either a questionnaire or a data capture form. Data should not be thought up and entered. This is purely a means of collecting the data, which is to be entered into the database.
'Range' implies more than one source, including one outside their immediate class or group.
Evidence must be provided that visual verification has taken place i.e. a printout of the database with the errors highlighted and a printout of the corrected version.
When searching the database the candidate writes down the question before the search is carried out. The questions should be sensible.
- 17-19** Collecting data could be done by using either a questionnaire or a data capture form. Data should not be thought up and entered. This is purely a means of collecting the data, which is to be entered into the database.
'Range' implies more than one source, including one outside their immediate class or group.
Evidence must be provided that visual verification has taken place i.e. a printout of the database with the errors highlighted and a printout of the corrected version.
More than one condition means that the candidate should use two of AND, OR or NOT.
When searching the database the candidate writes down the question before the search is carried out. The questions should be sensible.

- 20-22** Collecting data could be done by using either a questionnaire or a data capture form. Data should not be thought up and entered. This is purely a means of collecting the data, which is to be entered into the database.
- ‘Range’ implies more than one source, including one outside their immediate class or group.
- More than one condition means that the candidate should use two of AND, OR or NOT.
- Evidence must be provided that visual verification has taken place i.e. a printout of the database with the errors highlighted and a printout of the corrected version.
- When searching the database the candidate writes down the question before the search is carried out. The questions should be sensible.
- ‘Give reasons’ means the candidate must justify their use of software with respect to the task. This should include reference to the relevant features of the software.
- 23-25** Collecting data could be done by using either a questionnaire or a data capture form. Data should not be thought up and entered. This is purely a means of collecting the data, which is to be entered into the database.
- ‘Range’ implies more than one source, including one outside their immediate class or group.
- More than one condition means that the candidate should use two of AND, OR or NOT.
- Evidence must be provided that visual verification has taken place i.e. a printout of the database with the errors highlighted and a printout of the corrected version.
- When searching the database the candidate asks a question before the search is carried out. The questions should be sensible.
- ‘Give reasons’ means the candidate must justify their use of software and choice of fields, field types and lengths with respect to the task. This should include reference to the relevant features of the software.
- 26-28** The candidate must analyse the task and list the expected outcomes.
- Collecting data could be done by using either a questionnaire or a data capture form. Data should not be thought up and entered. This is purely a means of collecting the data, which is to be entered into the database.
- ‘Range’ implies more than one source, including one outside their immediate class or group.
- More than one condition means that the candidate should use two of AND, OR or NOT.
- Evidence must be provided that visual verification has taken place i.e. a printout of the database with the errors highlighted and a printout of the corrected version.
- When searching the database the candidate writes down the question before the search is carried out. The questions should be sensible.
- ‘Give reasons’ means the candidate must justify their use of software with respect to the task. This should include reference to the relevant features of the software.

MODELLING

- 0-2** Candidates are given a model and describe what the model does.
- 3-4** Candidates are given a model and describe what the model does and describe the different options available.
- 5-7** Candidates are given a model and describe what the model does and describe the different options available.
Write about how they used a model to make decisions; write about the consequences of these decisions.
- 8-10** Candidates write about the patterns in a model and how the model works.
Candidates relate more than one change they make to the outputs produced.
- 11-13** Candidates write about the patterns in a model and how the model works.
Candidates relate more than one change they make to the outputs produced.
- 14-16** The model must contain at least two columns with formulae in it.
Data as well as formulae should be changed.
A statement is required which describes how well the model represents the situation.
- 17-19** Data as well as formulae should be changed.
A statement is required which describes how well the model represents the situation.
- 20-22** Candidate designs and builds their own model of a situation, which can be supplied to them. The situation must require the need to consider several types of ‘what if’ scenarios. Evidence of initial designs and drafts will be required together with print outs of completed spreadsheets including formulae.
A complex model is one that contains at least two columns with formulae in them. The formulae must make use of at least two mathematical operators and at least two custom functions supplied with the software.
Candidates must identify the key features of the software which make it most suitable for the task before designing the model.
A statement is required which describes how well the model represents the situation.
- 23-25** Candidate designs and builds their own model of a situation, which can be supplied to them. Evidence of initial designs and drafts will be required together with print outs of completed spreadsheets including formulae.
Candidates must identify the key features of the software which make it most suitable for the task before designing the model.
An evaluation should be carried out describing how the software made the task easier and any limitations of the program.
A description of how they created the model, including the features of the software used, is required.
- 26-28** Candidate designs and builds their own model of a situation, which can be supplied to them. Evidence of initial designs and drafts will be required together with print outs of completed spreadsheets including formulae.
Candidates must identify the key features of the software which make it most suitable for the task before designing the model.
An evaluation should be carried out describing how the software made the task easier and any limitations of the program.
A description of how they created the model, including the features of the software used, is required.
Suitability for purpose – candidates need to explain how features of the software they used made the task easier or otherwise to complete.

