

International General Certificate
of Secondary Education

Syllabus

INFORMATION AND COMMUNICATION TECHNOLOGY 0417

For examination in June and November 2009

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Information and Communication Technology

Syllabus code: 0417

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Exclusions

This syllabus must not be offered in the same session with any of the following syllabuses:

0420 Computer Studies
7010 Computer Studies

INTRODUCTION

International General Certificate of Secondary Education (IGCSE) syllabuses are designed as two-year courses for examination at age 16-plus.

All IGCSE syllabuses follow a general pattern. The main sections are:

- Aims
- Assessment Objectives
- Assessment
- Curriculum Content

The IGCSE subjects have been categorised into groups, subjects within each group having similar Aims and Assessment Objectives.

Information and Communication Technology falls into Group V, Creative, Technical and Vocational, of the International Certificate of Education (ICE) subjects.

Information and Communication Technology is an applied subject and all candidates will require frequent access to computer and Internet facilities to develop their skills. The syllabus aims to give Centres the flexibility to cope with a wide variety of resources and ever-changing technology. The practical sections of this course can be accomplished using any software packages that will allow the candidates to demonstrate ALL of the skills listed in the relevant sections of this syllabus. For this reason CIE does not prescribe particular software packages or particular hardware. Students will learn to use particular packages, but they should be encouraged to realise that, with the aid of a manual, they can transfer their skills to other packages.

AIMS

The aims of the curriculum are the same for all candidates. These are set out below and describe the educational purposes of a course in Information and Communication Technology for the IGCSE examination. They are not listed in order of priority.

The aims are to:

1. help students to develop and consolidate their knowledge, skills and understanding in Information and Communication Technology;
2. encourage students to develop further as autonomous users of Information and Communication Technology;
3. encourage students to continue to develop their Information and Communication Technology skills in order to enhance their work in a variety of subject areas;
4. provide opportunities for students to analyse, design, implement, test and evaluate Information and Communication Technology systems;
5. encourage students to consider the impact of new technologies on methods of working in the outside world and on social, economic, ethical and moral issues;
6. help students to grow in their awareness of the ways in which Information and Communication Technology is used in practical and work-related situations.

ASSESSMENT OBJECTIVES

The two assessment objectives in Information and Communication Technology are:

- A Practical Skills
- B Knowledge and understanding

A description of each assessment objective follows.

A PRACTICAL SKILLS

Students should be able to:

1. use e-mail and the Internet to gather and communicate information;
2. use word processing facilities to prepare documents;
3. use database facilities to manipulate data to solve problems and represent data graphically;
4. integrate data from different sources into a single document or report;
5. produce output in a specified format;
6. use a spreadsheet to create and test a data model, extracting and summarising data;
7. represent data as information in a variety of chart formats;
8. create a structured website with style sheets, tables and hyperlinks;
9. create and control an interactive presentation.

B KNOWLEDGE AND UNDERSTANDING

Students should be able to demonstrate knowledge and understanding in relation to:

1. the functions of the main hardware and software components of computer systems;
2. the networking of information-processing systems;
3. the ways in which information and communication technology is used and the effects of its use;
4. the stages and methods of system analysis and design;
5. computing terminology.

SPECIFICATION GRID

Assessment Objective	Weighting
A Practical Skills	60%
B Knowledge and Understanding	40%

ASSESSMENT

Scheme of assessment

All candidates will be entered for Papers 1, 2 and 3.

Paper 1 (2 hours)

A written paper of 120 marks assessing the skills in Assessment Objective B. The paper will contain mainly questions requiring a short response, a word, a phrase or one or two sentences, although there will be some questions requiring a more extended response. There will be no choice of questions. The questions will test sections 1 - 8 of the curriculum content.

Paper 2 (2 hours 30 minutes)

A practical test assessing skills in sections 9 - 16.

Paper 3 (2 hours 30 minutes)

A practical test assessing skills in sections 9 - 16.

Practical Tests

The two practical tests will each comprise a number of tasks to be taken under controlled conditions. The practical tests focus on the candidate's ability to carry out practical tasks rather than to explain the theory of how the tasks are completed. Candidates are assessed on their ability to complete these tasks.

The tests will be made available to Centres electronically. Centres intending to enter candidates will be contacted by CIE with instructions on how to download the tasks. **If you do not receive these instructions, please contact CIE Customer Services not later than 21 February (for the June examination) and 16 August (for the November examination).**

The documentation and printouts produced in the assessment will be externally marked by CIE. The criteria that will be used by the examiners are included in this syllabus booklet.

The procedures for conducting the practical tests are given in this syllabus booklet.

The tasks should be completed and sent to CIE as specified by the timetable.

Hardware and Software requirements

Assessment of the practical tests is software independent. Any hardware platform, operating system and applications packages can be used by candidates in the practical examinations, providing that they have the facilities to enable the candidates to fully demonstrate all of the skills, performance criteria and assessment objectives in sections 9 to 16.

It is recommended that for the website authoring section of the syllabus, that candidates have a working knowledge of html code. There is no requirement for them to complete all of the practical test requirements by writing new code. They may use suitable web editing software to assist them, but they may be required to edit the code generated by such a package.

