CAMBRIDGE
International Examinations

Cambridge International AS & A Level

SYLLABUS

Cambridge International AS and A Level Applied Information and Communication Technology

9713

For final examination in June and November 2017.
Also available for examination in March 2017 for India only.

Cambridge Advanced

Version 3

Changes to syllabus for 2017

This syllabus has been updated. The latest syllabus is version 3, published May 2016

Changes have been made to the following pages:

Front cover
This syllabus is now available in March 2017 for India only.

Inside front cover

Syllabus code	Papers	Mar 16	Jun 16	Nov 16	Mar 17	Jun 17	Nov 17	Mar 18	Jun 18	Nov 18	Mar 19	Jun 19	Nov 19
OLD – 9713	AS	✓	✓	✓	✓	✓	✓						
	AL	✓	✓	✓	✓	✓	✓						
NEW – 9626	AS				✓	✓	✓	✓	✓	✓	✓	✓	✓
	AL				✓	✓	✓	✓	✓	✓	✓	✓	✓

The table showing availability of both 9713 and 9626 has been amended to now show the availability of 9713 in March 2017 for India only.

Page 8
Availability now states: This syllabus is now available in March 2017 for India only.

Changes made to version 2 of the syllabus

Changes have been made to Section 4.3 on page 11.

The sub-section Practical Tests has been amended.

The final bullet point

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

has been removed.

Changes have been made to **Section 6 Assessment criteria** for practical tests on page 31:

The final bullet point now reads:

- The tables below also show some of the skills that may be required to satisfy each performance criterion. Please note, these lists are not exhaustive and other related aspects should also be studied.

Section 7 Procedures for conducting practical tests on pages 45–48 has been removed from the syllabus.

Changes made to version 1 of the syllabus

Cambridge International AS & A Level Applied Information and Communication Technology (9713) syllabus has been updated for first examination in 2017. The updated syllabus is called Cambridge International AS & A Level Information Technology and the new syllabus code is 9626.

The table below shows availability of the syllabuses.

Syllabus code	Papers	Mar 16	Jun 16	Nov 16	Mar 17	Jun 17	Nov 17	Mar 18	Jun 18	Nov 18	Mar 19	Jun 19	Nov 19
OLD – 9713	AS	✓	✓	✓		✓	✓						
	AL	✓	✓	✓		✓	✓						
NEW – 9626	AS				✓	✓	✓	✓	✓	✓	✓	✓	✓
	AL				✓	✓	✓	✓	✓	✓	✓	✓	✓

For candidates who take a linear route for A Level examination in 2017

Candidates should be entered for the updated syllabus Cambridge International AS & A Level Information Technology (9626). These candidates would take all four papers (components 1, 2, 3 & 4) of the updated syllabus in 2017.

The first assessment for the updated Cambridge International AS Level Information Technology (9626) will be 2017 onwards.
A staged route for this syllabus (9626) will not be available in 2017.

For candidates who take a staged route for AS Level examination in 2016 and A Level examination in 2017

Candidates should be entered for the existing syllabus Cambridge International AS & A Level Applied Information and Communication Technology (9713). These candidates would take Papers 1 and 2 in 2016 and Papers 3 and 4 in 2017.

Please note candidates can resit Cambridge International AS & A Level Applied Information and Communication Technology (9713) in 2017 only. This syllabus will not be available for examination in subsequent years.

Combining syllabuses

Please note: candidates may not take Cambridge International AS Level Applied Information and Communication Technology (9713) and complete the A Level with components from the new syllabus Cambridge International AS & A Level Information Technology (9626).

Contents

1. Introduction

1.1 Why choose Cambridge?

Cambridge International Examinations is part of the University of Cambridge. We prepare school students for life, helping them develop an informed curiosity and a lasting passion for learning. Our international qualifications are recognised by the world's best universities and employers, giving students a wide range of options in their education and career. As a not-for-profit organisation, we devote our resources to delivering high-quality educational programmes that can unlock learners' potential.

Our programmes set the global standard for international education. They are created by subject experts, are rooted in academic rigour, and provide a strong platform for progression. Over 10 000 schools in 160 countries work with us to prepare nearly a million learners for their future with an international education from Cambridge.

Cambridge learners

Cambridge programmes and qualifications develop not only subject knowledge but also skills. We encourage Cambridge learners to be:

- **confident** in working with information and ideas – their own and those of others
- **responsible** for themselves, responsive to and respectful of others
- **reflective** as learners, developing their ability to learn
- **innovative** and equipped for new and future challenges
- **engaged** intellectually and socially, ready to make a difference.

Recognition

Cambridge International AS and A Levels are recognised around the world by schools, universities and employers. The qualifications are accepted as proof of academic ability for entry to universities worldwide, although some courses do require specific subjects.

Cambridge AS and A Levels are accepted in all UK universities. University course credit and advanced standing is often available for Cambridge International AS and A Levels in countries such as the USA and Canada.

Learn more at **www.cie.org.uk/recognition**

1.2 Why choose Cambridge International AS and A Level?

Cambridge International AS and A Levels are international in outlook, but retain a local relevance. The syllabuses provide opportunities for contextualised learning and the content has been created to suit a wide variety of schools, avoid cultural bias and develop essential lifelong skills, including creative thinking and problem-solving.

Our aim is to balance knowledge, understanding and skills in our programmes and qualifications to enable students to become effective learners and to provide a solid foundation for their continuing educational journey. Cambridge International AS and A Levels give learners building blocks for an individualised curriculum that develops their knowledge, understanding and skills.

Schools can offer almost any combination of 60 subjects and learners can specialise or study a range of subjects, ensuring a breadth of knowledge. Giving learners the power to choose helps motivate them throughout their studies.

Cambridge International A Levels typically take two years to complete and offer a flexible course of study that gives learners the freedom to select subjects that are right for them.

Cambridge International AS Levels often represent the first half of an A Level course but may also be taken as a freestanding qualification. The content and difficulty of a Cambridge International AS Level examination is equivalent to the first half of a corresponding Cambridge International A Level.

Through our professional development courses and our support materials for Cambridge International AS and A Levels, we provide the tools to enable teachers to prepare learners to the best of their ability and work with us in the pursuit of excellence in education.

Cambridge International AS and A Levels have a proven reputation for preparing learners well for university, employment and life. They help develop the in-depth subject knowledge and understanding which are so important to universities and employers.

Learners studying Cambridge International AS and A Levels have opportunities to:

- acquire an in-depth subject knowledge
- develop independent thinking skills
- apply knowledge and understanding to new as well as familiar situations
- handle and evaluate different types of information sources
- think logically and present ordered and coherent arguments
- make judgements, recommendations and decisions
- present reasoned explanations, understand implications and communicate them clearly and logically
- work and communicate in English.