MEASUREMENT

- 0-2** This requires a written description.
- 3-4** A minimum of 2 different devices should be given.
- 5-7** A minimum of 2 different devices should be given. Plug sensors, buffer boxes or similar into an IT system so that the system operates correctly. A diagram or photograph is required as evidence.
- 8-10** A minimum of 2 different devices should be given. Plug sensors, buffer boxes or similar into an IT system so that the system operates correctly. A diagram or photograph is required as evidence.
The candidate operates the system so that data is collected and displayed on a monitor or other output device. Print outs are required.
- 11-13** A minimum of 2 different devices should be given. Plug sensors, buffer boxes or similar into an IT system so that the system operates correctly. A diagram or photograph is required as evidence.
The candidate operates the system so that data is collected and displayed on a monitor or other output device. Print outs are required.
A written explanation, which clarifies the displayed data, is provided, pointing out important features and/or trends.
- 14-16** A minimum of 2 different devices should be given. Plug sensors, buffer boxes or similar into an IT system so that the system operates correctly. A diagram or photograph is required as evidence.
The candidate operates the system so that data is collected and displayed on a monitor or other output device. Printouts are required. The candidate must describe the purpose of the system and define the problem which was being solved.
A written explanation, which clarifies the displayed data, is provided, pointing out important features and/or trends.
- 17-19** A minimum of 2 different devices should be given. Plug sensors, buffer boxes or similar into an IT system so that the system operates correctly. A diagram or photograph is required as evidence.
The candidate operates the system so that data is collected and displayed on a monitor or other output device. Printouts are required. The candidate must describe the purpose of the system and define the problem which was being solved.
A written explanation, which clarifies the displayed data, is provided, pointing out important features and/or trends.
In addition to their description of how they use the IT devices, a statement is required to explain the choice of sensor(s) used and the advantages over other methods.
- 20-22** A minimum of 2 different devices should be given. Plug sensors, buffer boxes or similar into an IT system so that the system operates correctly. A diagram or photograph is required as evidence.
The candidate operates the system so that data is collected and displayed on a monitor or other output device. Print outs are required. The candidate must describe the purpose of the system and define the problem which was being solved.
A written explanation, which clarifies the displayed data, is provided, pointing out important features and/or trends.
'Record' means that data is saved in more than one format e.g. graph, spreadsheet, database file etc.
This will be a task that the candidate undertakes independently and includes identification of equipment required as well as a full write up of the task.
- 23-25** A minimum of 2 different devices should be given. Plug sensors, buffer boxes or similar into an IT system so that the system operates correctly. A diagram or photograph is required as evidence.
The candidate operates the system so that data is collected and displayed on a monitor or other output device. Printouts are required. The candidate must describe the purpose of the system and define the problem which was being solved.
At least 2 different physical variables must be measured.

A written explanation, which clarifies the displayed data, is provided, pointing out important features and/or trends.

One format is the internal format of the software being used and the other might be CSV.

This will be a task that the candidate undertakes independently and includes identification of equipment required as well as a full write up of the task.

Reasons why computers provide more reliable measurements are required.

26-28 A minimum of 2 different devices should be given. Plug sensors, buffer boxes or similar into an IT system so that the system operates correctly. A diagram or photograph is required as evidence.

The candidate operates the system so that data is collected and displayed on a monitor or other output device. Print outs are required.

At least 2 different physical variables must be measured.

A written explanation, which clarifies the displayed data, is provided, pointing out important features and/or trends.

One format is the internal format of the software being used and the other might be CSV.

This will be a task that the candidate undertakes independently and includes identification of equipment required as well as a full write up of the task.

Reasons why computers provide more reliable measurements are required.

Reasons for choice of hardware and software must be relevant to the task and not to circumstances.

CONTROL

0-2 This requires a written description.

3-4 The candidate must specify the purpose before controlling the device.

5-7 The candidate must specify the purpose before controlling the device. Single, independent instructions are sufficient. Trial and error may be used.

8-10 The candidate must specify the purpose before controlling the device.

11-13 Single, independent instructions are sufficient. Trial and error may be used.

Annotation of programme to show an understanding of precision or an explanation of likely consequences of imprecision, would be required.

14-16 The candidate must specify the purpose before controlling the device.

Candidates will need to provide printouts of instruction sets showing how a simple sequence has been developed into a complex one. From this level the task should consist of at least 2 smaller tasks which may have been assessed at lower levels. These combined form the complex manoeuvre or pattern. Each could be developed, tested and refined independently and then combined.

17-19 The candidate must specify the purpose before controlling the device.

‘Efficiency and economy’ are demonstrated by the use of loops, procedures etc.

The task should consist of at least 2 smaller tasks, which may have been assessed at lower levels. These combined form the complex manoeuvre or pattern. Each could be developed, tested and refined independently and then combined.

20-22 Candidates can build their physical device e.g. buggy, robot etc that employs the use of sensors.

The device will need to be controlled by software.

Instructions could be in the form of a flowchart.

- 23-25** Candidates can build their physical device e.g. buggy, robot etc that employs the use of sensors.
The device will need to be controlled by software.
Instructions could be in the form of a flowchart.
Candidates must give reasons related to the requirements of the task, why they chose their software.
- 26-28** Candidates can build their physical device e.g. buggy, robot etc that employs the use of sensors.
The device will need to be controlled by software.
Instructions could be in the form of a flowchart.
A full explanation of how the output data is modified according to the data received from sensor(s) is required together with examples of how the output data modifies the input to the sensors.

Assessment Unit 4: Problem solving using ICT (FULL COURSE)

Candidates are required to submit coursework which addresses a realistic problem, which is probably best focused on a real user where practicable. The solution produced should reflect the work of the candidate in analysing, designing, implementing, testing, evaluating and documenting an Information Technology system for use by others.