Weighting of Papers

<i>Paper</i>	<i>Weighting</i>
1	40%
2	30%
3	30%

CURRICULUM CONTENT

The curriculum content is set out in eight interrelated sections. These sections should be read as an integrated whole and not as a progression. The sections are as follows:

- 1 Components of a Computer System
- 2 Input and Output Devices
- 3 Storage Devices and Media
- 4 Computer Networks
- 5 Data Types
- 6 The Effects of Using IT
- 7 The ways in which IT is used
- 8 Systems Analysis and Design

Candidates should be familiar not only with the types of software available and the range of Information and Communication Technology knowledge and skills detailed below, but also with their uses in practical contexts. Examples of such uses are given in each section of the subject content as a teaching guide.

No marks will be awarded for using brand names of software packages or hardware.

SECTION 1

Components of a Computer System

Candidates should be able to:

- a) define hardware, giving examples;
- b) define software, giving examples;
- c) describe the difference between hardware and software;
- d) identify the main components of a general-purpose computer: central processing unit, main/internal memory (including ROM and RAM), input devices, output devices and secondary/backing storage.
- e) identify operating systems, including Graphic User Interface, command line interface

SECTION 2

Input and Output Devices

Candidates should be able to:

- a) identify the following input devices: keyboards, numeric keypads, pointing devices (including mouse, touch pad and tracker ball), remote controls, joysticks, touch screens magnetic stripe readers, chip readers, PIN pads, scanners, digital cameras, microphones, sensors, graphics tablet, MICR, OMR, OCR, barcode readers, video cameras, web cams, light pens;
- b) identify suitable uses of the input devices stating the advantages and disadvantages of each;

Device	Use
Keyboard	Entering text into a word processing document. Applications where text has to be created rather than copied.
Numeric keypad	Applications where only numeric data is to be entered. Inserting pin numbers for chip and pin credit/debit cards, or when using an ATM machine to withdraw money or check a bank balance.
Pointing devices – all	Applications which require selection from a graphics user interface. For example: the selection of data from a predefined list or menu.
Mouse	In most PCs
Touchpad	On Laptop computers
Trackerball	For use by people with limited motor skills e.g. young children or people with disabilities
Remote control	Using remote control devices to operate TVs, video players/recorders, DVD players/recorders, satellite receivers, HiFi music systems, data or multimedia projectors
Joystick	Used by a pilot to fly an aeroplane or flight simulator. Used in car driving simulators and for playing games.
Touch screen	Selecting from a limited list of options e.g. certain POS uses such as cafes, tourist information kiosks, public transport enquiries.
Magnetic stripe readers	At POS terminals, ATMs and in security applications
Chip readers	At ATMs to obtain cash and in retail stores for bill payments

PIN pad	At ATMs to obtain cash and in retail stores for bill payments
Scanners	Entering hard copy images into a computer
Digital cameras	Taking photographs for input to computers, for input to Photo printers
Microphones	Recording of voices for presentation software
Sensors (general)	In Control (see 7.1d) and measuring applications (see 7.1c)
Temperature sensor	Automatic washing machines, automatic cookers, air conditioning controllers, central heating controllers, computer-controlled greenhouses, scientific experiments and environmental monitoring
Pressure sensor	Burglar alarms, automatic washing machines, robotics, production line control, scientific experiments and environmental monitoring
Light sensor	Computer controlled greenhouses, burglar alarm systems, robotics, production line control, scientific experiments and environmental monitoring
Graphics tablet	To input freehand drawings or retouch photographs
Magnet Ink Character Reader	To input magnetic characters, such as those found on bank cheques
Optical Mark Reader	To input pencil marks on a form such as a school register, candidate exam answers, any application involving input of a choice of options
Optical Character Reader	To input text to a computer ready for processing by another software package such as word processors, spreadsheets, databases etc.
Bar code Reader	To input code numbers from products at a POS terminal, library books and membership numbers
Video camera	To input moving pictures, often pre-recorded, pre-recorded, into a computer
Web cam	To input moving pictures from a fixed position into a computer
Light pen	Where desktop space is limited, it is used Instead of a mouse or for drawing applications where a graphics tablet might be too big

- c) identify the following output devices: monitors (CRT, TFT), projectors, printers (laser, ink jet and dot matrix), plotters, speakers, control devices – motors, buzzers, lights, heaters;
- d) identify suitable uses of the output devices stating the advantages and disadvantages of each.

Device	Use
CRT monitor	Applications where space is not a problem. Applications where more than one user may need to view screen simultaneously such as in design use, e.g. when several designers may need to offer suggestions on a prototype.
TFT monitor	Applications where space is limited such as small offices. Applications where only one person needs to view the screen such as individual workstations.
Multimedia Projector	Applications such as training presentations, advertising presentations and home cinema. It displays data from computers, pictures from televisions and video/DVD recorders.