Guided learning hours

Cambridge International A Level syllabuses are designed on the assumption that learners have about 360 guided learning hours per subject over the duration of the course. Cambridge International AS Level syllabuses are designed on the assumption that learners have about 180 guided learning hours per subject over the duration of the course. This is for guidance only and the number of hours required to gain the qualification may vary according to local curricular practice and the learners' prior experience of the subject.

1.3 Why choose Cambridge International AS and A Level Applied Information and Communication Technology?

In a world where information and communication technology (ICT) is constantly changing, individuals increasingly need technological and information literacy skills that include the ability to gather, process and manipulate data.

The impact of ICT on society is enormous and as the percentage of businesses and households connected to communication networks such as the internet grows, so does the need for individuals who understand these new technologies.

This syllabus encourages students to become effective and discerning users of ICT. It helps them to develop a broad range of ICT skills, knowledge and understanding. Students gain an understanding of the structure and use of ICT systems within a wide range of organisations, including the use of a variety of computer networks. As a result, students learn about ICT system life cycles, and how these affect the workplace. They also gain an understanding of the wider impact of ICT on society in general.

Prior learning

Candidates beginning this course are not expected to have studied Applied Information and Communication Technology previously.

Progression

Cambridge International A Level Applied Information and Communication Technology provides a suitable foundation for the study of ICT or related courses in higher education. Equally it is suitable for candidates intending to pursue careers or further study in ICT, or as part of a course of general education.

Cambridge International AS Level Applied Information and Communication Technology constitutes the first half of the Cambridge International A Level course in Applied Information and Communication Technology and therefore provides a suitable foundation for the study of Applied Information and Communication Technology at Cambridge International A Level and thence for related courses in higher education. Depending on local university entrance requirements, it may permit or assist progression directly to university courses in ICT or some other subjects.

1.4 Cambridge AICE (Advanced International Certificate of Education) Diploma

Cambridge AICE Diploma is the group award of the Cambridge International AS and A Level. It gives schools the opportunity to benefit from offering a broad and balanced curriculum by recognising the achievements of candidates who pass examinations in different curriculum groups.

Learn more about the Cambridge AICE Diploma at **www.cie.org.uk/aice**

1.5 How can I find out more?

If you are already a Cambridge school

You can make entries for this qualification through your usual channels. If you have any questions, please contact us at **info@cie.org.uk**

If you are not yet a Cambridge school

Learn about the benefits of becoming a Cambridge school at **www.cie.org.uk/startcambridge**. Email us at **info@cie.org.uk** to find out how your organisation can register to become a Cambridge school.

2. Teacher support

2.1 Support materials

We send Cambridge syllabuses, past question papers and examiner reports to cover the last examination series to all Cambridge schools.

You can also go to our public website at **www.cie.org.uk/alevel** to download current and future syllabuses together with specimen papers or past question papers and examiner reports from one series.

For teachers at registered Cambridge schools a range of additional support materials for specific syllabuses is available from Teacher Support, our secure online support for Cambridge teachers. Go to **http://teachers.cie.org.uk** (username and password required).

2.2 Endorsed resources

We work with publishers providing a range of resources for our syllabuses including print and digital materials. Resources endorsed by Cambridge go through a detailed quality assurance process to ensure they provide a high level of support for teachers and learners.

We have resource lists which can be filtered to show all resources, or just those which are endorsed by Cambridge. The resource lists include further suggestions for resources to support teaching.

2.3 Training

We offer a range of support activities for teachers to ensure they have the relevant knowledge and skills to deliver our qualifications. See **www.cie.org.uk/events** for further information.

3. Assessment at a glance

Cambridge International AS Level

Paper 1	1 hour 15 minutes	Paper 2	2 hours 30 minutes
Written Candidates answer each question in the spaces provided on the question paper. Maximum mark: 80		Practical A number of tasks taken on a computer under controlled conditions. Candidates must use the most appropriate software and the most appropriate methods. Maximum mark: 120	
40% of total marks		60% of total marks	

Cambridge International A Level

Paper 1	1 hour 15 minutes	Paper 2	2 hours 30 minutes
Written Candidates answer each question in the spaces provided on the question paper. Maximum mark: 80		Practical A number of tasks taken on a computer under controlled conditions. Candidates must use the most appropriate software and the most appropriate methods. Maximum mark: 120	
20% of total marks		30% of total marks	
Paper 3	**1 hour 15 minutes**	**Paper 4**	**2 hours 30 minutes**
Written Candidates answer each question in the spaces provided on the question paper. Maximum mark: 80		Practical A number of tasks taken on a computer under controlled conditions. Candidates must use the most appropriate software and the most appropriate methods. Maximum mark: 90	
20% of total marks		30% of total marks	

Centres and candidates may:

- take all Advanced Level components in the same examination series for the full Cambridge International A Level.
- follow a staged assessment route to the Advanced Level by taking the Advanced Subsidiary Level (AS) qualification in an earlier examination series. If candidates reach the required mark, they only need to take the final part of the assessment (Papers 3 and 4) to obtain the full Cambridge International A Level.
- take the Advanced Subsidiary Level (AS) qualification only.

Availability

This syllabus is examined in the June and November examination series. Also available for examination in March 2017 for India only.

This syllabus is available to private candidates.

Detailed timetables are available from **www.cie.org.uk/examsofficers**

Centres in the UK that receive government funding are advised to consult the Cambridge website **www.cie.org.uk** for the latest information before beginning to teach this syllabus.

Combining this with other syllabuses

Candidates can combine this syllabus in an examination series with any other Cambridge syllabus, except:

- syllabuses with the same title at the same level.

4. Syllabus aims and assessment objectives

4.1 Syllabus aims

The aims of the curriculum are the same for all candidates. They are not listed in any particular order.

The first five aims apply to a course in Applied Information and Communication Technology for the **Advanced Subsidiary Leve**l GCE examination.

The aims are to encourage candidates to:

1. develop a broad range of ICT skills and be aware of new and emerging technologies
2. develop an understanding of the parts, uses and applications of ICT systems within a range of organisations, including the use of basic computer networks
3. develop an understanding of how ICT systems affect society in general
4. develop an understanding of the main systems life cycle and apply this understanding to workplace situations
5. develop a broad knowledge of the uses of ICT in workplace situations; candidates can then progress to learn more in ICT-related fields, and can progress from Cambridge International AS to A Level.

The additional aims of the **Advanced Level** GCE curriculum in Applied Information and Communication Technology encourage candidates to:

6. apply their knowledge and understanding of ICT and use these skills in workplace situations
7. develop an understanding of the parts, uses and applications of ICT systems within a wide range of organisations, including the use of a range of computer networks
8. develop an understanding of project management skills and other problem solving skills.

4.2 Assessment objectives

The two assessment objectives in Applied Information and Communication Technology are:

A Knowledge and understanding

B Practical skills

A description of each assessment objective follows.

