Cambridge Assessment
International Education

Syllabus

Cambridge IGCSE™ (9–1)
Information and Communication Technology 0983

For examination in June and November 2020, 2021 and 2022.

Cambridge Pathway

Why choose Cambridge?

Cambridge Assessment International Education prepares school students for life, helping them develop an informed curiosity and a lasting passion for learning. We are part of the University of Cambridge.

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 and qualifications set the global standard for international education. They are created by subject experts, rooted in academic rigour and reflect the latest educational research. They provide a strong platform for learners to progress from one stage to the next, and are well supported by teaching and learning resources.

Our mission is to provide educational benefit through provision of international programmes and qualifications for school education and to be the world leader in this field. Together with schools, we develop Cambridge learners who are confident, responsible, reflective, innovative and engaged – equipped for success in the modern world.

Every year, nearly a million Cambridge students from 10 000 schools in 160 countries prepare for their future with an international education from Cambridge International.

'We think the Cambridge curriculum is superb preparation for university.'

Christoph Guttentag, Dean of Undergraduate Admissions, Duke University, USA

Quality management

Our systems for managing the provision of international qualifications and education programmes for students aged 5 to 19 are certified as meeting the internationally recognised standard for quality management, ISO 9001:2008. Learn more at **www.cambridgeinternational.org/ISO9001**

Contents

1 Why choose this syllabus?

Key benefits

Cambridge IGCSE™ syllabuses are created especially for international students. For over 25 years, we have worked with schools and teachers worldwide to develop syllabuses that are suitable for different countries, different types of schools and for learners with a wide range of abilities.

Cambridge IGCSE (9–1) Information and Communication Technology encourages learners to develop lifelong skills, including:

* understanding and using applications
* using Information and Communication Technology (ICT) to solve problems
* analysing, designing, implementing, testing and evaluating ICT systems, ensuring that they are fit for purpose
* understanding the implications of technology in society, including social, economic and ethical uses
* awareness of the ways ICT can help in home, learning and work environments.

Our programmes balance a thorough knowledge and understanding of a subject and help to develop the skills learners need for their next steps in education or employment.

Our approach encourages learners to be:
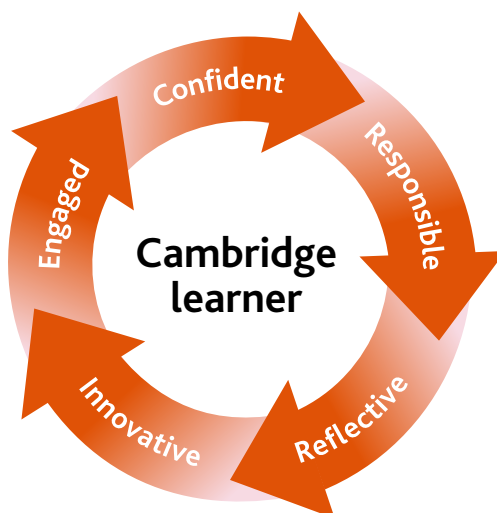
'The strength of Cambridge IGCSE qualifications is internationally recognised and has provided an international pathway for our students to continue their studies around the world.'

Gary Tan, Head of Schools and CEO, Raffles International Group of Schools, Indonesia

Recognition and progression

The combination of knowledge and skills in Cambridge IGCSE (9–1) Information and Communication Technology gives learners a solid foundation for further study. Candidates who achieve grades 9 to 4 are well prepared to follow a wide range of courses including Cambridge International AS & A Level Information Technology.

Cambridge IGCSEs are accepted and valued by leading universities and employers around the world as evidence of academic achievement. Many universities require a combination of Cambridge International AS & A Levels and Cambridge IGCSEs or equivalent to meet their entry requirements.

UK NARIC, the national agency in the UK for the recognition and comparison of international qualifications and skills, has carried out an independent benchmarking study of Cambridge IGCSE and found it to be comparable to the standard of GCSE in the UK. This means students can be confident that their Cambridge IGCSE qualifications are accepted as equivalent to UK GCSEs by leading universities worldwide.

Learn more at **www.cambridgeinternational.org/recognition**

Supporting teachers

We provide a wide range of practical resources, detailed guidance, and innovative training and professional development so that you can give your learners the best possible preparation for Cambridge IGCSE.

Teaching resources

- The School Support Hub
  www.cambridgeinternational.org/support
- Syllabus
- Scheme of work
- Learner guide
- Discussion forum
- Resource list
- Endorsed textbooks and digital resources

Exam preparation resources

- Question papers
- Mark schemes
- Example candidate responses to understand what examiners are looking for at key grades
- Examiner reports to improve future teaching

Support for Cambridge IGCSE

Training

- Face-to-face workshops around the world
- Online self-study training
- Online tutor-led training
- Cambridge Professional Development Qualifications

Community

You can find useful information, as well as share your ideas and experiences with other teachers, on our social media channels and community forums.

Find out more at **www.cambridgeinternational.org/social-media**

'Cambridge IGCSE is one of the most sought-after and recognised qualifications in the world. It is very popular in Egypt because it provides the perfect preparation for success at advanced level programmes.'

Mrs Omnia Kassabgy, Managing Director of British School in Egypt BSE

2 Syllabus overview

Aims

The syllabus aims summarise the context in which you should view the syllabus content and describe the purposes of a course based on this syllabus. They are not listed in order of priority.

The aims are to develop:

- knowledge of ICT including new and emerging technologies
- autonomous and discerning use of ICT
- skills to enhance work produced in a range of contexts
- skills to analyse, design, implement, test and evaluate ICT systems
- skills to consider the impact of current and new technologies on methods of working in the outside world and on social, economic, ethical and moral issues
- ICT-based solutions to solve problems
- the ability to recognise potential risks when using ICT, and use safe, secure and responsible practice.

Content overview

1   Types and components of computer systems
2   Input and output devices
3   Storage devices and media
4   Networks and the effects of using them
5   The effects of using IT
6   ICT applications
7   The systems life cycle
8   Safety and security
9   Audience
10 Communication
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12 Images
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15 Proofing
16 Graphs and charts
17 Document production
18 Data manipulation
19 Presentations
20 Data analysis
21 Website authoring

Support for Cambridge IGCSE (9–1) Information and Communication Technology

Our School Support Hub **www.cambridgeinternational.org/support** provides Cambridge schools with a secure site for downloading specimen and past question papers, mark schemes, grade thresholds and other curriculum resources specific to this syllabus. The School Support Hub community offers teachers the opportunity to connect with each other and to ask questions related to the syllabus.