Laser printer	Applications which require low noise and low chemical emissions, e.g. most networked systems. Applications which require rapid, high quality and high volumes of output, e.g. most offices and schools.
Inkjet printer	Applications which require portability and low volume output where changing cartridges is not an issue. e.g. small offices and stand alone systems. Applications which require very high quality output and where speed is not an issue, e.g. digital camera applications.
Dot matrix printer	Applications where noise is not an issue and copies have to be made, e.g. industrial environments (multipart forms, continuous stationery, labels etc.). Car sales and repair companies. Manufacturing sites.
Graph plotter	CAD applications, particularly where large printouts are required such as A0
Speakers	Any application which requires sound to be output such as multimedia presentations/web sites including encyclopaedias. Applications that require musical output such as playing of musical CDs and DVD films.
Control devices	In Control applications (see 7.1d)
Motors	Automatic washing machines, automatic cookers, air conditioning units, central heating controllers, computer-controlled greenhouses, microwave ovens, robotics, production line control
Buzzers	Automatic cookers, microwave ovens
Heaters	Automatic washing machines, automatic cookers, air conditioning units, central heating controllers, computer-controlled greenhouses
Lights/lamps	Computer-controlled greenhouses

SECTION 3

Storage Devices and Media

Candidates should be able to:

- a) describe common backing storage media (including magnetic tapes, CD ROMs, CD Rs, CD RWs, DVD ROMs, DVD Rs, DVD RWs, floppy discs and hard discs, Zip discs, Jaz discs, memory sticks, flash memory) and their associated devices;
- b) identify typical uses of the storage media, including types of access (e.g. serial/sequential, direct/random) and access speeds;

Media	Use
Magnetic backing storage Media	
Floppy discs	Any use where small files such as word processing, small spreadsheets and databases need to be moved from one computer to another. Useful to backup small data files.
Fixed hard discs	Used to store operating systems, software and working data. Any application which requires very fast access to data for both reading and writing to. Not for applications which need portability. Used for on-line and real time processes requiring direct access. Used in file servers for computer networks.
Portable hard discs	Used to store very large files which need

	transporting from one computer to another and price is not an issue. More expensive than other forms of removable media.
Magnetic tapes	Any application which requires extremely large storage capacity where speed of access is not an issue. Uses serial access for reading and writing. Used for backups of file servers for computer networks. Used in a variety of batch processing applications such as reading of bank cheques, payroll processing and general stock control.
Optical backing storage media such as CDs and DVDs	CDs tend to be used for large files (but smaller than 1Gb) which are too big for a floppy disc to hold such as music and general animation. DVDs are used to hold very large files (several Gb) such as movie films. Both CDs and DVDs are portable i.e. they can be transported from one computer to another. Both can be used to store computer data.
CD ROM/DVD ROM	Applications which require the prevention of deletion of data, accidental or otherwise. CDs used by software companies for distributing software programs and data; by Music companies for distributing music albums and by book publishers for distributing encyclopaedias, reference books etc. DVDs used by film distributors.
CD R/DVD R	Applications which require a single 'burning' of data, e.g. CDs - recording of music downloads from the Internet, recording of music from MP3 format, recording of data for archiving or backup purposes. DVDs – recording of film movies and television programs.
CD RW/DVD RW	Applications which require the updating of information and ability to record over old data. Not suitable for music recording but is very useful for keeping generations of files. DVDs have between five and ten times the capacity of CDs.
Solid state backing storage	Smallest form of memory, used as removable storage. More robust than other forms of storage. More expensive than other forms but can be easily written to and updated.
Memory sticks/Pen drives	Can store up to many Gb. Used to transport files and backup data from computer to computer.
Flash memory cards	Used in digital cameras, palmtops, mobile phones, MP3 players

- c) describe the comparative advantages and disadvantages of using different backing storage media;
- d) define the term backup and describe the need for taking backups;
- e) describe the difference between main/internal memory and backing storage, stating the relative benefits of each in terms of speed and permanence.

SECTION 4

Computer Networks

Candidates should be able to:

- a) describe a modem and its purpose;
- b) state the difference between analogue data and digital data;
- c) explain the need for conversion between analogue and digital data;
- d) identify the advantages and disadvantages of using common network environments such as the Internet;
- e) describe what is meant by the terms user id and password, stating their purpose and use;
- f) identify a variety of methods of communication such as fax, e-mail, bulletin boards, and tele/video conferencing;
- g) define the terms Local Area Network (LAN), Wireless Local Area Network and Wide Area Network (WAN);
- h) describe the difference between LANs, WLANs and WANs, identifying their main characteristics;
- i) identify the different network topologies (including star, ring, bus and hybrid);
- j) describe the characteristics and purpose of common network environments, such as intranets and the Internet;
- k) describe common network devices (including hubs, routers, bridges, switches and proxy servers)
- l) discuss the problems of confidentiality and security of data, including problems surrounding common network environments;
- m) identify the need for encryption, authentication techniques, including the use of User identification and passwords, when using common network environments such as the Internet.