A Knowledge and understanding

At **Cambridge International AS Level**, candidates should be able to demonstrate knowledge and understanding of:

- the functions and uses of the main hardware and software components of ICT systems, including portable communication systems;
- the ways in which organisations use ICT;
- the impact on society of the use of ICT in the home;
- the stages of the systems life cycle and the methods used within each of these stages;
- ICT and computing terminology.

At **Cambridge International A Level**, candidates should be able to demonstrate all the knowledge and understanding from Cambridge International AS Level, and extend their knowledge and understanding of:

- the ways in which a wide range of organisations use ICT;
- the impact on society of the use of a wide range of online applications;
- the networking of information-processing systems and the use of online services.

B Practical skills

At **Cambridge International AS Level**, candidates should be able to:

- select the right software for the task;
- communicate effectively with other ICT users using email and search for appropriate information using the internet;
- prepare, create, amend and edit documents and interactive presentations;
- create both flat-file and relational database structures, add data, check the data entry, perform searches, reorganise data by sorting and present calculated values based on the data;
- create graphs and charts;
- integrate data from several sources;
- output data in different forms;
- create and test a data model using a spreadsheet, extract and summarise data in a variety of forms.

At **Cambridge International A Level**, candidates should be able to fulfil all of the practical skills from Cambridge International AS Level and:

- create a mail merged document using a word processor and data handling package;
- create an automated procedure which enables a user to select both the required document and the data to merge it with;
- output data in different forms.

4.3 Description of components

Cambridge International AS Level

All Advanced Subsidiary Level candidates are entered for Papers 1 and 2.

Paper 1

- This is a written paper, all questions are compulsory.
- Candidates answer in the spaces provided on the question paper.
- The questions generally test sections 1 to 4 of the syllabus, although knowledge and understanding from sections 8 to 14 may also be assessed.

Paper 2

- A practical test assessing skills from sections 8 to 14 of the syllabus.
- It may also assess some core knowledge and understanding from sections 1 to 4 of the syllabus.

Cambridge International A Level

All Advanced Level candidates will be entered for Papers 3 and 4.

Paper 3

- This is a written paper, all questions are compulsory.
- Candidates answer in the spaces provided on the question paper.
- The questions generally test sections 1 to 7 of the syllabus, although knowledge and understanding from sections 8 to 17 may also be assessed.

Paper 4

- A practical test assessing selected skills from sections 8 to 17 of the syllabus.
- It may also assess some core knowledge and understanding from sections 1 to 7 of the syllabus.

Practical Tests

- The two practical tests consist of a number of tasks performed under controlled conditions.
- Candidates need to show they can use the appropriate knowledge and understanding to complete the practical tasks efficiently.
- Candidates are assessed on their ability to use the most appropriate software and with the most appropriate methods.

Printed copies of the practical tests will be sent to Examination Officers. Practical paper packets must not be opened before the examination. Source files will be available to Cambridge International Centres **three days** before the examination window so they can be downloaded by the Centres.

- The procedures for conducting the practical tests are given in this syllabus booklet.
- The tasks should be completed and sent to Cambridge by the dates given in the timetable.
- The documentation and printouts produced in the assessment are externally marked by Cambridge.

Hardware and Software requirements

- This is an applied subject and all candidates 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 technologies.
- The practical sections of this course can be undertaken using any software packages that allow candidates to demonstrate all of the skills listed in the relevant sections of the syllabus (8–17). For this reason Cambridge does not recommend particular software packages or particular hardware.
- Candidates 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.

5. Syllabus content

Although the subject content is set out in five curriculum areas, these areas overlap. The five sections should be read as a whole and not as a progression. The five areas are as follows:

1. ICT systems including portable communication devices
2. How organisations use ICT
3. Impact of ICT on society
4. Computer networks
5. Systems life cycle

The five areas are split into seven sections to allow a balance between Cambridge International AS Level and Advanced level. The seven sections are as follows:

At Cambridge International AS Level

1. ICT systems including portable communication devices
2. How organisations use ICT – Part 1
3. Impact of ICT on society – Part 1
4. Systems life cycle

At Cambridge International A Level

5. How organisations use ICT – Part 2
6. Impact of ICT on society – Part 2
7. Computer networks

Candidates should be familiar with the types of software available, and the range of Information Technology knowledge and skills detailed below; they should also be familiar 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 are awarded for using brand names of software packages or hardware.

5.1 AS Level

Section 1: ICT systems including portable communication devices

Candidates should be able to:

(a) identify the input devices including: keyboards, pointing devices (including mouse, touchpad and tracker ball), video digitisers, remote controls, joysticks, magnetic stripes, scanners, digital cameras, microphones, sensors, MIDI instruments, graphics tablets, 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 personal identification number (PIN) 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 graphical user interface. For example: the selection of data from a set 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. May be used for handwriting recognition in a PDA or Tablet PC
Magnetic stripe reader	At POS terminals, ATMs and in security applications
Smart card	Payment cards, ID cards, door control systems, public transport tickets
Scanner	Entering hard copy images into a computer
Digital camera	Taking photographs for input to computers, for input to photo printers
Microphone	Recording of voices for presentation software
MIDI instrument	Recording a performance directly onto a computer as a MIDI file
Temperature sensor	Automatic washing machines, automatic cookers, 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

Device	Use
Light sensor	Computer-controlled greenhouses, burglar alarm systems, robotics, production line control, scientific experiments and environmental monitoring
Graphics tablet	Inputting freehand drawings or retouch photographs
Magnet Ink Character Reader (MICR)	Inputting magnetic characters, such as those found on bank cheques
Optical Mark Reader (OMR)	Inputting 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 (OCR)	Inputting text to a computer ready for processing by another software package such as word processors, spreadsheets or databases
Bar code reader	Inputting code numbers from products at a POS terminal, library books and membership numbers
Video camera	Inputting moving pictures, often pre-recorded, into a computer
Video digitiser	Inputting video from an analogue source (for example television or video camera)
Web cam	Inputting 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

Candidates should be able to:

(c) identify the following output devices: monitors (CRT, TFT), printers (laser, ink jet and dot matrix), plotters, speakers, control devices (including motors, buzzers, lights and 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
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
3D inkjet printer	CAD/CAM applications where 3D designs are made by layering of resin powder
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

Device	Use
Speakers	Any application which requires sound to be output such as multimedia presentations and websites including encyclopaedias. Applications that require musical output such as playing of music CDs and DVD films
Control devices in control applications	
Motors	Automatic washing machines, automatic cookers, central heating controllers, computer-controlled greenhouses, microwave ovens, robotics, production line control
Buzzers	Automatic cookers, microwave ovens
Heaters	Automatic washing machines, automatic cookers, central heating controllers, computer-controlled greenhouses
Lights/lamps	Computer-controlled greenhouses