The coursework is to be marked by the teacher in accordance with the assessment criteria and marks recorded on the Coursework Assessment Form and the candidate's cover sheet. The total mark will then be submitted to OCR. OCR will send Centres full instructions on moderation.

Details for the assessment criteria for Unit 4 are given in the following table.

Candidates should be able to:		1 mark	2 marks	3 marks	4 marks
Analysis 12 Marks	identify a problem	Identify a problem. Outline the nature of the problem.	Identify a problem. Outline the nature of the existing problem. Describe the user's requirements.	Identify a problem. Describe the nature of the existing problem. Describe the user's requirements.	Identify a complex problem. Describe the nature of the existing problems. Describe the user's requirements.
	use methods of collecting information	Collect information from potential users.	Collect information from potential users and describe the method used.	Collect information from potential users, describe the method used and suggest alternatives.	Collect information from potential users, and justify the method used, compared with alternatives.
	identify the inputs, outputs and processing required	List the inputs, outputs and processing required.	Describe the inputs, outputs and processing required.	Describe the inputs, outputs and processing required. Suggest a system specification for the solution.	Describe the inputs, outputs and processing required. Justify a system specification for the solution compared with alternatives.
Design 12 Marks	produce designs for the data structure	Produce an appropriate design for the data structure.	Describe alternative appropriate designs for the data structure.	Describe alternative appropriate designs for the data structure. Justify their choice of design for the data structure.	
	produce designs for the user interface	Produce an appropriate design for the user interface.	Describe alternative appropriate designs for the user interface.	Describe alternative appropriate designs for the user interface. Justify their choice of design for the user interface.	
	produce a design for the output formats	Produce an appropriate design for the output formats.	Describe alternative appropriate designs for the output formats.	Describe alternative appropriate designs for the output formats and justify their choice of designs for the output formats.	
	produce software and hardware requirements	List the software and hardware requirements of the solution.	Describe appropriate alternative software and hardware requirements of the solution.	Describe appropriate alternative software and hardware requirements of the solution and justify their choice.	
Implementation 14 Marks	implement their data structure	List the features of the software used to produce their data structure.	Describe the features of the software used to produce their data structure.	Describe the features of the software used to produce their data structure including changes made to the data structure.	Describe the features of the software used to produce their data structure. Justify the changes made to the data structure.
	implement their input and output formats	List the features of the software used to produce their input and output formats.	Describe the features of the software used to produce their input and output formats.	Describe the features of the software used to produce their input and output formats including changes made to formats.	Describe the features of the software used to produce their input and output formats. Justify the changes made to their formats.
	use features of software appropriately	Appropriately use at least one feature of a software package.	Appropriately use a range of features of a software package.	Appropriately use a range of features of more than one software package.	Justify their choice of the range of features and software packages.
	combine software features	Within their solution, interchange data from one software package to another for an appropriate purpose.	Within their solution, interchange data from one software package to another for appropriate purposes.		

Candidates should be able to:		1 mark	2 marks	3 marks	4 marks
Testing 7 Marks	describe their testing	Provide evidence that they have carried out at least one test of their solution.	Provide evidence of, and describe at least two tests used to test their solution.	Provide evidence of, and describe the tests used to thoroughly test their solution.	Provide evidence of, and describe the tests used to thoroughly test their solution. Including testing from the point of view of the user.
	describe the results	List the actual results of the tests. List the expected results of the tests.	Compare the actual results with the expected results.	Compare the actual results with the expected results. Explain their choice of test data.	
User Documentation 7 Marks	show a potential user how to enter, amend and save data	Produce a basic user guide showing how to enter and save data.	Produce a detailed user guide showing how to enter, amend and save data.		
	show a potential user how to process and output data	Produce a basic user guide showing how to process and output data.	Produce a detailed user guide showing how to process and output data.	Produce a detailed user guide showing how to process and output data for all aspects of the solution.	
	show a potential user how to avoid problems	List errors, which the user should avoid when using the system	List errors, which the user should avoid when using the system. Describe methods of rectifying the errors.		
Evaluation 4 Marks	evaluate their solution	Describe what the solution can do.	Compare their solution with the outline of the problem.	Compare their solution with their design. Describe the limitations of their solution. Suggest possible improvements.	Compare their solution with their design. Describe the limitations of their solution. Evaluate their solution from the point of view of users. Suggest possible improvements.

NOTES FOR GUIDANCE ON THE ASSESSMENT OF SYSTEMS ANALYSIS AND DESIGN COURSEWORK

PROJECT 2 (FULL COURSE)

Candidates must intend to produce a system for others to use. The most common pitfall for candidates is to produce a finished Communicating product or artefact instead of a system. The difference is subtle. If teachers wish their candidates to use vehicles such as word processing or desk top publishing or presentation software they must ensure that their candidates understand the need to provide users with the opportunity to input their own data. The Systems Analysis and Design must relate to the production of a system, which provides these opportunities. Problems also arise with data surveys where the survey tends to be an end in itself and not a system, which can be adapted for use by someone else.

- All examples given below relate to exemplar task 1.
- Where the word list is used, more than two items are required.
- Where plurals are used, the requirement is always for more than one.
- The use of the word 'alternatives', therefore requires two further ways in addition to the way adopted by the candidate.