SECTION 5

Data Types

Candidates should be able to:

- a) identify different data types: logical/Boolean, alphanumeric/text, numeric (real and integer) and date;
- b) select appropriate data types for a given set of data: logical/Boolean, alphanumeric/text, numeric and date;
- c) describe what is meant by the terms file, record, field and key field.

SECTION 6

The Effects of Using IT

Candidates should be able to:

- a) explain what is meant by software copyright;
- b) describe what hacking is;
- c) describe what a computer virus is;
- d) explain the measures that must be taken in order to protect against hacking and viruses;

- e) describe the effects of information and communication technology on patterns of employment, including areas of work where there is increased unemployment;
- f) describe the effects of microprocessor-controlled devices in the home, including their effects on leisure time, social interaction and the need to leave the home;
- g) describe the capabilities and limitations of IT;
- h) discuss issues relating to information found on the Internet, including unreliability, undesirability and the security of data transfer;
- i) describe the potential health problems related to the prolonged use of ICT equipment, for example repetitive strain injury (RSI), back problems, eye problems and some simple strategies for preventing these problems;
- j) describe a range of safety issues related to using computers and measures for preventing accidents.

SECTION 7

The ways in which IT is used

- 7.1 Candidates should have an understanding of a range of IT applications in their everyday life and be aware of the impact of IT in terms of:
- a) communicating applications (such as newsletters, websites, multimedia presentations, music scores, cartoons, flyers and posters);
 - b) data handling applications (such as surveys, address lists, tuck shop records, clubs and society records, school reports and school libraries);
 - c) measurement applications (such as scientific experiments, electronic timing and environmental monitoring);
 - d) control applications (such as turtle graphics, control of lights, buzzers and motors, automatic washing machines, automatic cookers, central heating controllers, burglar alarms, video recorders/players, microwave ovens and computer controlled greenhouse);
 - e) modelling applications (such as 3D modelling, simulation (e.g. flight or driving) and use of spreadsheets for personal finance and tuck shop finances).
- 7.2 Candidates should understand the differences between batch processing, on-line processing and real-time processing. They should have an understanding of a wider range of work-related IT applications and their effects, including:
- a) communication applications (such as the Internet, electronic mail, fax, electronic conferencing and mobile telephones);
 - b) applications for publicity and corporate image publications (such as business cards, letterheads, flyers and brochures);
 - c) applications in manufacturing industries (such as robotics in manufacture and production line control);
 - d) applications for finance departments (such as billing systems, stock control and payroll);
 - e) school management systems (including registration, records and reports);
 - f) booking systems (such as those in the travel industry, the theatre and cinemas);
 - g) applications in banking (including Electronic Funds Transfer (EFT), ATMs for cash withdrawals and bill paying, credit/debit cards, cheque clearing, phone banking, Internet banking);
 - h) applications in medicine (including doctors' information systems, hospital and pharmacy records, monitoring, and expert systems for diagnosis);
 - i) applications in libraries (such as records of books and borrowers and the issue of books);
 - j) the use of expert systems (for example in mineral prospecting, car engine fault diagnosis, medical diagnosis, chess games);

- k) applications in the retail industry (stock control, POS, EFTPOS, internet shopping, automatic re-ordering).

SECTION 8

Systems Analysis and Design

8.1 Analysis

Candidates should be able to:

- a) describe different methods of researching a situation (such as observation, interviews, questionnaires and examination of existing documentation);
- b) state the need for establishing the inputs, outputs and processing in both the existing system and the proposed system;
- c) state the need for recording information about the current system;
- d) state the need for identifying problems with the current system;
- e) state the need for identifying suitable hardware and software for developing a new system;
- f) state the need for identifying the user and information requirements necessary to resolve the identified problems;
- g) state the need for specifying the required hardware and software.

8.2 Design

Candidates should be able to:

- a) state the need for producing designs for documents, files, forms/inputs, reports/outputs and validation;
- b) design data capture forms and screen layouts to solve a given problem;
- c) design reports layouts and screen displays to solve a given problem;
- d) design validation routines to solve a given problem;
- e) design the required data/file structures to solve a given problem.

8.3 Implementation

Candidates should be able to:

- a) identify the different methods of system implementation (such as parallel running, phased implementation, direct changeover);
- b) identify suitable situations for the use of the methods in a), giving advantages and disadvantages of each;
- c) describe testing strategies that would be employed in implementing the new system (such as the use of normal, abnormal and extreme data as well as the use of test data and real/live data);
- d) identify improvements that could be needed as a result of testing.

8.4 Verification

Candidates should be able to:

- a) identify the need for, and the different methods of, verification when entering data.

8.5 Documentation

Candidates should be able to:

- a) identify the components of technical documentation for an information system (such as program coding, program flowcharts, system flowcharts, hardware and software requirements, file structures, list of variables, validation routines);
- b) identify the components of user documentation for an information system (such as purpose and limitations, hardware and software requirements, how to use the system, input and output formats, sample runs, error messages, trouble-shooting guide).

8.6 Evaluation

Candidates should be able to:

- a) explain the need for evaluating a new system in terms of the efficiency, ease of use, and appropriateness of the solution;
- b) state the need for comparing the solution with the original task requirements;
- c) state the need for identifying any limitations and necessary improvements to the system;
- d) state the need for evaluating the users' responses to the results of testing the system.