(e) describe common backing storage media (including magnetic tapes, CD ROMs, CD Rs, CD RWs, DVD ROMs, DVD Rs, DVD RWs, DVD-RAM, Blu-ray, minidisc and hard discs, memory sticks, flash memory) and their associated devices;

(f) identify suitable uses of the storage media and understand the types of access and access speeds required for each use (e.g. serial/sequential, direct/random). Describe the comparative advantages and disadvantages of using different backing storage media;

Media	Use
Magnetic backing storage media	
Fixed hard disc	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 online and real time processes requiring direct access. Used in file servers for computer networks
Portable hard disc	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 tape	Any application which requires extremely large storage capacity and 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 CD and DVD	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 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

Media	Use
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 films 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	Physically the 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
DVD-RAM	Same properties as DVD RW but quicker access and data can be overwritten more easily. Similar to floppies in nature but has 3000 – 6000 times more storage and uses optical technology
Blu-ray	Capacities of 25Gb, 50Gb and 100 Gb. Used for storing films (movies). 25Gb equates to 2 hrs HDTV, 13hrs standard definition TV. It is possible to playback video on a disc while simultaneously recording HD video. (Will be) used for storage of PC data
Memory stick/Pen drive	Can store up to many Gb. Used to transport files and backup data from computer to computer
Flash memory card	Used in digital cameras, palmtops, mobile phones, MP3 players
Hybrid media	
Minidisc	Magneto-optical method of writing data. Used for storing music. Can store up to 140Mb

Candidates should be able to:

(g) Identify the following portable communication devices: mobile phones, portable DVD players, portable hard disc players, portable media players (MP3 players), global positioning systems, satellite navigation systems, personal digital assistants, Bluetooth devices and handheld computers;

(h) Identify suitable uses of the communication devices in (g) above, stating the advantages and disadvantages of each.

Section 2: How organisations use ICT – Part 1

Candidates should have an understanding of how organisations use ICT. They should be able to describe a number of uses, giving the hardware and software requirements together with the applications that these uses can be put to.

	Applications	Hardware requirements	Software requirements
(a) Control systems	Maintaining constant physical conditions: Air conditioning systems Central heating systems Refrigeration Car manufacture: Industrial robots Medical applications: Intensive care Process control	Robot Temperature sensor Moisture sensor Pressure sensor Light sensor	Control software
(b) Working practices	Home working: Managers of offices Sales staff etc. Remote working: Sales staff Site workers Office based working Through the use of: Video conferencing Phone conferencing Instant messaging Faxing	Laptop computer Desktop computer Mouse Keyboard Printer Scanner Modem Fax machine Mobile telephone Web cam Microphone Telephone	Word processing DTP Spreadsheet Database Organising software Communications software Web browser
(c) Use of ICT in advertising	Product advertising Business advertising Service advertising All of these through: Websites Multimedia presentations Flyers Posters	Computer Mouse Keyboard Printer Scanner Modem Microphone Speakers Video camera Digital camera	Web authoring packages Word-processing DTP Spreadsheet Database Communications software
(d) Use of ICT in teaching and learning	Schools, Universities, Colleges: CAL CBL Computer aided assessment Record keeping Examination boards: Computer aided assessment	Computer Mouse Keyboard Printer Scanner (for OMR) Overlay keyboard Interactive whiteboard	Web browsing software Web authoring software Overlay software Database Spreadsheet Assessment software

	Applications	Hardware requirements	Software requirements
(e) Use of ICT in publishing	Printing: Books Magazines Newspapers Record/CD/DVD labels and sleeves Posters All through: Computerised plate making Computerised typesetting Facsimile transmission	Web offset machine Computer Digital camera	Photo image editing DTP
(f) Use of ICT in time management	Managers of offices: Organising meeting times Arranging workload Research and development projects Construction project management: Identifying project progress Daily and weekly planning	Computer Laptop PDA	Time management Time tracking Project tracking
(g) Data management	Sequential file systems: Batch processing, e.g. payroll Indexed sequential & random access files: Hybrid batch and interrogational processing, e.g. payroll and personnel records combined Relational database systems: Interrogational databases, e.g. customer database linked to sales records	Magnetic tape Magnetic disc Magnetic disc	
(h) Use of data management	Hierarchical database management systems: Business reporting, e.g.: sales marketing management reporting business performance management (BPM) budgeting and forecasting Network database management systems: Large organisations spread over wide geographical area	Magnetic disc Computer network	DBMS
(i) Payroll applications	Producing payslips Financial reports	Computers	Payroll software

	Applications	Hardware requirements	Software requirements
(j) Technical and customer support	Utility companies Mail order catalogue firms: Telephone call centres Customer support for computer hardware and software: Online help lines	Computer network Modem	Computer telephony integration software including third party control and first party control
(k) Art and design work	Producing designs for: Marketing/advertising CD, DVD and record labels and sleeves Posters Books Magazines	Computers Digital cameras Scanners Mouse/trackerball Large memory Light pens	Design software Library of designs Clipart Photo galleries

Section 3: Impact of ICT on society – Part 1

Candidates should have an understanding of the use of home-based ICT applications including:

	Applications	Hardware requirements	Software requirements
(a) Online services	Online shopping: Purchasing goods Selling goods Online transaction services Online banking: Opening and maintaining bank accounts	PC Modem	Internet browser

Candidates should have an understanding of the effects of the use of online services on society including:

	Effect
(b) Employment	General staff unemployment, technical staff – employment opportunities
(c) Increased leisure time	Staff may work for shorter periods
(d) Working patterns	Job-sharing, part-time working, flexible working hours, working from home, compressed hours, ability to move from branch to branch
(e) Security of, privacy of and access to personal/confidential information/data	Need to protect confidentiality of data, data protection legislation, social and ethical implications of access to personal information Need for security Duty of confidence Duty of fidelity Anonymised information Aggregated information
(f) Health and safety	Increase in RSI, vision and posture problems Need for increased safety measures against electrocution, fire, etc.