ANALYSIS

Identify a problem

- 1 Candidates can choose a problem from a list of tasks set by the teacher. A minimum of three tasks should be set. These could be chosen from the exemplar tasks given in the specification by the board.

Candidates give a list of the problems, which might be being faced by the user of the current system.

e.g. One item on the list might be that it is difficult to identify the availability of certain models.

- 2 In addition to doing everything above, candidates will be required to produce a list of requirements of the user of the current system.

e.g. One item on the list might be that the users will need a system which enables the availability of particular models to be easily ascertained.

- 3 In addition to the above the candidate needs to add some detail to each item on the list of problems being faced by the user of the current system.

e.g. One item on the list might be that it is difficult to identify the availability of certain models since the records are kept in folders in filing cabinets which are not kept in any particular order.

As well as this the candidate needs to add some detail to the list of the owner's requirements.

e.g. One item on the list might be that the users will need a system which enables the availability of particular models to be easily ascertained. When customers make enquiries about availability the owner will need to be able to give details such as make, model, colour, price etc., if it is in stock.

- 4 Candidates will need to identify at least two aspects of a problem which will need the use of at least two different types of software from these 5:

databases
spreadsheets
communicating software (i.e. word processors/DTP/presentation software)
measuring software
control

Candidates will produce descriptions as they did for three marks, but for all aspects of their problem.

Use methods of collecting information

- 1 Candidates provide evidence that they have used at least one method of collecting information from potential users of such a system. This information must relate to the current method used for dealing with aspects of the problem. They provide transcripts of interviews or completed questionnaires or documents currently being used.
- 2 In addition to doing everything above, candidates will be required to describe how they obtained the information.
e.g. They might describe how they sent letters to dealerships. They provide a copy of the letter sent together with the details of the company/companies that replied.
- 3 In addition to the above the candidate needs to describe alternative methods of collecting information. They detail the use of letter writing, distribution of questionnaires, personal interviews, visiting establishments and obtaining copies of documents.
- 4 In addition to the above they write down advantages and disadvantages of their own and alternative methods, thereby justifying their own method.
e.g. One of the reasons they might give is to describe how they considered interviewing some users but felt that it would take too long to arrange and complete all the interviews. There would be an advantage in using questionnaires to obtain information as they could give them out one week and collect them all the following week.

This of course is only one comparison with only one alternative. At least two of each are required.

Identify the inputs, outputs and processing required

- 1 Based on a manual card index system candidates provide a list of the inputs, outputs and processing requirements of the current manual system.
e.g. one item on the output list might be the prices of the cars, which matches the details in the input list.
One item for processing may be that the user has to be able to search physically through the documents and match all those cars that match the input requirement and subsequently write out information about these matching cars.

- 2 Candidates will be required to add detail to that above.
e.g. One item on the input list might be that a customer has come in and asked for the price of a particular model so the make and model will be the requirements input.
One item on the output list might be that following on from the input the prices of all the cars of the same model would need to be found.
One item on the processing list might be that the user would need to search manually through the records and look for all the models that are by the same manufacturer. The user must then write down the price for each of the matching cars.
Candidates write down as many relevant scenarios as they can related to the problem.
- 3 In addition to the above the candidate needs to suggest a specification for a computerised system which will be able to do this in terms of software and hardware.
- 4 In addition to the above the candidate needs to suggest alternative specifications for a computerised system which will be able to do this in terms of software and hardware. They will need to compare the advantages of their chosen system with the alternatives. One alternative for each of the software and the hardware is all that needs to be compared for this mark.

DESIGN

Produce designs for the data structure

- 1 Candidates produce a design of a spreadsheet (including formulae) or database (file structure), word processing template etc.
e.g. A design for the car dealership would be the field names, field types and field lengths for each of car make, model, reg. no., price, engine size, colour etc. Appropriate means that their structure must contain at least those fields mentioned in their input and output lists in their Analysis section. It means that the field lengths and types must be sensible. I.e. 15 characters for a registration number would not be considered appropriate.
- 2 In addition to doing everything above, candidates will be required to produce alternative designs.
e.g. Candidates produce structures, which have additional/fewer fields and different field lengths, or types but again the word appropriate means that these must be reasonable alternatives.
- 3 In addition to the above the candidate needs to write down a list of the advantages and disadvantages of each structure and give reasons why their choice is best.
e.g. One of the reasons candidates might give is that originally they were not going to have a field for top speed of the car. This was because all cars are capable of doing 70 mph and legally you are not allowed to go faster. However, it had occurred to them that many people travel abroad and in Germany there is no official speed limit so people might want to know this after all.

Produce designs for the user interface

- 1** Candidates produce a design of a database or a spreadsheet data entry screen or a database query screen etc.
e.g. A design for the car dealership would involve the positioning of the database fields or the size of the cells in a spreadsheet (lack of gridlines etc.). The most important fields/cells could be in different colours to the others.
- 2** In addition to doing everything above, candidates will be required to produce alternative designs. They will need to annotate these in order to describe them.
e.g. Candidates produce screens which have changes in the position or colour or size of the fields/cells. They write about these giving details showing the changes and differences between each one.
- 3** In addition to the above the candidate needs to write down a list of the advantages and disadvantages of each screen and give reasons why their choice is best.
In all the above the appropriateness of the design must at least relate to the sensible layout of a screen and the matching of the fields/cells with those in the database/spreadsheet structure.