ASSESSMENT CRITERIA FOR PRACTICAL TESTS

The curriculum content for the practical tests is set out in eight sections. The sections are as follows:

- 9 Communication
- 10 Document Production
- 11 Data Manipulation
- 12 Integration
- 13 Output Data
- 14 Data Analysis
- 15 Website Authoring
- 16 Presentation Authoring

In the tables, each section is broken down into a series of more specific assessment objectives which candidates should be able to meet. For each specific objective, there are one or more performance criteria that will be used by the examiners to mark the candidate's work.

The majority of the listed performance criteria will be tested.

The tables below also detail some of the skills that may be required to satisfy each performance criterion.

Section 9

Communication

Students should be able to use e-mail and the Internet to gather and communicate information.

Using the Internet and email facilities, the candidate must demonstrate the ability to:

Assessment Objectives	Performance Criteria	Skills
9 Communicate with other ICT users using e-mail and use the internet as an information source		
9a Read e-mail	Read specified message	Open message
9b Send e-mail	Send message as specified	New message, address, subject, reply, forward, carbon copy, blind carbon copy
9c Send a file	Send a file to another ICT user electronically	Attach file/s
9d Receive a file	Receive a file from another ICT user electronically	Save attached file
9e Locate information from a website	Specified information from a given URL	Search string
9f Search for information	Find specified information using a search engine	Simple search, advanced (refined) search
9g Download information	Download and save information as specified	

Section 10

Document Production

Students should be able to use word processing facilities to prepare documents.

Using word processing facilities, the candidate must demonstrate the ability to:

Assessment Objectives		Performance Criteria		Skills
10. Enter, edit and format data from different sources and set text appearance and layout.				
10a	Load data from an existing file	Load/open specified file		Locate file, identify file type, csv, txt, rtf
10b	Key in and edit text	(i)	Enter text as specified with no errors	Enter text, enter numbers
		(ii)	Edit text as specified	Highlight, delete, move, cut, copy, paste, drag and drop
10c	Import image from external source	(i)	Place image as specified	Import clip art, import from a digital source, import from file, import from website
		(ii)	Manipulate image as specified	Move image, resize image, crop image, text wrap (around image, square, tight, above, below), maintain aspect ratio
10d	Include information downloaded from the Internet	Specified data only, positioned as required		Text, graphic image, table, chart
10e	Set up a page format	(i)	Page size as specified	A4, A5, Letter
		(ii)	Page orientation as specified	Portrait, landscape
		(iii)	Set margins as specified	Top margin, bottom margin, left margin, right margin, gutter
		(iv)	Create/edit headers and footers as specified	Headers, footers, automatic file information, automated page numbering, text, date, position, consistency of position, position left, right, centre, outside of pages, align with page margins
		(v)	Set columns as specified	Number of columns, column width, spacing between columns
		(vi)	Set breaks as specified	Page breaks, section breaks, column breaks, inserted, deleted, set breaks to avoid widows, set breaks to avoid orphans
10f	Format the text	(i)	Set fonts as specified	Font style, font type (serif, sans-serif), point size, increase, decrease, use an appropriate font for the task
		(ii)	Use text emphasis as specified	Select text, bold, underline, italic, highlight, specified item/s only
		(iii)	Format a list as specified	Bulleted list, numbered list
		(iv)	Insert/edit table as specified	Specified number of rows and columns, insert row/s, delete row/s, insert column/s, delete column/s, format cells/cell contents

10g	Text alignment and spacing	<ul style="list-style-type: none"> (i) Set alignment as specified (ii) Line spacing as specified (iii) Indent text as specified 	<p>Left, centred, right, fully justified</p> <p>Single, 1.5 times, double, multiple, consistent, between lines, between paragraphs, before and after headings</p> <p>Indent text, indent paragraph, hanging indent, specified portion only</p>
10h	Proof read and correct errors	<ul style="list-style-type: none"> (i) Use spell-check facilities (ii) Proof-read and correct the document 	<p>Spelling is checked and free from error</p> <p>Document is proof-read and corrected for accuracy, consistent line spacing, consistent character spacing, re-pagination, remove blank pages, check for widows/orphans, tables/lists split over pages, specified orientation</p>

Section 11

Data Manipulation

Students should be able to use database and charting facilities to manipulate data to solve problems and represent data graphically.