Section 4: Systems life cycle

Candidates should have an understanding of the systems life cycle and an understanding of applying it to workplace scenarios (such as introducing a new system or upgrading an existing system in a typical ICT application). They should be able to compare and contrast methods, including:

	Examples	Methodology
(a) Analysis	Different methods of researching a situation	Observation, examination of documents, questionnaires, interviews
	Establishing the inputs, outputs and processing in the existing system	Identify the sources and volume of input data and collection methods. Identify the input documents currently in use. Determine frequency addition/deletion of records. Identify manual and computer procedures necessary to achieve the current output
	Recording information about the current system	Data flow diagrams (Level 0 DFD – context diagram and Level 1 DFD – current system), system flowcharts
	Identifying problems with the current system	Observation, examination of documents, questionnaires, interviews
	Identifying suitable hardware and software for a new system	Analysing required outputs, storage and processing requirements
	Identifying the user and information requirements	Collating the interview transcripts, questionnaires and documents
(b) Design	Specifying the required hardware and software	Volume of data will determine the choice of output devices. The order that data is output affects choice of storage devices
	Designing data collection forms, screen layouts	These depend on the user requirements as well as output required from system and file structures
	Designing report layouts and screen displays	The content and presentation of reports, layouts and screen displays depend on the requirements of the users
	Designing validation routines	These are determined by the form of input and file structures
	Designing the required data and file structures and programming specifications	The data structures and programming depend on the types of processing, and input and output structures

	Examples	Methodology
(c) Development and testing	Creating data structures, program modules	
	Testing strategies	Testing each module with normal and live data Testing each module with abnormal and extreme data Testing whole system
	Improvements that could be needed as a result of testing	Adjust structures, program modules in line with the results of testing
(d) Implementation	Identifying the different methods of system implementation	Parallel running, direct changeover, phased implementation and pilot running
(e) Documentation	Designing and developing elements of technical documentation	Developing systems documentation (results of systems analysis, what is expected of the system, overall design decisions, test plan and test data) Developing program documentation (description of the software, purpose of the software, input data formats, output, flowcharts, program listing, notes to assist future modifications)
	Designing and developing elements of user documentation	A guide to simple elements of use of the software and hardware that make up the system
(f) Evaluation	Evaluating a new system in terms of the efficiency, ease of use and appropriateness of the solution	Using test results to evaluate the solution Obtaining feedback from the user The results of this evaluation are used to identify limitations Using knowledge of the limitations to make improvements

5.2 Advanced Level

For Advanced level, the candidates must be able to meet all of the requirements of sections 1 to 4 for Cambridge International AS Level as well as sections 5 to 7 for Advanced Level.

Section 5: How organisations use ICT – Part 2

Candidates should have an understanding of a range of work-related ICT applications (hardware/software requirements/expected knowledge/skills), including:

	Applications	Hardware requirements	Software requirements
(a) Expert systems	Mineral prospecting Interpretation – producing probabilities from given data Investment analysis Financial planning Insurance planning All through prediction: deducing future events from current data Car engine fault diagnosis Medical diagnosis Route scheduling for delivery vehicles Plant identification Animal identification All through diagnosis: producing possible solutions from given data	Computer Laser printer	Knowledge base editor Inference engine
(b) Monitoring and measurement	Use of sensors in: Medical applications Weather monitoring Climate monitoring Monitoring environment Scientific experiments To measure physical variables such as: Temperature Pressure Humidity Moisture Light Sound level Blood pressure Acidity/alkalinity (pH)	Computers Speakers Printers Sensors Interface box	Spreadsheets Databases Measuring software Data logging software
(c) Project management	Software development Building construction Business efficiency	PC	PM Software Planning software Gantt chart software Timeline software

	Applications	Hardware requirements	Software requirements
(d) Modelling	Economic Prototype Climate Simulations Profit forecasts Architecture Weather forecasting Air pilot training Car driver training Nuclear research Geology/predicting deposits	Computers Graph plotters Printers	Spreadsheets CAD, CAM Purpose built software
(e) Market research	Research in: Advertising media Public opinion Techniques: Personal interviewing Phone interviews Online data capture	PC Mainframe Interactive hand held device	Internet software Database management software
(f) Research applications	Medicine: Developing new drugs Genetic analysis Science: Space research Nuclear research Universities Education: ICT in education Teacher education	Super computer PC network	Spreadsheets Databases Advanced programming
(g) Online applications	Shopping: Purchasing goods Banking: Maintaining accounts Booking: Holidays Train tickets Plane tickets Cinema tickets Theatre tickets	PC network Modems	Internet browser authoring packages Database
(h) Stock control	Point of sale: Retail industry/supermarkets Manual: Manufacturing industry Wholesale/suppliers Just in time	POS terminal Bar code reader Electronic scales Numeric keypad PC Memo pad	Database Bar code reading software Purpose written software

Section 6: Impact of ICT on society – Part 2

Candidates should have an understanding of the use of interactive ICT applications including:

	Applications	Hardware requirements	Software requirements
(a) Home entertainment	Television: Satellite Terrestrial: Television programmes Films Music centres: Music Plays Radio programmes Audio books Interactive games consoles Video on demand systems	Satellite receiver TV screen Speakers PC Portable media player (MP3 player) CD/DVD player/ recorder Projector Satellite decoder FM tuner Games console	Internet browser MP3 software Projector control software
(b) Auctions	Internet auctions: Buying goods Selling goods Online transaction services	PC Modem	Internet browser
(c) Booking	Travel agents: Booking holidays Booking plane tickets (e-tickets) Rail companies: Booking train tickets Airlines: Booking plane tickets Cinemas Theatres	PC terminals PC networks Modem	Booking software Databases
(d) Information services	Trading Governments Academic institutions Stocks and shares Public interest Educational research	PC networks	Internet browser

	Applications	Hardware requirements	Software requirements
(e) Government (local, regional, central)	Inland Revenue: Income tax records Tax collection Tax payment Local government: Electoral register Local tax records Budget calculations Issuing of: Passports Identity cards Driving licences	PC Mainframe PC network	Database Budget analysis Spreadsheet
(f) Use of ICT in Teaching and learning	Schools, Universities, Colleges: CAL CBL Computer aided assessment Record keeping Examination boards: Computer aided assessment	Computer Scanner (for OMR) Overlay keyboard	Web browsing software Web authoring software Overlay software Database Spreadsheet Assessment software

Candidates should have an understanding of the effects of the use of online services on society including:

	Effect
(g) The digital divide/information literacy	Individuals – restricted access to: Educational services Health services Employment opportunities Nations – restricted access to: Worldwide marketing opportunities
(h) Catering for disabilities	Increased access for disabled people to: Shopping Banking Booking systems Health services Employment
(i) Legal system	Increased access to legal information Increased involvement in focus groups More able to influence political representatives Inexperienced people regarding themselves as 'legal eagles'

	Effect
(j) Computer fraud	Personal identities can be stolen (government records) Money taken from personal accounts (interception of bank details whilst using online booking) Tickets intercepted from online booking details Goods intercepted from online auction details
(k) Antisocial use of ICT	Deleting/amending/distributing personal data gained from auction, booking and government records Spreading of viruses by email using the above sources of information

Section 7: Computer networks

Candidates should have an understanding of the following computer networks and how they can be used:

	Applications	Hardware requirements	Software requirements
(a) Network type	LAN: Intranet Local email Business network WLAN: Infrared Spread spectrum transmission Used for: Email Business network WAN: Internet Extranets Email Virtual private network Video conferencing Business network Telephone call centre Booking system Online shopping Online banking	PC Hub Switch Router Dedicated cabling Server Network card Laptop Wireless access point Router Wireless network card PC Modem Hub Switch Router Server Proxy server VPN	FTP HTTP Telnet SSH Router software

Candidates must understand the need for security and the measures taken to prevent a breach of security:

	Examples	Methodology
(b) Network security	Physical	Locked room Security guard
	Software	Firewall Digital certification Encryption Anti virus software User ID Password Anti spam Anti pop up software Physical security Anti spyware software Authentication techniques Wired equivalent privacy

Candidates should understand the use of networks in electronic conferencing, including the advantages and disadvantages:

	Applications	Hardware requirements	Software requirements
(c) Electronic conferencing	Use of: Video conferencing Phone conferencing Instant messaging Used in: Business conferences Linking schools Research meetings For each include: Advantages Disadvantages	PC Phone Webcam Microphone Speakers	Conference software VOIP software Instant messaging

6. Assessment criteria for practical tests

- The criteria which are used by the examiners to mark the practical tests are based on the practical skills (with underlying knowledge and understanding) identified in sections 8 to 14 for Cambridge International AS Level and sections 8 to 17 for Cambridge International A Level.
- The underlying knowledge and understanding may be drawn from any of the sections 1 to 17.
- Each section is broken down into a series of specific objectives which candidates should be able to meet.
- For each specific objective, examiners use one or more performance criteria to mark the candidates' work.
- Any of the performance criteria may be tested on any examination paper.
- The tables below also show some of the skills that may be required to satisfy each performance criterion. Please note, these lists are not exhaustive and other related aspects should also be studied.

Cambridge International AS Level

Section 8: Software selection

Candidates should be able to select the software which is most appropriate for any given task, using a critical evaluation of the task and of the scenario provided with the task.

Candidates are given a range of software packages; they should then be able to:

Assessment	Performance Criteria	Skills
8. Select the most appropriate software for the task		
(a) Select software	Select the most appropriate software for a task	Using the task and scenario given

Section 9: Communication

Candidates should be able to use email and the internet to gather and communicate information; they should be able to critically evaluate the material to identify the reliability of the sources and whether the material is fit for purpose.

Assessment	Performance Criteria	Skills
9. Communicate effectively with other ICT users using email and search for appropriate information using the internet		
(a) Use email	(i) Read specified email message Send email message as specified	Open message, new message, address, subject, reply, forward, carbon copy, blind carbon copy
	(ii) Send a file to another ICT user electronically, receive a file from another ICT user electronically, compress a file, extract data from a compressed file	Attach file(s), file attachment(s), save attached file, zip file, extract from a zipped file
	(iii) Identify potential viruses within email attachments	Understand file types for attachments and those file types which provide likely sources of viruses
(b) Use the internet	(i) Locate specified information from a website	Locate from a given URL, hyperlinks, search engines, search techniques including Boolean operators (AND, OR, NOT), downloading and saving
	(ii) Evaluate Internet sources	Identify validity of data, potential for misinformation, plagiarism (how to detect, how to avoid, identifying full references), appropriateness of information for the task, bias, reliability of the source (author/provider, bibliography), accuracy, currency

Section 10: Document and Presentation Production

Candidates should be able to use word processing, desktop publishing and presentation authoring facilities to prepare documents/slides for an audience.

Assessment	Performance Criteria	Skills
10. Prepare, create, amend and edit documents and presentations		
(a) Enter and edit data from different sources	(i) Load/open data from a specified file	Locate file, identify file type, csv, txt, rtf
	(ii) Key in text as specified with no errors	Enter text, enter numbers, enter date, use special characters, mathematical symbols, accents, superscript, subscript, auto-text, date and time
	(iii) Edit text as specified	Highlight, delete, move, cut, copy, paste, drag and drop
(b) Import image or other object from an external source	(i) Import and place an image or other object as specified from an external source	Import clip art, import from a digital source, import from file, import from website, text, graphic image, table, chart, program, media files (sound, video)
	(ii) Manipulate image as specified	Move image, position with precision framing, copy, contrast, brightness, resize image, crop image, text wrap (around image, square, tight, above, below), maintain aspect ratio
(c) Include information downloaded from the internet	Evaluate and select from the specified information that which is fit for the specified purpose, position relevant information as required	Text, graphic image, table, chart, media files (sound, video) Take into account bias, reliability of the source (author/provider, bibliography, alternative point of view), appropriateness, accuracy, currency (how up to date, date of production)

Assessment	Performance Criteria	Skills
(d) Create an electronic document using a suitable package	(i) Create a link from the document or slide	Hyperlink within a word processed document, link to a specified webpage, link to another document stored locally or globally. Link to other slides in a presentation. Link to a presentation. Visible links, hidden links
	(ii) Control a document to be edited by multiple users	Protect document for editing Track changes (identify changes made to a working document, accept change(s), reject changes), bookmark, insert comment, remove comment, footnotes. Understand the concept of multiple user editing to a single document, including ownership and the management of systematic version numbers Compare and merge documents
(e) Set up a document/page/ slide format	(i) Create and edit a master document/slide	Master document (document template), master slide, page setup (A4, A5, letter), page orientation (portrait, landscape), margins (top margin, bottom margin, left margin, right margin, gutter), columns (number of columns, column width, spacing between columns), colour schemes, logos, presenter notes, audience notes
	(ii) Create styles to a given specification	Font (serif, sans-serif), point size, enhancements (bold, italic, underscore, highlighting), text alignment (left, centred, right, fully justified, indent text, indent paragraph, hanging indent,), line spacing (single, 1.5 times, double, multiple, consistent, between lines, between paragraphs, before and after headings), hyphenation, indentation, tabulation, heading style, subheading style, bulleted list
	(iii) Create/edit headers and footers as specified	Headers, footers, automatic file information, automated page numbering, text, date, position, consistency of position
	(iv) Set breaks and amend document sections as specified	Page breaks, section breaks, column breaks, inserted, deleted, widows, orphans, split orientation, multiple headers and footers, amended margins

Assessment	Performance Criteria	Skills
(f) Set text appearance and layout	(i) Understand the need for corporate house styles	Understand the need for corporate house styles and the application of these styles to all documents, presentations and other forms of communication to customers/ clients
	(ii) Apply corporate house styles as specified	Apply styles including font style, paragraph style, text alignment, page layout, page formatting, bullets, numbering, and colour schemes
	(iii) Create/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
(g) Use manual methods and software tools to ensure error-free accuracy	Manually proof-read and correct all document(s)/slide(s). Use appropriate software tools to ensure the document(s)/slide(s) are error-free	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. Use automated tools (spell-checker and grammar-checker) and check that they are correctly used to ensure text is suitable for its purpose

Section 11: Data Handling 1 – Databases and Charts

Candidates should be able to use database and charting facilities to store, search and manipulate data, solve problems and to represent data graphically. Using database facilities, candidates should be able to:

Assessment	Performance Criteria	Skills
11. Create a database structure, add data, check the data entry, perform searches, sorts, calculations and produce output from the data.		
(a) Create a database	(i) Create a database structure and add data to this structure, organising data using the most efficient and appropriate structure	Define a database record structure by assigning the following field/data types: text, numeric, (integer, decimal, currency, date/time), Boolean/logical (yes/no, true/false). Use meaningful file and field names. Locate file, open file, import file, identify file type (.csv, .txt, .rtf). Key in data
	(ii) Link tables where appropriate	Set keys including primary keys and foreign keys. Understand the function and use of flat-file and relational databases
	(iii) Create and use relationships	One-to-many relationship, one-to-one relationship
	(iv) Check data entry	Validate data, verify data. Understand the purpose of validation and verification. Use input masks to restrict data entry
(b) Perform searches	Select subsets of data using one or more criteria as specified	Use numeric, text and Boolean operators: LIKE, AND, OR, NOT, >, <, =, >=, <=, <>, wildcards, data range, specified data items only
(c) Sort data	Using one criterion or two criteria as specified	Ascending, descending, alphanumeric, numeric, date, time
(d) Perform calculations and manipulate numeric data	Enter formula/formulae to calculate results Use scalar and Aggregate Functions	Calculated field, run time calculation, addition, subtraction, multiplication, division, sum, average, maximum, minimum, count Mathematical Functions, Date and Time Functions, String Functions

Assessment	Performance Criteria	Skills
(e) Output the selected data	(i) Use the display features of the package to produce an electronic or printed report with selected data and fields only	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). Header, footer (including page header, section header, report header, page footer, section footer, report footer, calculations within a header or footer), page layout, label production
	(ii) Group data as specified	Group data in a grouped report, group header, group footer
	(iii) Summarise data	Cross-tab query (pivot table), count, sum, average, max, min, first
	(iv) Export the data into a format that can be used in a different package	Export data (table, query or report) into a format like common text (.csv, .txt, .rtf). Export into graph/charting package
	(v) Produce an appropriate type of graph or chart with suitable labels	Select the chart type (bar chart, pie chart, line graph, comparative bar chart, comparative line graph), data series and labels which must be appropriate for the application. Select only the specified data series (contiguous data, non-contiguous data, specified range(s)). Label graph/ chart appropriately (title, legend, segment labels, segment values, percentages, category axis labels, series labels, value axis labels, scales, set axis scale maximum, set axis scale minimum). Place chart, move chart, resize chart. Ensure visibility of all labels

Section 12: Integration 1

Candidates should be able to integrate data from different sources into a single document/presentation or report. Using a range of software packages, candidates should be able to:

Assessment	Performance Criteria	Skills
12. Integrate data from several sources		
(a) Combine data from several sources into an integrated document/ presentation/ report	Combine text, image(s), graph/ charts and numeric data	Import text, import from file, import clip art, import from a database, import from a digital source, import a graph/chart, import from a website, cut, copy, paste. Place as specified. Ensure consistency of display. Repaginate to ensure that page breaks are positioned appropriately (no widows, no orphans, no split lists, no split tables/ images/charts)

Section 13: Output Data

Candidates should be able to produce output in a specified format. Using a range of software packages candidates should be able to:

Assessment	Performance Criteria	Skills
13. Output data in different forms		
(a) Save and print as specified	Save and print the document/ presentation/object/data	Draft document, final copy, email, file attachment, screen shots, audience notes, slides, presenter notes, database report, data table, queries, database relationships, graph/chart, different file formats, print directories/folder structure, file details. Prepare colour documents in such a way that they can be printed on black/white printer without losing relevance using coloured patterns which will render as grey scale patterns

Section 14: Data Handling 2 – Spreadsheets

Candidates should be able to use a spreadsheet to create and test a data model, extracting and summarising data in a variety of forms. Using spreadsheet facilities, candidates should be able to:

Assessment	Performance Criteria	Skills
14. Spreadsheets		
(a) Create a spreadsheet model	(i) Create a data model as specified by keying data with 100% accuracy, importing data	Cut, copy, paste, drag and drop, fill, replication, multi-layered workbooks, import data into spreadsheet, import from another file into another open spreadsheet, use common file interchange formats. Understand the need for 100% data entry accuracy
	(ii) Check data entry	Validate data, verify data. Understand the purpose of validation and verification
	(iii) Manipulate rows and columns	Insert row, insert column, delete row, delete column, resize row/column, hide row/column, protect rows/columns
	(iv) Manipulate window(s)	Freeze panes, unfreeze panes, split windows, restore windows
	(v) Name cell(s) and/or range(s)	Named cell, named range
	(vi) Rearrange cells and/or manipulate their contents	Transpose cells, split strings, join strings, extract from strings (substring, left, right, mid, length), convert string values to numeric values, concatenate cells, protect cell(s), protect rows/columns
	(vii) Enter formula/formulae to meet the requirements	Add, subtract, multiply, divide, indices, relative reference, absolute reference, named cells, named ranges, nested formulae, manipulate date/time values, absolute values
	(viii) Enter functions to meet the requirements	Sum, average, maximum, minimum, integer, rounding, manipulating strings, total, subtotal, counting, conditional counting, if, lookup using horizontal or vertical referencing, nested functions, manipulate date/time values
	(ix) Test the data model	Demonstrate that the model works. Select appropriate test data to ensure that the spreadsheet model is fully tested (formulae, functions, named ranges, validation rules)

Assessment	Performance Criteria	Skills
(b) Adjust page layout	Adjust the page layout	Page setup (A4, A5, letter), page orientation (portrait, landscape), fit to page, margins (top margin, bottom margin, left margin, right margin), display row/column headings, hide row/column headings, headers, footers, automated text (including page numbering). Understand the need for corporate house styles and apply these to all worksheets within a workbook
(c) Use display features	(i) Format rows, columns and/or cells	Format cells (integer, decimal places, percentage, date (e.g. short date, long date), time (e.g. 12 hour clock, 24 hour clock), currency, fractions, numeric values as text), text orientation (horizontal, vertical), align cells (left, centre, right, top, middle, bottom, text wrap), conditional formatting
	(ii) Enhance/emphasise cells	Fill cell(s) (colours, shading, patterns), bold, underscore, italics, borders, merge cells, font styles (font face, point size), add comments to a cell
	(iii) Adjust row/column/cell sizes so that all data/labels/formulae are visible	Display formulae/data, adjust column width, row height
(d) Perform searches	Select subsets of data using more than one criterion as specified	Use numeric, text, date, time and Boolean operators: AND, OR, NOT, >, <, =, >=, <=, wildcards, data range, specified data items only
(e) Sort data	Use one or two criteria as specified	Ascending, descending, alphanumeric, numeric, date, time
(f) Output the selected data	(i) Use the display features of the package to produce an electronic or printed report with selected data only	Display calculations/formulae, display data/labels in full (with no truncation). Header, footer, page layout, label production, fit to page, fit to (n) page(s) by (n) page(s), display selected extracts, display validation rules, screen shots, show/hide row/column headings
	(ii) Export the data into a format that can be used in a different package	Export data into a format like common text (.csv, .txt, .rtf). Export into graph/ charting package

Cambridge International Advanced Level

For Cambridge International A Level, the candidates must be able to meet all of the requirements of sections 8 to 14 for Cambridge International AS Level as well as sections 15 to 17.