Produce designs for the output formats

- 1** Candidates produce a design of the printouts, which will be required.
e.g. A design for the car dealership would be relevant fields to those required by a specific search laid out in an appropriate manner. More than one format has to be designed i.e. the results of more than one search need to be considered.
- 2** In addition to doing everything above, candidates will be required to produce alternative designs.
e.g. Candidates produce designs of alternative output formats such as tables and lists. More than one alternative format has to be considered.
- 3** In addition to the above the candidate needs to write down a list of the advantages and disadvantages of each output format and give reasons why their choice is best.

Produce software and hardware requirements

- 1** The candidate writes down a list of the software and hardware, which will be needed by the solution.
- 2** In addition to the list written down for one mark the candidate writes down possible alternative hardware and software, which might be available to the user. This will be a list of other hardware, which is available, not a wish list. The items listed will be relevant to the solution but will not have been chosen for this particular solution.
e.g. the candidate mentions available items like scanners, ion cameras etc.
The candidate must make a list of alternative hardware and software.
- 3** In addition to that written for 2 marks the candidate writes down reasons why the alternative hardware and software have not been chosen for this particular solution.
e.g. the candidate explains that the computer system being employed is short on memory and the amount of space on the cars database which would be taken up by graphics images of each car would be prohibitive.
This is a negative reason why something was not chosen. The candidate must also supply positive reasons for their choice.
The candidate must give reasons for their choice of hardware and software.

IMPLEMENTATION

Implement their data structure

- 1** Candidates make brief statements about how they created their database/spreadsheet/word-processing template.
e.g. Candidates produce a brief description of how they created the database of cars. They loaded the software package. They clicked on File. They clicked on New Database, They typed in their data and clicked on Save etc.
- 2** Candidates make detailed statements about how they created their database/spreadsheet/word-processing template.
e.g. Candidates produce a detailed description of how they created the database of cars. It should be detailed enough for a competent computer user to be able to recreate the database following the instructions.
- 3** In addition to the above the candidate describes how they made changes in the light of unforeseen circumstances. The word changes is in the plural requiring more than one change to have been made.
e.g. When the candidate went to save the database the computer warned them that they had not created a key field. They had not really thought about this until now and decided to create a field for the registration of the car. The candidate describes how they did this.
- 4** In addition to the above they write down the reasons for the changes they made.
e.g. One of the reasons they might give is that when they came to type in the features of the car they found that the data did not fit into the field length allowed. They could have extended the field length but felt that it was taking too long to type the data in this way. They decided that in the long run it would be quicker to add extra Boolean type fields. Instead of typing in the features like airbags, air conditioning, CD player etc. they decided to create fields for each feature and just have Y or N as the data entry. Once the fields were created it would be quicker to type in the data.

Implement their input and output formats

- 1** Candidates make brief statements about how they created their user screens and output formats.
e.g. Candidates produce a brief description of how they altered the data entry screen and printouts. They give brief descriptions of how they created their form layout and their reports.
- 2** Candidates make detailed statements about how they created their user screens and output formats.
e.g. Candidates produce a detailed description of how they altered the data entry screen and printouts. It should be detailed enough for a competent computer user to be able to recreate the forms and reports following the instructions.
- 3** In addition to the above the candidate describes how they made changes in the light of unforeseen circumstances. The word changes is in the plural requiring more than one change to have been made.
e.g. When the candidate implemented the form for inputting data it was noticed that the registration field was not highlighted in quite the way the owner had expected it. As this was the a key field the candidate felt the need to make the colour of the field different and the background different. The candidate describes how they did this.

- 4 In addition to the above they write down the reasons for the changes they made.
e.g. Following on from the situation described above for three marks, the candidate might give alternative ways of highlighting the field such as changing font and font size. They then give reasons why this might not be such a good idea as it might distort the layout of the whole form or disturb the symmetry of the form etc.

Use features of software appropriately

This section does not have to be documented separately by the candidate but the evidence of the work needs to be present. Candidates should have provided evidence of their use of the software in the previous two sections. This, together with the Testing and User Documentation sections should contain the evidence for awarding marks in the next two sections.

- 1 Candidates provide evidence that they have used at least one feature appropriately.
e.g. In the candidate's work there is evidence that the database has been searched to obtain the results of a query. Appropriately means that the need for these particular results had been outlined previously.
- 2 Candidates provide evidence that they have used more than three features appropriately.
e.g. Such features in a database package might be the use of forms, searches, reports and producing graphs.
- 3 In addition to the above candidates have to provide similar evidence for their use of another software package.
- 4 In addition to the above they write down the reasons for the choice of features they have used compared with alternatives.
e.g. Following on from the situation described above for three marks, the candidate might give alternative ways of producing the results to a query using graphs but as specific records were required rather than an overview, it was more sensible to design a query.

Combine software features

- 1 A mark is awarded if data is moved from one package to another and the purpose is made clear and is appropriate.
e.g. The information about the customers in the sales customer database is used to combine with the invoices produced from the servicing spreadsheet to produce an invoice with both sets of details on.
- 2 Both marks are awarded if data has been moved from one package to another for a completely different purpose.
e.g. The information about the customers in the sales customer database is used to combine with the invoices produced from the servicing spreadsheet to produce an invoice with both sets of details on.

The number in stock of a car part has fallen below the re-order level. The details of the part are imported into a standard letter.