Using database facilities, the candidate must demonstrate the ability to:

Assessment Objectives	Performance Criteria	Skills
11. Enter data from different sources, perform calculations, search for data, sort the data and produce a report from the data.		
11a	Load data from existing files	(i) Load specified file (ii) Define a database record structure as specified (iii) Format fields as specified
		Locate file, open file, import file, identify file type (.csv, .txt, .rtf) Assign the following field/data types: Text, numeric, (integer, decimal, currency, percentage, date/time), Boolean/logical (yes/no, true/false, 1/0). Use meaningful file names Identify field sub-types and formatting (e.g. specify currency used, or number of decimal places)
11b	Enter data	Enter data as specified with no errors
11c	Enter formulae	Use arithmetic operations/numeric functions to perform calculations
		Calculated field, run time calculation, addition, subtraction, multiplication, division, sum, average, maximum, minimum, count
11d	Sort data	Use one criterion as specified
		Ascending, descending, alphanumeric, numeric, date
11e	Select subsets of data	Use several criteria as specified
		Use numeric, text and Boolean operators: AND, OR, NOT, LIKE, >, <, =, >=, <=, Wildcards
11f	Produce a report	(i) Display fields as specified (ii) Enter text as specified (iii) Layout as specified (iv) Export a query or report as specified
		Data aligned as specified (left, centred, right) and displayed in specified format (percentage, currency (various), decimal, specified number of decimal places, integer), hide data and labels, show hidden fields, display calculations/formulae, display data/labels in full (with no truncation) Report titles Header, footer, page layout, label production Export data into a common text format .csv, .txt, .rtf format, export into graph/charting package
11g	Produce a graph or chart	(i) Select only the specified data series (ii) Label graph/chart as specified
		Contiguous data, non-contiguous data, specified range/s Title, legend, segment labels, segment values, percentages, category axis labels, value axis labels, scales set axis scale maximum, set axis scale minimum

Section 12

Integration

Students should be able to integrate data from different sources into a single document or report.

Integrating data from many sources into a single document/report, the candidate must demonstrate the ability to:

Assessment Objectives		Performance Criteria	Skills
12. Integrate data from several sources			
12a	Combine text, image and numeric data	(i) Combine text and image as specified (ii) Combine text and database extract as specified (iii) Combine text and graph/chart as specified	Import text, import clip art, import from a digital source, import from a website, cut, copy, paste. Place as specified. Import text, import from a database, cut, copy, paste. Place as specified. Import text, import a graph/chart, cut, copy, paste. Place as specified.

Section 13

Output Data

Students should be able to produce output in a specified format.

Producing output in the specified format from a variety of sources, the candidate must demonstrate the ability to:

Assessment Objectives		Performance Criteria	Skills
13. Output data			
13a	Save and print data/document	(i) Save and print the document as specified (ii) Save and print the object/data as specified (iii) Save specified data selection in a format suitable for importing into a text based document	Draft document, final copy, e-mail, file attachment, screen shots Database report, data table, graph/chart

Section 14

Data Analysis

Students should be able to use a spreadsheet to create and test a data model, extracting and summarising data.

Using spreadsheet facilities, the candidate must demonstrate the ability to:

Assessment Objectives		Performance Criteria	Skills
14. Create a model, extract data, use display features and output data from the model.			
14a	Create a data model	(i) Enter layout of model as specified (ii) Enter text and numerical test data with 100% accuracy (iii) Enter formula/e to meet the requirements (iv) Use function/s to meet the requirements	Cut, copy, paste, drag and drop, fill Manually verify data entry Add, subtract, multiply, divide, indices, relative reference, absolute reference, named cells, named ranges, nested formulae Sum, average, maximum, minimum, integer, rounding, counting, if, lookup, nested functions
14b	Test the data model	Demonstrate that the model works	Test using appropriately selected test data
14c	Select subsets of data	Use several criteria as specified	Use numeric, text and Boolean operators: AND, OR, NOT, LIKE, >, <, =, >=, <=, Wildcards, string
14d	Adjust display features	(i) Display data/labels as specified (ii) Adjust row/column/cell sizes so that all data/labels/formulae are visible (iii) Adjust page orientation as specified	Select data, bold, underline, italic, highlight, specified row/column/item/s only, integer, percentage, decimal, specified number of decimal places, currency (various) Display formulae/data, adjust column width, row height, hide row/column Portrait, landscape, fit to page
14e	Save and print data	Save and print data as specified	Formulae, values, extracts, test data

Section 15

Website Authoring

Students should be able to create a structured website with style sheets, tables and hyperlinks. Students should have a working knowledge of html.

Using website authoring facilities, the candidate must demonstrate the ability to:

Assessment Objectives		Performance Criteria	Skills
15 Create webpage structures using external stylesheets, tables, images and output the webpage/s.			
15a	Use stylesheets	(i) Create an external stylesheet (ii) Create styles for common tags (iii) Specify font appearance (iv) Apply tags	<pre><link rel="stylesheet" type="text/css" href="stylesheetname.css"></pre> h1, h2, h3, p, li <pre>h1 { color: #FF0000; font-family: arial; text-align: center; font-size: 48pt; font-weight: bold; }</pre> <pre><meta name="keywords" content="text string, text string"></pre>
15b	Create webpage/s	(i) Create webpage/s as specified (ii) Apply menu options to pages as specified	Homepage, other pages, menu options, text hyperlink, graphics hyperlink, foreground colour, background colour, text colour Text hyperlink, graphics hyperlink
15c	Create links	(i) Create links as specified (ii) Open in a specified location	Links to the same page (e.g. top), anchors, links to other pages <pre>linkname</pre> , external links <pre>linkname</pre> web addressing with correct URL Same window, new window, named as specified <pre>textusedforlink</pre>
15d	Use tables	(i) Insert table (ii) Specify borders (iii) Merge cells	Table, table header <th>, table row <tr>, table data <td>, cellpadding, cellspacing, <pre><table cellpadding="10" cellspacing="6"></pre> Use of tables with visible or invisible borders, set border thickness <table border="4"> Use merged cells within rows <td colspan="2">, use merged cells within columns <th rowspan="3">
15e	Insert image	(i) Insert image (ii) Place images relative to text	Insert image Use of tables to place images, align cell contents left, align cell contents right, align cell contents centre