Assessment overview

All candidates take three papers.

All candidates take:	
Paper 1	2 hours
Theory	40%
100 marks	
Questions will be based on sections 1–21 of the subject content	
All questions are compulsory	
Externally assessed	

and:	
Paper 2	2 hours 30 minutes
Document Production, Data Manipulation and Presentations	30%
80 marks	
This test assesses the practical skills needed to use the applications covered in sections 17, 18 and 19 of the subject content	
Candidates must demonstrate the practical skills relevant to sections 11–16	
All tasks are compulsory	
Externally assessed	

and:	
Paper 3	2 hours 30 minutes
Data Analysis and Website Authoring	30%
80 marks	
This test assesses the practical skills needed to use the applications covered in sections 20 and 21 of the subject content	
Candidates must demonstrate the practical skills relevant to sections 11–16	
All tasks are compulsory	
Externally assessed	

Assessment objectives

The assessment objectives (AOs) are:

AO1 Recall, select and communicate knowledge and understanding of ICT

AO2 Apply knowledge, understanding and skills to produce ICT-based solutions

AO3 Analyse, evaluate, make reasoned judgements and present conclusions

Weighting for assessment objectives

The approximate weightings allocated to each of the assessment objectives (AOs) are summarised below.

Assessment objectives as a percentage of the qualification

Assessment objective	Weighting in IGCSE %
AO1	32
AO2	60
AO3	8

Assessment objectives as a percentage of each component

Assessment objective	Weighting in components %		
	Paper 1	Paper 2	Paper 3
AO1	80	0	0
AO2	0	100	100
AO3	20	0	0

3 Subject content

The subject content details the topics which must be studied. Everything listed must be studied, however, examples are not exhaustive and other related aspects of the topics should be studied.

Annual technical updates
Technical updates will be published each year to take account of emerging technologies relevant to the subject content. Please refer to the updates page for this syllabus on the Cambridge International website **www.cambridgeinternational.org/0983**for the relevant year of examination.

1   Types and components of computer systems

1.1   hardware and software

Candidates should be able to:

- define hardware as consisting of physical components of a computer system
- identify internal hardware devices (e.g. processor, motherboards, random access memory (RAM), read-only memory (ROM), video cards, sound cards and internal hard disk drives)
- identify external hardware devices and peripherals (such as monitors, keyboards, mice, printers as input and output devices and external storage devices in general)
- define software as programs for controlling the operation of a computer or processing of electronic data
- identify the two types of software – applications software and system software
- define applications software (e.g. word processing, spreadsheet, database management systems, control software, measuring software, applets and apps, photo editing software, video editing software, graphics manipulation software)
- define system software (e.g. compilers, linkers, device drivers, operating systems and utilities)

1.2   the main components of computer systems

Candidates should be able to:

- describe the central processing unit (CPU) including its role
- describe internal memory, i.e. ROM and RAM and the differences between them
- define input and output devices and describe the difference between them
- define secondary/backing storage

1.3   operating systems

Candidates should be able to:

- define and describe operating systems which contain a Command Line Interface (CLI)
- define and describe operating systems which contain a Graphical User Interface (GUI)
- describe the differences, including the benefits and drawbacks, between operating systems which contain a CLI and those which contain a GUI

1.4   types of computer

Candidates should be able to:

- describe the characteristics of a personal/desktop computer and its uses, both as a standalone and as a networked computer
- describe the characteristics of a laptop computer and what it is used for, both as a standalone and as a networked computer
- describe the characteristics of a tablet computer and what it is used for, including its ability to use wireless technology or 3G/4G technology
- describe the computer characteristics of a smartphone and what it is used for in computing terms
- describe the advantages and disadvantages of each type of computer (as above) in comparison with the others (as above)

1.5   impact of emerging technologies

Candidates should be able to:

- describe how emerging technologies are having an impact on everyday life (e.g. artificial intelligence, biometrics, vision enhancement, robotics, quantum cryptography, computer-assisted translation, 3D and holographic imaging, virtual reality)

2   Input and output devices

2.1   input devices and their uses

Candidates should be able to:

- identify input devices and their uses, e.g. keyboard, numeric keypad, pointing devices (such as mouse, touchpad, trackerball), remote control, joystick/driving wheel, touch screen, scanners, digital cameras, microphone, sensors (general), temperature sensor, pressure sensor, light sensor, graphics tablet, video camera, webcam

2.2   direct data entry and associated devices

Candidates should be able to:

- describe direct data entry and associated devices, e.g. magnetic stripe readers, chip and PIN readers, Radio Frequency Identification (RFID) readers, Magnetic Ink Character Recognition/Reader (MICR), Optical Mark Recognition/Reader (OMR), Optical Character Recognition/Reader (OCR), bar code reader
- identify the advantages and disadvantages of any of the above devices in comparison with others

2.3   output devices and their uses

Candidates should be able to:

- identify output devices and their uses, e.g. CRT monitor, TFT/LCD monitor, IPS/LCD monitor, LED monitor, touch screen (as an output device), multimedia projector, laser printer, inkjet printer, dot matrix printer, wide format printer, 3D printer, speakers, motors, buzzers, heaters, lights/lamps
- describe the advantages and disadvantages of any of the above devices

3   Storage devices and media

Candidates should be able to:

- identify storage devices, their associated media and their uses, e.g.
  - magnetic backing storage media: fixed hard disks and drives, portable and removable hard disks, portable and removable hard drives, magnetic tape drives and magnetic tapes, memory cards
  - optical backing storage media (CD/DVD/Blu-ray): CD ROM/DVD ROM, CD R/DVD R, CD RW/DVD RW, DVD RAM, Blu-ray discs
  - solid state backing storage: solid state drives (SSDs), flash drives (pen drive/memory stick/USB stick)
- describe the advantages and disadvantages of the above devices

4   Networks and the effects of using them

4.1   networks

Candidates should be able to:

- understand how a router works and its purpose
  - describe how networks and individual computers connect to the internet
  - describe how a router stores computer addresses
  - describe how it routes data packets
- understand the use of other common network devices, including: network interface cards, hubs, bridges, switches, modems
- understand the use of WiFi and Bluetooth in networks
  - describe how computers can use WiFi to connect to a network
  - describe how computers can use Bluetooth to connect to a network
  - compare and contrast Bluetooth and WiFi
- understand how to set up and configure a small network, including: access to the internet, the use of a browser, the use of email, access to an Internet Service Provider (ISP)
- understand the characteristics and purpose of common network environments, such as intranets and the internet
  - define what the internet is
  - define what an intranet is
  - describe the differences between an intranet and the internet
  - explain the purpose of an intranet and how that differs from the purpose of the internet
  - describe the uses of an intranet
  - describe the uses of the internet
  - define the terms *Local Area Network* (*LAN*), *Wireless Local Area Network* (*WLAN*) and *Wide Area Network* (*WAN*)
  - describe the differences between a LAN, a WLAN and a WAN
- understand the advantages and disadvantages of using different types of computer to access the internet
  - compare the advantages and disadvantages of using laptop computers, desktop computers, tablet computers and smartphones to access the internet

4.2   network issues and communication

Candidates should be able to:

- security issues regarding data transfer
    - describe the security issues surrounding the use of computer networks
    - describe other issues such as the idea that the internet is not policed and the effects of this, such as the existence of inappropriate sites
    - identify methods of avoiding password interception (such as the use of anti-spyware and changing passwords regularly)
    - describe the difference between strong and weak passwords
    - describe other authentication techniques (such as biometric methods, magnetic stripes, id cards, passports, other physical tokens, retina scans, iris scans, face scans)
    - describe the use of anti-virus software and other methods of avoiding viruses (such as use of unknown storage media to transfer data, the risk of downloading software from the internet)
    - define encryption and describe its use
    - list the principles of a typical data protection act
- network communication
    - describe facsimile communication and describe the differences between physical faxing (which does not require the use of a network) and electronic faxing (which does require the use of a network)
    - describe email communication, including the use of attachments
    - describe the advantages and disadvantages of using email compared with faxing
    - describe video-conferencing, including the hardware used
    - describe audio-conferencing
    - describe web-conferencing and how it can be linked to either video- or audio-conferencing

5   The effects of using IT

5.1   effects of IT on employment

Candidates should be able to:

- describe how there has been a reduction of employment in offices, as workers' jobs have been replaced by computers in a number of fields (e.g. payroll workers, typing pools, car production workers)
- describe how there has been an increase in employment in other fields (e.g. website designers, computer programmers, delivery drivers in retail stores)

5.2   effects of IT on working patterns within organisations

Candidates should be able to:

- describe how the use of computers has led to a number of employees changing their working patterns (e.g. part-time working, flexible hours, job sharing, compressed hours)
- describe what is meant by part-time working, flexible hours, job sharing, compressed hours

5.3 microprocessor-controlled devices in the home

Candidates should be able to:

- describe the positive effects microprocessors have on aspects of lifestyle (e.g. the amount and use of leisure time, the degree of social interaction, the ability to leave the home)
- describe the negative effects microprocessors have on aspects of lifestyle (e.g. lack of exercise)

5.4 potential health problems related to the prolonged use of IT equipment

Candidates should be able to:

- describe repetitive strain injury (RSI) and what causes it
- identify other health issues (e.g. back problems, eye problems, headaches)
- describe some simple strategies for preventing these problems
- evaluate the use of IT equipment and develop strategies to minimise the health risks

6   ICT applications

6.1   communication applications

Candidates should be able to:

- describe a range of communication applications (e.g. newsletters, websites, multimedia presentations, music scores, cartoons, flyers and posters)
- describe the use of smartphones for communication (e.g. text messaging, phone calls, accessing the internet)
- describe the use of internet telephony, including Voice over Internet Protocol (VoIP)
- describe applications for publicity and corporate image publications (e.g. business cards, letterheads, flyers and brochures)

6.2   data handling applications

Candidates should be able to:

- describe the use of a range of data handling applications (e.g. surveys, address lists, clubs and society records, school reports and school libraries)

6.3   measurement applications

Candidates should be able to:

- describe a range of measurement applications (e.g. scientific experiments, weather stations)
- explain the difference between analogue data and digital data
- explain the need for conversion between analogue and digital data
- describe the use of microprocessors and computers in a number of applications (e.g. pollution monitoring, intensive care units in hospitals)
- discuss the advantages and disadvantages of using computers in measurement rather than humans

6.4   microprocessors in control applications

Candidates should be able to:

- describe the role of a microprocessor or computer in control applications, including the role of the pre-set value
- describe the use of computer control in applications (e.g. turtle graphics, automatic washing machines, automatic cookers, computer controlled central heating systems, burglar alarms, computer controlled glasshouses)

6.5   modelling applications

Candidates should be able to:

- describe the use of computer modelling in spreadsheets (e.g. for personal finance)

6.6   applications in manufacturing industries

Candidates should be able to:

- describe a range of computer controlled applications (e.g. robotics in manufacture and production line control)
- discuss the advantages and disadvantages of using computer controlled systems rather than humans

6.7   school management systems

Candidates should be able to:

- describe how systems are used to manage learner registration and attendance
- describe how systems can be used to record learner performance
- describe how systems can be used for organising examinations, creating timetables and managing teaching cover/substitution

6.8   booking systems

Candidates should be able to:

- identify areas where booking systems are used (e.g. travel industry, theatres and cinemas)
- describe the online processing involved in booking tickets
- discuss the advantages and disadvantages of online booking systems

6.9   banking applications

Candidates should be able to:

- describe the computer processing involved in Electronic Funds Transfer (EFT)
- describe the computer processing involved in using automatic teller machines (ATM) (e.g. withdrawing cash, depositing cash or cheques, checking account balance, mini statements, smartphone/cellphone recharge/top up, bill paying, money transfers, ordering paper-based goods)
- describe the use of processing involved in credit/debit card transactions
- describe the clearing of cheques
- describe phone banking
- describe internet banking, and discuss the advantages and disadvantages of it

6.10 computers in medicine

Candidates should be able to:

- describe the contents of information systems in medicine (including patient records, pharmacy records, monitoring and expert systems for diagnosis)
- describe how 3D printers can be used in producing medical aids (e.g. surgical and diagnostic aids, development of prosthetics and medical products, tissue engineering, artificial blood vessels and the design of medical tools and equipment)

6.11 computers in libraries

Candidates should be able to:

- describe the files used in libraries (e.g. records of books and borrowers)
- describe the computer processing involved in the issue of books, including the use of direct data entry methods
- describe the automatic processing involved in issuing reminders for overdue books

6.12 expert systems

Candidates should be able to:

- identify a range of applications which use expert systems (e.g. mineral prospecting, car engine fault diagnosis, medical diagnosis, chess games)
- identify the components of an expert system (e.g. interactive user interface, inference engine, rules base, knowledge base)
- describe how an expert system is used to suggest diagnoses

6.13 computers in the retail industry

Candidates should be able to:

- describe the use of point of sale (POS) terminals, how the stock file is updated automatically, and how new stock can be ordered automatically
- describe the use of electronic funds transfer at point of sale (EFTPOS) terminals (e.g. the checking of the validity of cards, the use of chip and PIN, the communication between the supermarket computer and the bank computer)
- describe internet shopping
- discuss the advantages and disadvantages of internet shopping

6.14 recognition systems

Candidates should be able to:

- describe how recognition systems work (e.g. Magnetic Ink Character Recognition (MICR), Optical Mark Recognition (OMR) and Optical Character Recognition (OCR), Radio Frequency Identification Device (RFID))
- describe how number plate recognition systems work
- describe the processing of cheques
- describe the processing of OMR media (e.g. school registers, multiple-choice examination papers)
- describe how RFID and RF technology is used in a range of applications (e.g. tracking stock, passports, automobiles, contactless payment)

6.15 monitoring and tracking systems

Candidates should be able to:

- describe how a workforce or member of the public can be monitored or logged
- describe how the use of cookies can be used to monitor a person's internet activity
- describe the use of key-logging
- describe how worker/employee call monitors can be used
- describe the use of automatic number plate recognition

6.16 satellite systems

Candidates should be able to:

- describe the use of different satellite systems (e.g. Global Positioning Systems (GPS), satellite navigation, Geographic Information Systems (GIS), media communication systems)

7 The systems life cycle

7.1 analysis

Candidates should be able to:

- methods of researching an existing system
  - identify and describe methods of researching an existing system (e.g. observation, interviews, questionnaires and examination of existing documents)
  - discuss the disadvantages and advantages of the different methods
- recording and analysing information about the current system
  - describe the need to identify inputs, outputs and processing of the current system
  - describe the need to identify problems with the current system
  - describe the need to identify the user and information requirements for the new system
- system specification
  - identify and justify suitable hardware for the new system
  - identify and justify suitable software for the new system

7.2 design

Candidates should be able to:

- describe how it is necessary to design documents, files, forms/inputs, reports/outputs and validation
- produce designs to solve a given problem
- design data capture forms and screen layouts
- design report layouts and screen displays
- design validation routines (including length check, type check, format check, presence check, check digit)
- design the required data/file structures (e.g. field length, field name, data type)

7.3 development and testing

Candidates should be able to:

- testing designs
  - describe how data/file structures are created and tested
  - describe how validation routines are created and tested
  - describe how input methods are created and tested
  - describe how output formats are created and tested
- testing strategies
  - describe the need to test each module
  - describe the need to test the whole system
  - describe testing using normal data including definition and examples
  - describe testing using live data including definition and examples
  - describe testing using abnormal data including definition and examples
  - describe testing using extreme data including definition and examples
- improvements needed as a result of testing
  - describe how it may be necessary to improve the system and make changes (e.g. data/file structures, validation routines, input methods, output formats may need to be amended/improved)

7.4 implementation

Candidates should be able to:

- different methods of system implementation
  - describe the four methods of implementation (direct changeover, parallel running, pilot running, phased implementation)
- methods of implementation
  - identify suitable situations for the use of different methods of system implementation (e.g. organisations or departments within organisations which need a quick changeover, organisations or departments within organisations which cannot afford to lose data)
  - describe advantages and disadvantages of each method of implementation

7.5 documentation

Candidates should be able to:

- technical documentation for an information system
  - explain the need for technical documentation
  - identify the components of technical documentation (e.g. purpose of the system/program, limitations of the system, program listing, program language, program flowcharts/algorithms, system flowcharts, hardware and software requirements, file structures, list of variables, input format, output format, sample runs/test runs, validation routines)
- user documentation for an information system
  - explain the need for user documentation
  - identify the components of user documentation (e.g. purpose of the system, limitations of the system, hardware and software requirements, how to load/run/install software, how to save a file, how to print data, how to add records, how to delete/edit records, input format, output format, sample runs, error messages, error handling, troubleshooting guide/helpline, frequently asked questions, glossary of terms)

7.6 evaluation

Candidates should be able to:

- describe the need to evaluate a solution in terms of the efficiency of the solution, the ease of use of the solution, and the appropriateness of the solution
- describe the need for a variety of evaluation strategies, e.g.
  - compare the solution with the original task requirements
  - identify any limitations and necessary improvements to the system
  - evaluate the users' responses to the results of testing the system

8 Safety and security

8.1 physical safety

Candidates should be able to:

- describe common physical safety issues and what causes them, e.g. electrocution from spilling drinks, fire from sockets being overloaded or equipment overheating, tripping over trailing cables
- describe some simple strategies for preventing these issues
- evaluate own use of IT equipment and develop strategies to minimise the potential safety risks

8.2 eSafety

Candidates should be able to:

- explain what is meant by personal data
- explain why personal data should be confidential and protected
- explain how to avoid inappropriate disclosure of personal data including: own name, address, school name, a picture in school uniform
- discuss why eSafety is needed
- evaluate own use of the internet and use strategies to minimise the potential dangers, e.g. only using websites recommended by teachers, only using a learner-friendly search engine
- evaluate own use of email and use strategies to minimise the potential dangers, including only emailing people already known, thinking before opening an email from an unknown person, never emailing the school's name or a picture of a learner in school uniform
- evaluate own use of social media/networking sites, instant messaging and internet chat rooms and use strategies to minimise the potential dangers, including: knowing how to block and report unwanted users, never arranging to meet anyone alone, always telling an adult first and meeting in a public place, avoiding the misuse of images, using appropriate language, respecting confidentiality
- describe measures which should be taken when playing games on the internet (including not using real names)