TESTING

Describe their testing

- 1** Candidates produce printouts, with a little annotation, of the results of a test they have performed.

e.g. They do this by printing an appropriate search of their database based on the Analysis section. The candidate might have mentioned there that a typical query might be a request for all the red cars from a certain manufacturer. This would be an appropriate set of search criteria, which would be written down.
- 2** Candidates produce printouts, with written descriptions of, at least two different tests used to test their solution.

e.g. They do this by producing printouts of the results of at least two appropriate searches. In addition to searches similar to that above, they would write about how they convert a question into a database query.
- 3** Candidates produce printouts, with written descriptions, of a number of tests used to thoroughly test their solution.

e.g. They do this by producing printouts of the results of tests of all aspects of their solution. In addition to searches similar to that above, they would write about how they convert a question into a database query. They would perform some 'what ifs' on their spreadsheet, produce graphs etc. They would test the aspects of the solution, which required the integration of data into one package from another.
- 4** In addition to meeting the criteria for three marks candidates must get potential users to 'trial' the system.

e.g. In addition to the requirements for three marks, candidates provide response forms from potential users on all aspects of their solution.

Describe their results

- 1** Candidates write down the expected results of the tests and then write down what actually happened when the solution was tested.

e.g. Candidates write down for every query performed on the database and every "what if" on the spreadsheet etc. a list of the expected results and a list of the actual results.
- 2** In addition to what is required for 1 mark, candidates comment on the results of every test when compared with the expected results.
- 3** In addition to what is required for 2 marks candidates explain why they chose the data, which they did for inclusion in the database.

e.g. It may be that when they looked at the data collected from their data capture forms there were tests, which would produce no results. In order to prove that the searches/"what ifs" etc. did actually perform a thorough test on their database/spreadsheet, they would describe the data which needed to be added to the collected data. It may be that using the search above there were no matching cars in the collected data so the candidate put some in. It would be expected that a minimum of three reasons would be given.

USER DOCUMENTATION

Show a potential user how to enter, amend and save data

- 1 Candidates produce documentation giving instructions on how to enter data and then how to save it.
e.g. Candidates produce instructions showing how to load the database/spreadsheet. They then give instructions on how to add a new car to the database and how to save this database.
- 2 Candidates produce documentation on how to enter, change and save data in such a manner that a competent user could follow it and produce the same database.
e.g. Candidates produce separate instructions on how to load the database and spreadsheet. They give easy to follow instructions on how to add a car to the database or a new part to the spreadsheet. They show how to edit data and how to save the database and spreadsheet. They use screen dumps to illustrate their guide.

Show a potential user how to process and output data

- 1 Candidates produce documentation giving instructions on how to use the system and how to print data and results from the system.
e.g. Candidates produce instructions showing how to search the car database i.e. how to type in search condition and how to execute the search. They then give instructions on how to print out the results of the search.
- 2 Candidates produce documentation giving examples of uses of the system and how to print data and results from these uses.
e.g. Candidates produce separate instructions on how to search the database as above, how to produce graphs from the spreadsheet, how to sort the spreadsheet etc. They give easy to follow instructions on how to print out their graphs and the results of the searches, sorts etc. They use screen dumps to illustrate their guide.
- 3 Candidates produce documentation giving examples of each use of the system and how to print data and results from these uses.
e.g. Candidates produce separate instructions on how to search the database as above, how to produce graphs from the spreadsheet, how to sort the spreadsheet etc. They include all aspects of the solution. They give easy to follow instructions on how to print out the results of the searches, sorts etc. illustrating the different types of output format available. These could be printing out all fields in a record, printing out selected records, results in table format, results in different report formats etc. They use screen dumps to illustrate their guide.

Show a potential user how to avoid problems

- 1 Candidates write down a list of at least two errors that the user should avoid when using the system.
This is not a trouble-shooting guide to the software or the hardware.
e.g. Candidates give examples of possible errors such as what can happen when typing in incorrect search criteria. This can be the misspelling of makes/models of cars. This can be the typing in of numbers outside an allowable range etc.
- 2 In addition to what they have to do for one mark they suggest ways these errors can be trapped and corrected. These methods can be
verification - where the user is advised to read through their entered data and check that it matches the data capture form etc.
validation - where the user uses a query that detects numbers outside a given range e.g. a car on the database cannot have a cost greater than £20 000.

EVALUATION

Evaluate their solution

- 1** Candidates must write down a simple statement about what the solution can do.
e.g. One part of evaluation might be ‘the database contains data about cars and allows you to search for information about all the cars with the same colour.’ A list of all the things the solution can do has to be made.
- 2** In addition to the what is required for 1 mark, candidates compare the things that the solution can do with what the problem was in the first place. The candidate writes about the user’s requirements of the solution and gives examples of how they feel these requirements have been met.
e.g. One of the user’s requirements might have been the need for a system which enables the availability of particular models to be easily ascertained. The candidate writes this down and says that in their testing they show that this has been achieved. They need to point out which test they are referring to. i.e. ‘the test on page xx illustrates this’.
- 3** In addition to what is required for 2 marks candidates’ list the features of their design and compare each feature with what has been achieved. They mention ways in which the design has not been met in full and how this could be remedied.
e.g. One part of the design for the car dealership could be the field names, field types and field lengths for each of car make, model, registration, price, engine size, colour etc. The candidate writes about each field and says how they have implemented this design. They give reasons for any amendments and any omissions. They write about how the testing highlighted any limitations of the solution and suggest how the system could be improved to overcome this.