15f	Alter image	<p>(i) Use tags to adjust image size and alignment</p> <p>(ii) Use software to resize image/adjust colour depth</p>	<p>Resize and position on the page width="500" height="300" valign="top" align="left"</p> <p>Resize/resample, .gif, .jpg, .png, screen shot evidence, maintain aspect ratio, distort as specified</p>
15g	Save and print web pages	Save and print web pages as specified	In browser, in HTML format, screen shots

Section 16

Presentation Authoring

Students should be able to create and control an interactive presentation.

Using presentation graphics facilities, the candidate must demonstrate the ability to:

Assessment Objectives		Performance Criteria	Skills
16. Create, control and output information from a presentation			
16a	Set up presentation	Create/edit master slide as specified	Master slide, placing images/text/logos, slide footers, automated slide numbering, font styles, heading styles, colour scheme
16b	Create presentation pages	(i) Create the required number of presentation pages with information specified	Areas for headings, subheadings, bullets, images, charts; colours, text boxes, presenter notes, audience notes
		(ii) Insert text as specified	Headings, subheading, bulleted list, font styles, font types (serif, sans-serif), point sizes, text colour (selected from presentation colour scheme), text alignment, enhancements (bold, italic, underscore)
		(iii) Ensure consistency within the presentation	Consistently applied font styles, point sizes and colour schemes
16c	Use graphical information	(i) Image inserted as required	Resize, position, crop, copy, contrast, brightness
		(ii) Create or insert chart as required	Create within the package, import from spreadsheet, from contiguous or non contiguous data, title, legend, segment labels, segment values, percentages, category axis labels, value axis labels, scales
		(iii) Insert other features as specified	Symbols, lines, arrows, call out boxes
16d	Use transitions	Automate the transition between pages as specified	Consistent between slides, range of features
16e	Use animation facilities	Add animation as specified	Text, images, consistent between objects
16f	Save and print presentation	(i) Save and print the presentation as specified	File compression (zip files) floppy disk, presenter notes, audience notes (handouts)
		(ii) Capture elements of the presentation as specified	Use screen shots to show features like animation/ transition/builds

PROCEDURES FOR CONDUCTING PRACTICAL TESTS

The Supervisor

A suitably competent Supervisor, who may be the candidates' teacher, is responsible for the administration of the practical tests according to the procedures detailed here and in the Handbook for Centres. The Supervisor is also responsible for the preparation of the hardware and software.

Timetabling of the Practical Tests

The practical tests will not be timetabled in the same way as most IGCSE written papers. The IGCSE timetable will specify a period within which the two practical tests must be taken by candidates. Within this period, Centres may conduct the practical tests at any convenient time or times.

The candidates are not all required to take the tests at the same time, and they do not need to be sequestered until other candidates have taken the test. Some Centres may therefore choose to conduct each test in several sessions over a number of days or weeks.

Preparation for the Practical Tests

Before the candidates take a practical test, the Supervisor must work through it using similar hardware and software to that used by the candidates, in order to:

- ensure that the hardware and software at the Centre will enable the candidates to meet all the performance criteria;
- produce the Supervisor's worked copy of the assessment, which must be included with the submission to CIE of candidates' work.

Centres are responsible for ensuring that the hardware and software to be used by candidates is in full working order and will enable them to meet all the performance criteria as specified in this syllabus. Errors as a result of faulty software or hardware will not be taken into consideration in the marking of candidates' work.

Invigilation of the Practical Tests

Each practical test is to be completed within the time specified under supervised conditions. The Centre should provide a quiet, business-like atmosphere for the tests.

A suitably competent invigilator, preferably the Supervisor, must be present throughout the test. Two invigilators must be present at all times: it is not appropriate for a teacher who has been responsible for the preparation of the candidates to be the sole invigilator.

One invigilator will be responsible for collecting the printout/s from the printers and giving this to the candidate, only where the candidate's name, candidate number and centre number have been printed on each printout. If this information is not present on the printout then the printout will be removed and destroyed by the invigilator at the end of the examination period.

If printers are in a different room an additional invigilator will be required in order to collect the printouts and distribute these to the candidates as they work during the examination.