8.3 security of data

Candidates should be able to:

- effective security of data
  - define the term *hacking* and describe its effects
  - explain what is meant by the term hacking and the measures that must be taken in order to protect data
  - explain what is meant by the terms *user id* and *password* stating their purpose and how they are used to increase the security of data
  - explain what is meant by the term *biometric data* and why biometric data is used
- security of data online
  - explain what is meant by the term *digital certificate* and its purpose
  - explain what is meant by the term Secure Socket Layer (SSL)
  - describe the features of a web page that identify it as using a secure server
  - define the terms: *phishing*, *pharming*, *smishing*
  - describe the methods which can be used to help prevent phishing, pharming and smishing
  - describe the potential for the malicious use of technology to collect personal data, including: phishing, pharming, smishing
  - describe how it is possible to recognise when someone is attempting to obtain personal data, report the attempt and avoid the disclosure of information
  - explain the difference between moderated and unmoderated forums and the relative security of these
  - explain the concept of and how to recognise spam mail and avoid being drawn into it
  - describe what encryption is and why it is used
  - define the term *computer virus* and describe its effects
  - describe the effects of infecting a computer with a virus from a downloaded file
  - describe how to take preventative action to avoid the danger of infecting a computer with a virus from a downloaded file
  - describe the measures that must be taken in order to protect against hacking
  - describe how it is possible to be the subject of fraud when using a credit card online
  - explain the issues related to security of data in the cloud
  - explain the concept of a firewall and why it is used
  - discuss the effectiveness of different methods of increasing security

9   Audience

9.1   audience appreciation

Candidates should be able to:

- show a clear sense of audience when planning and creating ICT solutions
- analyse the needs of an audience
- explain why solutions must meet the needs of the audience

9.2 legal, moral, ethical and cultural appreciation

Candidates should be able to:

- explain the need for copyright legislation and the principles of copyright relating to computer software (e.g. software piracy)
- describe methods that software producers employ to prevent software copyright being broken
- discuss the legal, moral, ethical and cultural implications of creating an ICT solution
- create ICT solutions that are responsive to and respectful of the needs of the audience
- discuss why the internet is not policed (although legislation is enforced in some countries) and the effects of this, including the existence of inappropriate sites

10   Communication

10.1 communication with other ICT users using email

Candidates should be able to:

- describe the constraints that affect the use of email, including: the laws within a country, acceptable language, copyright, local guidelines set by an employer, the need for security, netiquette, password protection
- define the term *spam*
- explain why spam needs to be prevented
- describe the methods which can be used to help prevent spam
- explain why email groups are used

10.2 effective use of the internet

Candidates should be able to:

- fundamentals of the internet
  - define the terms *internet* and *intranet*
  - explain the differences between the internet, an intranet and the World Wide Web (WWW)
  - explain the concept of storage in the cloud
  - define and understand the terms: *HyperText Transfer Protocol* (*HTTP*), *HyperText Transfer Protocol secure variant* (*HTTPS*), *Uniform Resource Locator* (*URL*), *hyperlink*, *Internet Service Provider* (*ISP*), *File Transfer Protocol* (*FTP*)
  - describe the structure of a web address
  - explain what a web browser is used for
  - explain what a search engine is used for
  - define the term *blog* and describe the use of a blog as a means of communication
  - define the term *wiki* and describe the use of a wiki as a means of communication
  - define the term *social networking* and describe the use of social networking websites as a means of communication
- advantages and disadvantages of using the internet
  - explain why the internet is so popular, giving reasons such as the amount of information available and the speed of accessing information
  - explain why an internet search to find relevant information is not always fast
  - explain why it is not always easy to find reliable information on the internet
  - explain how to evaluate the reliability of information found on the internet

11 File management

11.1 manage files effectively

Candidates should be able to:

- identify different file types and their use(s), for example: css, csv, gif, htm, jpg, pdf, png, rtf, txt, zip
- locate stored files
- open and import files of different types
- save files in a planned hierarchical directory/folder structure
- save files using appropriate file names
- save and print files in a variety of formats, including: a draft document, final copy, screenshots, database reports, data table, graph/chart, a web page in browser view, a web page in HTML view
- save and export data into file formats for your applications packages, e.g. .doc, .docx, .xls, .sdb, .sdc, .rtf, .ppt
- explain why generic file formats are needed
- save and export data into generic file formats, including: .csv, .txt, .rtf, .pdf, .css, .htm

11.2 reduce file sizes for storage or transmission

Candidates should be able to:

- explain the need to reduce file sizes for storage or transmission
- identify where it will be necessary to reduce file sizes for storage or transmission
- reduce file sizes using file compression

12 Images

Candidates should be able to:

- use software tools to place and edit an image to meet the requirements of its intended application and audience
- know when it is necessary to edit an image and can appropriately:
  - place an image with precision
  - resize an image
  - maintain or adjust the aspect ratio of an image, or distort an image, where appropriate
  - crop an image
  - rotate an image
  - reflect an image (flip an image horizontally or vertically)
  - adjust the colour depth of an image
  - adjust the brightness of an image
  - adjust the contrast of an image
  - understand the need to reduce image resolution to increase transmission speed
  - reduce the resolution of an image to reduce file size

13   Layout

Candidates should be able to:

Note: The word 'document' in this section relates to any of the applications used within sections 16 to 21.