The design might have included a field for ‘special features’. On searching for various features such as air bags, air conditioning etc. the search criteria became over complicated. On reflection the candidate might suggest separate fields for the various features each being a simple logical or yes/no field.
- 4** As for 3 marks but include feedback from potential users and how improvements might be made to the solution as a result.
e.g. One additional item might be that a teacher, acting as a user, has found difficulty in amending data because of, in an attempt to produce an eye catching user interface, the confusing data entry screen. The candidate suggests that a more simplified data entry screen might be better and produces a sketch of one.

7.6 ASSESSMENT OF WRITTEN COMMUNICATION

- 1 The assessment quality of written communication is required in the following modules of this specification.

Assessment Unit	Title	Mode of Assessment
2	Practical skills and understanding relating to the use of ICT applications	Coursework
4	Problem solving using ICT	Coursework

- 2 Written communication is not assessed on the written papers as these are short answer questions and use of extended prose is not evidenced.
- 3 The marks for each module will be awarded on the basis of the performance in spelling, punctuation and grammar on the module overall, in accordance with the performance criteria given in paragraph 4 below.
- 4 For the coursework component, teachers should first assess the candidate's work against the subject specific criteria given in the specification and then award a total mark.
- 5 The criteria for communication should then be applied, and marks added to the total according to the range given below. The Coursework Assessment Form will accommodate the marks awarded for spelling, punctuation and grammar.


Performance Description	Allocation of Marks Coursework
Below threshold performance	0
This is the threshold performance. Candidates spell, punctuate and use the rules of grammar with some accuracy. They use a small range of specialist terms appropriately.	1
Candidates spell, punctuate and use the rules of grammar with some accuracy. They use a small range of specialist terms appropriately. They communicate some meaning in their work.	2
Candidates spell, punctuate and use the rules of grammar with considerable accuracy. They use a good range of specialist terms with facility. They communicate meaning in their work.	3
Candidates spell, punctuate and use the rules of grammar with almost faultless accuracy, deploying a range of grammatical constructions. They use a wide range of specialist terms adeptly and with precision. They very clearly communicate the meaning of the work.	4

SECTION E: FURTHER INFORMATION

8 Opportunities for Teaching

8.1 CITIZENSHIP

From September 2002, the National Curriculum for England at Key Stage 4 includes a mandatory programme of study for Citizenship. Parts of this programme of study may be delivered through an appropriate treatment of other subjects.

This section offers guidance on opportunities for developing knowledge, skills and understanding of citizenship issues during the course. These opportunities are also indicated within the content of Section 5 by a  symbol.

Several areas exist within the specification where “Skills” outlined in the KS4 Citizenship programme of study may be developed by appropriate tailoring of the scheme of work to provide the opportunity for develop “skills of enquiry and communication”. This is dependant upon the teacher’s individual approach to teaching and broadly dependant upon the opportunistic use of ICT as a tool to facilitate attainment of these broader objectives.

More specifically identifiable opportunities for building “Knowledge and Understanding” of citizenship are detailed in the table below:

Citizenship Programme of Study	Opportunities for Teaching Citizenship Issues during the Course
To develop knowledge and understanding pupils should be taught about the legal and human rights and responsibilities underpinning society and how they relate to citizens, including the role and operation of the criminal and civil justice system;	5.1.6 Information management and effects of IT: legal issues, implications, health and safety 5.3.2 Legal, Economic and Political Issues relating to the Use of ICT 5.3.4 Networks
To develop knowledge and understanding pupils should be taught about the importance of a free press and the role and influence of the media in society in providing information and affecting opinion;	5.1.4 Introductory communications - Internet
To develop knowledge and understanding pupils should be taught about the rights and responsibilities of consumers, employers and employees;	5.1.6 Information management and effects of IT: legal issues, implications, health and safety 5.3.2 Legal, Economic and Political Issues relating to the Use of ICT

<p>To develop knowledge and understanding pupils should be taught about the UK's relations within Europe, including the European Union, and the wider issues and challenges of global interdependence and responsibility</p>	<p>5.1.4 Introductory communications – Internet</p> <p>5.1.6 Information management and effects of IT: legal issues, implications, health and safety</p> <p>5.3.2 Legal, Economic and Political Issues relating to the Use of ICT</p>
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8.2 SPIRITUAL, MORAL, ETHICAL, SOCIAL AND CULTURAL ISSUES

This specification encourages candidates to explore the moral, ethical, and legal aspects of the introduction of ICT solutions to problems through a study of the effects of ICT on society.

Through candidates' study of sections 5.1.6 and 5.3.2, they have an opportunity to develop their understanding of moral, social and legal issues. These sections 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 issues.

8.3 HEALTH, SAFETY AND ENVIRONMENTAL ISSUES

OCR has taken account of the 1988 Resolution of the Council of the European Community and the Report *Environmental Responsibility: An Agenda for Further and Higher Education*, 1993 in preparing this specification and associated specimen assessments.


8.4 THE EUROPEAN DIMENSION

OCR has taken account of the *1988 Resolution of the Council of the European Community* in preparing this specification and associated specimen assessments. European example should be used where appropriate in the delivery of the subject content. Relevant European legislation is identified within the specification where applicable.