Section 15: Integration 2 – Mail Merge

Candidates should be able to use a word processor with mail merge facilities and a data handling package in order to create mail merged documents. Using word processing, database and spreadsheet facilities, candidates should be able to:

Assessment	Performance Criteria	Skills
15. Create a mail merge master document with automated merge codes, link to a data source, generate individual form letters, and produce output in a variety of formats.		
(a) Create a master document	(i) Create a master document structure	Locate file, open file, import file, identify file type (.csv, .txt, .rtf). Key in data.
	(ii) Create a source file in the most appropriate applications package	Define a database record structure by assigning the following field/data types: text, numeric, (integer, decimal, currency, percentage, date/time), Boolean/logical (yes/no, true/false). Use meaningful file and field names. Locate file, open file, import file, identify file type (.csv, .txt, .rtf). Key in data. Set keys including primary keys and foreign keys. Understand the function and use of flat-file and relational databases. One-to-many relationship, one-to-one relationship. Cut, copy, paste, drag and drop, fill, replication, multi-layered workbooks, import data into spreadsheet, import from another file into another open spreadsheet, use common file interchange formats, working sheet. Understand the need for 100% data entry accuracy
	(iii) Check data entry	Validate data, verify data. Understand the purpose of validation and verification
	(iv) Set up variable fields for automatic completion	Link the master document to the source file(s). Identify and use the correct field names within merge codes. Use conditional operators (e.g. IF)
	(v) Set up variable fields to control record selection/omission at mail merge run time	IF, NEXT, SKIPIF, NEXTIF, COMPARE, IF-THEN-ELSE
	(vi) Set up fields for manual completion	FILLIN

Assessment	Performance Criteria	Skills
	(vii) Create appropriate prompts to the user for manual completion	PROMPT
	(viii) Automatically select the required records	QUERY
(b) Use manual methods and software tools to ensure error-free accuracy	Manually proof-read and correct all document(s)/source data files. Use appropriate software tools to ensure the document(s)/file(s) are error free	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. Use automated tools (spell checker and grammar checker) and check they are correctly used to ensure text is suitable for its purpose
(c) Perform mail merge	Generate the form letters using the master document and data source(s)	Merge to new document, merge to printer, merge to email, merge to fax

Section 16: Integration 3 – Automation

Candidates should be able to use a variety of packages, techniques and functions to select the appropriate document(s) and data source(s), and produce automated document(s) as required.

Suitable packages could include one or more of these features:

- Object oriented programming languages
- Macros
- Hyperlinks

The exact techniques, functions and methods used will depend on the application software chosen and the methods employed by the candidate to achieve the required result. Selecting the most appropriate method is part of the assessment. Candidates should be able to:

Assessment	Performance Criteria	Skills
16. Create an automated procedure which enables the user to select both the required document and the data to merge it with.		
(a) Select software	(i) Select a software application suitable for the task	Select the most appropriate package(s) from a variety of software packages available
	(ii) Create an automated document	Paste link, object link embedding (OLE)
	(iii) Set up a suitable selection facility which will allow the required document(s) to be selected	The skills required for this section will depend upon the software selected for the task. Examples could include: menu, drop down menu, hyperlink, push button, list box, combo box, command button, radio buttons
	(iv) Set up a further facility to enable the user to select the data to be merged with the chosen document(s)	The skills required for this section will depend upon the software selected for the task. Examples could include: menu, drop down menu, hyperlink, push button, list box, combo box, command button, radio buttons

Section 17: Output Data

Candidates should be able to produce output in a specified format. Using a range of software packages, candidates should be able to:

Assessment	Performance Criteria	Skills
17. Output data in different forms		
(a) Save and print as specified	Save and print the document/ presentation/object/data	Selected document(s) (e.g. letters, labels, cards, invitations, invoices, statements, passes), master document, (merge codes, macros, code, procedures), screen shots, merged documents, database report, data table, queries, database relationships, different file formats, print directories/folder structure, file details. Prepare colour documents in such a way that they can be printed on black/white printer without losing relevance using coloured patterns which will render as grey scale patterns

7. Other information

Equality and inclusion

Cambridge International Examinations has taken great care in the preparation of this syllabus and assessment materials to avoid bias of any kind. To comply with the UK Equality Act (2010), Cambridge has designed this qualification with the aim of avoiding direct and indirect discrimination.

The standard assessment arrangements may present unnecessary barriers for candidates with disabilities or learning difficulties. Arrangements can be put in place for these candidates to enable them to access the assessments and receive recognition of their attainment. Access arrangements will not be agreed if they give candidates an unfair advantage over others or if they compromise the standards being assessed.

Candidates who are unable to access the assessment of any component may be eligible to receive an award based on the parts of the assessment they have taken.

Information on access arrangements is found in the *Cambridge Handbook* which can be downloaded from the website **www.cie.org.uk/examsofficers**

Language

This syllabus and the associated assessment materials are available in English only.

Grading and reporting

Cambridge International A Level results are shown by one of the grades A*, A, B, C, D or E, indicating the standard achieved, A* being the highest and E the lowest. 'Ungraded' indicates that the candidate's performance fell short of the standard required for grade E. 'Ungraded' will be reported on the statement of results but not on the certificate. The letters Q (result pending), X (no results) and Y (to be issued) may also appear on the statement of results but not on the certificate.

Cambridge International AS Level results are shown by one of the grades a, b, c, d or e, indicating the standard achieved, 'a' being the highest and 'e' the lowest. 'Ungraded' indicates that the candidate's performance fell short of the standard required for grade 'e'. 'Ungraded' will be reported on the statement of results but not on the certificate. The letters Q (result pending), X (no results) and Y (to be issued) may also appear on the statement of results but not on the certificate.

If a candidate takes a Cambridge International A Level and fails to achieve grade E or higher, a Cambridge International AS Level grade will be awarded if both of the following apply:

- the components taken for the Cambridge International A Level by the candidate in that series included all the components making up a Cambridge International AS Level
- the candidate's performance on these components was sufficient to merit the award of a Cambridge International AS Level grade.

For languages other than English, Cambridge also reports separate speaking endorsement grades (Distinction, Merit and Pass), for candidates who satisfy the conditions stated in the syllabus.

Entry codes

To maintain the security of our examinations, we produce question papers for different areas of the world, known as 'administrative zones'. Where the component entry code has two digits, the first digit is the component number given in the syllabus. The second digit is the location code, specific to an administrative zone. Information about entry codes for your administrative zone can be found in the *Cambridge Guide to Making Entries*.

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