Instructions for conducting the Practical Tests

- a) If no colour printers are available in the Centre, candidates should be made aware of the need to choose colours or patterns which are visibly distinct when printed in black and white. Candidates should normally be made aware of this in an announcement immediately before the start of the test.
- b) There must be no access to portable storage media (e.g. memory sticks, floppy disks, CDs, etc.).
- c) Candidates must NOT have access to their own electronic files or personal notes, pre-prepared templates, past papers or other files during the examination.
- d) Candidates may use dictionaries, spell-checkers, the software's help facilities, and the manufacturer's manuals on the software packages during the practical test.
- e) Candidates may use software's wizards provided by the original software vendor.

- f) Candidates are NOT allowed to refer to textbooks or centre-prepared manuals during the examination.
- g) Display material (e.g. maps, diagrams, wall charts) must be removed from the examination room.
- h) No other help may be given to candidates during the test, unless there is an equipment failure.
- i) Candidates must not communicate with one another in any way and security of the individual candidates' files must be ensured.
- j) To conform with safe working practices in using display screen equipment, it is recommended that candidates be allowed to take short approved breaks from working at their screens (5-10 minutes every hour), without leaving the examination room. Such breaks may naturally form part of the working pattern as candidates study the assessment material or collect printouts from the printer.

The invigilators are responsible for maintaining security during these break periods.

- k) At the end of the test, candidates should present the invigilator with the printouts they wish to submit. Each printout should include the candidate's name and the date on which the assessment was carried out. This information should be printed, not hand-written. Failure to do so will result in a loss of marks.

Security Issues

The practical tests are test of skills, not of knowledge or understanding. The performance criteria - that is, the skills which are to be included in the test - are published in this syllabus and are available to candidates. The majority of the performance criteria are assessed in each examination. Candidates can therefore gain no advantage by speaking to other candidates who have already taken the tests: they already know what skills they have had to acquire. The security issues associated with the practical tests are therefore different from those associated with conventional written papers.

There are, nevertheless, important security issues. For example, candidates must not gain sufficient knowledge of the tests to enable them to rote-learn the sequences of keystrokes or commands which form the answers.

All assessment material must be treated as confidential. It should only be issued at the time of the test.

Candidates are not permitted to retain a copy of the test, or of any printouts produced during the test, or of any electronic files which form part of the test or have been produced during the test.

All work stored on a network or hard disk must be kept secure. Centres are advised to consider setting up passwords to control login procedures and to ensure that only authorised access to files is possible.

Centres must ensure that:

- candidates do not have access to test material except during their test;
- at the end of each session all assessment material (including the CIE practical tests and candidates' completed work) is collected by the invigilator;
- all draft copies and rough work not to be submitted is destroyed;
- candidates' work is kept securely by the Centre between the end of the test and submission to CIE.

Equipment Failure

In the event of a system crash, power cut or damage to equipment occurring during the test, extra time may be given to candidates to compensate for the time lost while the problem is resolved.

If, in the Supervisor's opinion, an equipment failure makes it impossible to continue with the test, then the Supervisor may decide to abort the test. If this decision is taken, then all the candidate's work must be destroyed and the candidate should be allowed a second attempt at the test on a different day. This is the only circumstance in which a candidate may be allowed a second attempt at a practical test. Second attempts are only permitted as a last resort, for example where all of a candidate's data has been lost or corrupted and it is impossible to continue with the test without starting again, or where power has been lost indefinitely, or where failed equipment cannot be replaced within a reasonable time.

If there has been an equipment failure, the Supervisor must submit a detailed report to examiners with the candidates' work. The report should state the nature of the problem, the candidates affected, and the actions taken.

GRADE DESCRIPTIONS

A **Grade A** candidate is likely to:

- demonstrate a sound knowledge and understanding of the range and scope of information processing applications and of the techniques and systems needed to support them, some of which are outside their everyday experience;
- have a good grasp of terms and definitions and be able to contrast and compare related ideas;
- be able to apply general principles of information processing to given situations and to be able to abstract general principles from given examples.
- identify a range of needs and opportunities and analyse, design and evaluate the most appropriate ways of addressing these using information systems;
- be able to discuss methods of detecting the loss or corruption of electronic information and describe steps that minimise the likelihood of the abuse of personal information;
- be able to use competently a broad range of software packages to successfully complete a wide variety of practical work-related tasks.

A **Grade C** candidate is likely to:

- demonstrate knowledge and understanding of the range and scope of information processing applications and of the techniques and systems needed to support them;
- have a good grasp of basic terms and definitions and be able to contrast and compare related ideas;
- identify some needs and opportunities and analyse, design and evaluate appropriate ways of addressing these using information systems;
- be able to control Information and Communication Technology devices showing an awareness of efficiency and economy;
- demonstrate a clear sense of audience and purpose in their presentations;
- be able to use a range of software packages to complete a variety of practical work-related tasks.

A **Grade F** candidate is likely to:

- demonstrate a basic knowledge and understanding of familiar, simple information processing applications and of the techniques and systems needed to support them;
- have some knowledge of some of the basic terms and definitions;
- respond to needs and opportunities and evaluate ways of addressing these using information systems;
- manipulate and interrogate previously stored information;
- use Information and Communication Technology to present work and demonstrate how it contributes to the development of their ideas;
- be able to use software packages to complete some simple practical work-related tasks.