The role of ICT in improving communications between European countries and their people should be understood by candidates.

Candidates should appreciate the technological dependence of modern economies on ICT communication networks, both in terms of the vulnerability it may create and the potential it has for future economic, culture and social development.

9 Key Skills

Key Skills are central to successful employment and underpin future success in learning independently. Whilst they are certificated separately, the Key Skills guidance for this qualification has been designed to support the teaching and learning of the content. Opportunities for developing the generic Key Skills of Communication, Application of Number and Information Technology are indicated through the use of a 'key symbol'  in Section 5. The wider Key Skills of Working with Others, Problem Solving and Improving Own Learning and Performance may also be developed through the teaching programmes associated with the specification.

The following matrix indicates those Key Skills for which opportunities for at least some coverage of the relevant Key Skills modules exist.

	Communication	Application of Number	IT	Working with Others	Improving Own Learning and Performance	Problem Solving
Level 1	✓	✓	✓	✓	✓	✓
Level 2	✓	✓	✓	✓	✓	✓

Detailed opportunities for generating Key Skills evidence through this specification are posted on the OCR website. A summary document for Key Skills co-ordinators showing ways in which opportunities for Key Skills arise within GCSE courses will be published during 2001.

A grade in the G-D in the full GCSE provides full exemption for the IT Key Skill at Level 1.

A grade in the range C-A* in the full GCSE provides full exemption for the IT Key Skill at Level 2.

A grade in the range G-D in the short course GCSE provides exemption for the external test and for one of the two specified purposes of the internal Key Skill component for the IT Key Skill at Level 1.

A grade in the range C-A* in the short course GCSE provides exemption for the external test and for one of the two specified purposes of the internal Key Skill component for the IT Key Skill at Level 2.

10 Reading List

At the time of the publication of this specification Hodder and Stoughton are preparing a GCSE ICT textbook to accompany this course. It will be endorsed by OCR for use with this specification subject to OCR's quality assurance procedure before final publication. For further details, please contact the Information Technology team at OCR Birmingham Office.

Information and Communication Technology for GCSE (Denise Walmsley et al)	Hodder and Stoughton	0340 800062	SF
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The following list of suggested titles is not intended to be exhaustive nor does inclusion on the list constitute a recommendation of the suitability of the book for the specification. The list details the texts available at the time of the preparation of the specification (May 2000). The possibility exists that more up to date texts which have been prepared for the revised GCSE specifications may become available.

Teachers will need to use their professional judgement in assessing the suitability of the material contained in this list.

Title	Publisher	ISBN	Code
Certificate of Achievement Information Technology Teachers Book Student Book (Alun Hinder)	John Murray	0 7195 7178 2 0 7195 7177 4	Entry
Computer Studies Coursework Companion (Ray Bradley)	Letts	0 850 97858 0	F R
Coursework Plans for Data Handling Key Stages 3 and 4	AU Enterprises Ltd	1 874 16417 7	S F R
Glossary of Computing Terms	Longman	0 582 27544 X	S F
Go for IT L3 ed Available May 2001 (Peter Bishop)	Hodder and Stoughton	0 340 782927	SF

Information Systems for You (Stephen Doyle)	Stanley Thornes	0 748 72809 0	S F
IT for the National Curriculum (Ithurralde & Ramkaran) Curriculum pack and CD-ROM	Hodder and Stoughton	0 340 61100 6	S
IT Key Stage 4 Series (G and M Williams) Copyable materials - packs 1, 2 & 3	Pearson	1 85749 125 4 1 85749 126 2 1 85749 127 0	S F R
Letts Study Guide KS4 (Information Systems & Information Technology)	Letts	1 857 58331 0	S F
Longman Revise Guides - IT and IS	Longman	0 582 24494 3	S F
Questions for Standard Grade Computing Studies (John Walsh)	Hodder & Stoughton	0 349 66407 X	S F
Revise GCSE Information Technology (Peter Bishop)	Hodder & Stoughton	0 340 66384 7	S F
Student Handbook for IT (Gareth Williams)	Pearson	1 85749 396 6	S F
This is IT 1 (Ithurralde & Ramkaran)	Hodder and Stoughton	0 340 73809X	S
This is IT 2 (Ithurralde & Ramkaran)	Hodder and Stoughton	0 340 701536	S F
Work Out Computer Studies GCSE (G Taylor)	Macmillan	0 333 44009 9	S F R

Key: **F - Full course;**
 S – Short course;
 R – Reference
 Entry – Entry Level Certificate

11 Arrangements for Candidates with Special Needs

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 *Inter-Board Regulations and Guidance Booklet for Special Arrangements and Special Consideration*.

In such cases, advice should be sought from the OCR Special Requirements team (Tel 01223 552505) as early as possible during the course.

12 Support and In-service Training for Teachers

To support teachers using this specification, OCR will make the following materials and services available:

- A full programme of In-Service training meetings arranged by the Training and Customer Support Division (telephone 0870 8706622).
- Specimen question papers and mark schemes, available from the Publications department (fax 0870 8706621).
- Past question papers and mark schemes, available from the Publications department (fax 0870 8706621).
- Coursework guidance materials.
- Examples of marked work.
- Written advice on coursework proposals.
- A report on the examination, compiled by senior examining personnel after each examination session.
- Individual feedback to each Centre on the moderation of internally assessed work.
- A free consultancy service on setting coursework tasks.