- use software tools to prepare a basic document to match the purpose and target audience
    - create a new document or, where appropriate, open an existing document
    - enter text and numbers
    - use editing techniques to manipulate text and numbers, including: highlight, delete, move, cut, copy, paste, drag and drop
    - place objects into the document from a variety of sources, including: text, image, screenshot, spreadsheet extract, database extract, clip art or chart
    - create a table with a specified number of rows and columns
    - format a table and its contents
    - place text or objects in a table
    - wrap text around a table, chart or image, including: above, below, square and tight
- use software tools to use headers and footers appropriately within a range of software packages
    - create headers and footers
    - align consistently within a document the contents of the header and footer including: to left margin, right margin and centre of the page
    - place automated objects in headers and footers, including: automated file information, automated page numbering, text, date, time
    - explain why headers and footers are needed

14   Styles

Candidates should be able to:

- understand the purpose of a corporate house style and ensure that all work produced matches this
    - produce documents which conform to a corporate house style
    - explain what is meant by corporate branding/house style
- apply styles to ensure consistency of presentation
    - explain why consistent styles are required
    - apply consistent styles using a variety of application packages
    - ensure that page/slide layout is consistent, including: font styles, text alignment, spacing between lines, spacing between paragraphs, spacing before and after headings
    - create and apply an appropriate style, including: font type (serif, sans serif), point size, font colour, alignment, line spacing, style of bullets, text alignment to the left, right, centre or fully justified
    - select an appropriate font style for a task, taking into account the audience
    - use text enhancement, including: bold, underline, italic, highlight
    - create and apply paragraph style(s) with a new style name to match the corporate house style

15   Proofing

15.1 software tools

Candidates should be able to:

- use software tools to ensure that all work produced contains as few errors as possible
    - explain why the automated suggestions given by spell check software do not always give the correct response
    - use automated tools, including spell check facilities, to remove errors
    - use validation routines to minimise errors
    - explain why validation checks must be appropriate to the data that is being checked

15.2 proofing techniques

Candidates should be able to:

- accuracy of data entry
    - describe the importance of accuracy and the potential consequences of data entry errors
    - correct errors in data entry, including: transposed numbers, incorrect spelling, inconsistent character spacing, inconsistent case and factual errors (following proofreading by a third party)
    - check to ensure consistent line spacing, remove blank pages/slides, remove widows/orphans, ensure that tables and lists are not split over columns or pages/slides
- verification
    - define the term *verification*
    - describe visual verification (i.e. visual comparison of data entered with a data source)
    - describe double data entry (i.e. entering data twice and the computer compares the two sets of data, either by comparing them after data has been entered or by comparing them during data entry)
    - explain the need for validation as well as verification

16   Graphs and charts

Candidates should be able to:

- produce a graph or chart from the given data
    - select data to produce a graph/chart, including: using contiguous data, non-contiguous data, and specified data ranges, where necessary
    - select the graph or chart type to match the required purpose and meet the needs of the audience
    - label the graph or chart, including: chart title, legend, sector labels, sector values, segment labels, segment values, percentages, category axis title, value axis title, category axis labels, value axis labels, scales
    - add a second data series to a chart, as necessary
    - add a second axis to a chart, as necessary
    - change the maximum and minimum values of an axis scale to appropriate values
    - enhance the appearance of a graph or chart, including: changing the colour scheme or fill patterns, extracting a pie chart sector to meet the needs of the audience

17   Document production

Candidates should be able to:

- format text and organise page layout
    - set page size
    - set page orientation
    - set page and gutter margins
    - set the number of columns
    - set the column width and spacing between columns
    - define the terms *widow* and *orphan*
    - explain why it is necessary to use page, section and column breaks, to adjust pagination and to avoid widows and orphans
    - set and remove page, section and column breaks
    - set line spacing, including: single, 1.5 times, double, multiple, spacing before and after paragraphs
    - set tabulation settings, including: indented paragraphs, hanging paragraphs
    - format text as bulleted or numbered lists to meet the needs of the audience
- use software tools to edit tables
    - edit a table structure, where necessary, to include: insert row(s), delete row(s), insert column(s), delete column(s), merge cells
    - set horizontal cell alignment: left, right, centre, fully justified
    - set vertical cell alignment: top, centre, bottom
    - format cells and the cell contents, including: show gridlines, hide gridlines, wrap text within a cell, shading/colouring cells
- mail merge a document with a data source
    - explain why mail merged documents are created
    - edit a master document to insert appropriate fields from a data source
    - insert special fields such as date
    - select records to merge
    - merge a document with selected fields
    - save and print merge master document
    - save and print selected merged documents, as appropriate

18   Data manipulation

18.1 create a database structure

Candidates should be able to:

- design and use suitable software tools to create an appropriate database record structure
    - define the terms *flat file database* and *relational database*
    - explain where it would be appropriate to select a flat file database or a relational database
    - assign appropriate data types to fields, including: text, numeric (integer, decimal, percentage, currency), date/time, Boolean/logical (–1/0, yes/no, true/false)
    - explain that other field types such as placeholders for media, including images, sound bites and video clips are used in commercial databases
    - use short, meaningful file and field names
    - format fields and identify sub-types, including: specifying the number of decimal places, specifying a particular currency
    - identify the structure of external data with different file types, including: .csv, .txt, .rtf
    - locate, open and import data from an existing file
    - define and understand the terms *primary key* and *foreign key* and their role in a relational database
    - create a relationship between two or three tables
    - discuss the advantages and disadvantages of using relational tables rather than a flat file database
- design and use suitable software tools to create a data entry form appropriate to purpose and audience
    - understand the key features of form design
    - create a data entry form to meet the needs of the audience
    - create a data entry form with all fields included to match the purpose of the task
    - create an appropriate data entry form, including: appropriate font styles and sizes, spacing between fields, character spacing of individual fields, use of white space, radio buttons, drop down menus, highlighting key fields

18.2 manipulate data

Candidates should be able to:

- use arithmetic operations or numeric functions to perform calculations within a database
    - create a calculated field
    - perform calculations at run time using formulae and functions, including: addition, subtraction, multiplication, division, sum, average, maximum, minimum, count
- use suitable software tools to sort data appropriately in a database
    - sort data using a single criterion and using multiple criteria where necessary, into ascending or descending order
- use suitable software tools to search a database to select subsets of data
    - perform suitable searches using a single criterion and using multiple criteria, on different field types such as alphanumeric, numeric, Boolean
    - perform searches using a variety of operators including: AND, OR, NOT, LIKE, >, <, =, >=, <=, <>
    - perform searches using wildcards, as appropriate

18.3 present data

Candidates should be able to:

- use suitable software tools to produce reports to display data appropriate to purpose and audience
  - produce reports to display all the required data and labels in full where required
  - use appropriate headers and footers within a database report, including: report header, report footer, page header, page footer
  - set report titles
  - produce different output layouts as required, including: tabular format, labels
  - align data and labels appropriately, including: right aligning numeric data and decimal alignment
  - format numeric data, including: number of decimal places, variety of currencies, percentage, as required by the task
  - show and hide data and labels within a report, as necessary
  - export data for use in another application

19   Presentations

Candidates should be able to:

- use a master slide to appropriately place objects and set suitable styles to meet the needs of the audience
  - identify the need for consistency of presentation, in terms of styles, point sizes, colour schemes, transitions and animations
  - use the master slide to place objects appropriately, including: images, text, logos, slide footers, automated slide numbering
  - use the master slide to set font styles, heading styles and colour schemes, as required by the audience
  - manipulate and use specified areas for headings, subheadings, bullets, images, charts, colours, text boxes, presenter notes, audience notes, as appropriate
- use suitable software tools to create presentation slides to meet the needs of the audience
  - insert a new slide, when required, selecting the appropriate slide type for the purpose
  - place text on the slides including: headings, subheadings, bulleted lists, where appropriate
  - apply consistent styles using available software tools, including: select from the presentation colour scheme, the use of text enhancement
  - place appropriate images on the slides, including: still images, video clips, animated images
  - place sound within a slide
  - place charts imported from a spreadsheet
  - place other objects including: symbols, lines, arrows, call out boxes
  - create consistent transitions between pages
  - create consistent animation facilities on text, images and other objects
- use suitable software tools to display the presentation in a variety of formats, including: looped on-screen carousel, controlled presentation, presenter notes, audience notes, taking into account the needs of the audience

20   Data analysis

20.1 create a data model

Candidates should be able to:

- create and edit a data model
  - define the terms: *cells*, *rows*, *columns*, *sheets*, *tabs*, *pages*, *charts*
  - explain the importance of accurate data entry in spreadsheets
  - enter data with 100 per cent accuracy
  - edit the structure of an existing model, including: inserting cells, deleting cells, inserting rows, deleting rows, inserting columns, deleting columns
  - define the terms: *formula*, *function*, *absolute reference*, *relative reference*, *ranges*, *named cell*, *named range*, *nested formulae/functions*
  - explain the difference between a formula and a function
  - explain the order in which mathematical operations are performed and use brackets to make sure that formulae work
  - use mathematical operators, including: add, subtract, multiply, divide, indices, where necessary
  - explain the function of, and use, absolute and relative referencing, as appropriate, when formulae are to be replicated
  - use absolute and relative references, named cells, named ranges and nested formulae, as appropriate
  - use functions, including: sum, average, maximum, minimum, integer, rounding, counting, LOOKUP, VLOOKUP, HLOOKUP, IF and nested functions, when necessary

20.2 test the data model

Candidates should be able to:

- devise suitable test plans and test the data to demonstrate that the model works
  - define the terms: *testing*, *test data*, *expected outcome*, *actual outcome*, *normal data*, *abnormal data*, *extreme data*, *what-if*
  - explain the need to test a model before it is used
  - select appropriate test data to thoroughly test a data model
  - justify the choice of test data
  - calculate the expected outcomes before testing the model
  - test the model, correcting errors and re-testing, where appropriate
  - test the model by the use of what-ifs

20.3 manipulate data

Candidates should be able to:

- use search tools in spreadsheet software to select subsets of data
  - search using a single criterion and using multiple criteria, where appropriate, with a variety of operators such as: AND, OR, NOT, LIKE, >, <, =, >=, <=
  - search, where appropriate, using wildcards
- sort data using a single criterion and using multiple criteria into ascending or descending order, as required

20.4 present data

Candidates should be able to:

- use software tools to adjust the display features in a spreadsheet
    - adjust row height, column width and cell sizes so that all data, labels, and formulae are fully visible
    - wrap text within cells so that all data are fully visible
    - hide and display rows and columns, where appropriate
    - use features to enhance a spreadsheet, including: text colour, cell colour, bold, underline, italic and shading to meet the needs of the audience
    - format numeric data to display the number of decimal places, a variety of different currency values, percentages, as appropriate
    - set the spreadsheet to display formulae and values
    - set the page orientation to portrait or landscape, as necessary
    - set the page layout so that it prints on a specified number of pages
    - use conditional formatting appropriately to change display format depending upon the contents of a cell

21   Website authoring

21.1 web development layers

Candidates should be able to:

- identify and describe the three web development layers
- understand the function of: content layer to enter the content and create the structure of a web page; presentation layer to display and format elements within a web page; behaviour layer to enter scripting language to elements within a web page

21.2 create a web page

Candidates should be able to:

- use software tools to create the content layer of a web page to meet the needs of the audience
    - explain the purpose of the head and body sections of a web page
    - place appropriate elements in the head section of a web page, including: page title, attached stylesheets
    - place appropriate elements in the body section of a web page
    - explain why tables are used to structure elements within a web page
    - insert a table, including: table header, table rows, table data
    - use appropriate table attributes, including: to adjust cells to span more than one row/column, to set table and cell sizes in terms of pixels and/or % values, to apply styles to tables, to meet the needs of the audience
- use software tools to appropriately place the content in a web page
    - insert appropriate objects into a web page including: text, still images, moving images, sound clips
    - apply styles to text within a web page
    - apply styles to a list, including: ordered list, unordered list
    - insert an appropriate image into a web page
    - use appropriate image attributes, including: to adjust its size, aspect ratio and alternate text

continued

21.2 create a web page continued

- use software tools to create navigation within a web page and between web pages
    – describe the function of a hyperlink
    – describe the concept of a bookmark and methods of creating a bookmark within a web page
    – describe the function of an anchor and why it is rarely seen from the browser view
    – define and understand the terms *relative file path* and *absolute file path*
    – explain why absolute file paths must not be used for hyperlinks to locally saved web pages/objects
    – use an object's id attribute to create a bookmark within a web page
    – create an anchor within a web page
    – create hyperlinks from: text, images
    – create hyperlinks, where appropriate, to: bookmarks on the same page, other locally stored web pages, a website using the URL, send mail to a specified email address, open in a specified location including: the same window, a new window, with a window named as specified

21.3 use stylesheets

Candidates should be able to:

- use software tools to create the presentation layer of a web page
    – explain what is meant by the term *cascading stylesheets*
    – explain the difference between attached stylesheets and inline style attributes
    – explain the hierarchy of multiple attached stylesheets and inline styles within a web page
    – explain the difference between a style and a class
    – create generic external styles and inline style attributes, including: background properties (e.g. colour, images), font properties (e.g. style, typeface), table properties (e.g. background colour, horizontal and vertical alignment, spacing, padding, borders: including collapsed, border thickness, visible/invisible)
    – create external styles to be tagged in a web page including: h1, h2, h3, p, li, as required
    – specify the font appearance for each style, including features such as: font family, size, colour, alignment, bold and italic
    – save styles in cascading stylesheet format
    – explain why relative file paths must be used for attached stylesheets
    – attach an external stylesheet to a web page using a relative file path
    – attach comments to an external stylesheet

21.4 test and publish a website

Candidates should be able to:

- know how to publish a website
    – explain how to upload and publish the content of a website using ftp
    – test that web page elements work
    – test navigation within/from a web page using a test plan
- test a website
    – create a test plan to test a website including: web page elements are visible, navigation within/from a web page
    – justify the choice of test plan

4 Details of the assessment

Paper 1 – Theory

Written paper, 2 hours, 100 marks

This is a compulsory paper consisting of multiple-choice, short-answer and structured questions. The questions are set on all sections of the subject content. Each individual question is set within separate contexts of ICT applications in everyday life. Candidates must answer all questions. Candidates answer on the question paper.

Paper 2 – Document Production, Data Manipulation and Presentations

Practical test, 2 hours 30 minutes, 80 marks

For Paper 2 Document Production, Data Manipulation and Presentations, candidates must **not** have access to the internet or email. For each of the tasks, candidates will be provided with electronic source files; these files must be loaded onto the candidates' computer system before the start of the examination. Please refer to the *Cambridge Handbook* for full details on the administration of this paper.

This is a compulsory paper. It is a practical test which comprises a number of tasks to be taken under examination conditions and focuses on the candidate's ability to carry out practical tasks by applying their knowledge and understanding to the following subject content sections:

- Section 17 Document production
- Section 18 Data manipulation
- Section 19 Presentations.

Candidates demonstrate the practical skills relevant to sections 11–16.

A scenario is described at the start of the paper and each task has a purpose within this scenario. Candidates work through the steps of each task in order. At the end of each task, candidates are prompted to produce evidence of their work by creating screenshots and placing these within an Evidence Document and making printouts. It is essential that candidates remember to enter **electronically** their centre number, candidate number and name on each piece of evidence before it is sent to the printer.

Paper 3 – Data Analysis and Website Authoring

Practical test, 2 hours 30 minutes, 80 marks

For Paper 3 Data Analysis and Website Authoring, candidates must **not** have access to the internet or email. For each of the tasks, candidates will be provided with electronic source files; these files must be loaded onto the candidates' computer system before the start of the examination. Please refer to the *Cambridge Handbook* for full details on the administration of this paper.

This is a compulsory paper. It is a practical test which comprises a number of tasks to be taken under examination conditions and focuses on the candidate's ability to carry out practical tasks by applying their knowledge and understanding to the following subject content sections:

- Section 20 Data analysis
- Section 21 Website authoring.

Candidates demonstrate the practical skills relevant to sections 11–16.

A scenario is described at the start of the paper and each task has a purpose within this scenario. Candidates work through the steps of each task in order. At the end of each task, candidates are prompted to produce evidence of their work by creating screenshots and placing these within an Evidence Document and making printouts. It is essential that candidates remember to enter **electronically** their centre number, candidate number and name on each piece of evidence before it is sent to the printer.

Notes for guidance

Hardware and software requirements

Assessment of the practical tests is software independent, therefore any hardware platform, operating system and applications packages can be used by candidates in the practical examinations, provided that these packages have the facilities to enable the candidates to fully demonstrate all of the skills, performance criteria and assessment objectives in sections 1–21.

It is recommended that for the website authoring section of the syllabus, candidates have a working knowledge of HTML. They may use suitable web editing software to assist them, but they will be required to edit the markup generated by such a package, or they may create their own HTML.

There will be no requirement for candidates to use any scripting language.

5 What else you need to know

This section is an overview of other information you need to know about this syllabus. It will help to share the administrative information with your exams officer so they know when you will need their support. Find more information about our administrative processes at **www.cambridgeinternational.org/examsofficers**

Before you start

Previous study

We do not expect learners starting this course to have previously studied ICT.

Guided learning hours

We design Cambridge IGCSE syllabuses based on learners having about 130 guided learning hours for each subject during the course but this is for guidance only. The number of hours a learner needs to achieve the qualification may vary according to local practice and their previous experience of the subject.

Availability and timetables

You can enter candidates in the June and November exam series. You can view the timetable for your administrative zone at **www.cambridgeinternational.org/timetables**

All Cambridge schools are allocated to one of six administrative zones. Each zone has a specific timetable.
This syllabus is **not** available in all administrative zones. To find out about the availability visit the syllabus page at **www.cambridgeinternational.org/igcse**

Private candidates can enter for this syllabus.

Combining with other syllabuses

Candidates can take this syllabus alongside other Cambridge International syllabuses in a single exam series. The only exceptions are:

- Cambridge IGCSE Information and Communication Technology (0417)
- syllabuses with the same title at the same level.

Cambridge IGCSE, Cambridge IGCSE (9–1) and Cambridge O Level syllabuses are at the same level.

Making entries

Exams officers are responsible for submitting entries to Cambridge International. We encourage them to work closely with you to make sure they enter the right number of candidates for the right combination of syllabus components. Entry option codes and instructions for submitting entries are in the *Cambridge Guide to Making Entries*. Your exams officer has a copy of this guide.

Exam administration

To keep our exams secure, we produce question papers for different areas of the world, known as administrative zones. We allocate all Cambridge schools to one administrative zone determined by their location. Each zone has a specific timetable. Some of our syllabuses offer candidates different assessment options. An entry option code is used to identify the components the candidate will take relevant to the administrative zone and the available assessment options.

Support for exams officers

We know how important exams officers are to the successful running of exams. We provide them with the support they need to make your entries on time. Your exams officer will find this support, and guidance for all other phases of the Cambridge Exams Cycle, at **www.cambridgeinternational.org/examsofficers**

Retakes

Candidates can retake the whole qualification as many times as they want to. This is a linear qualification so candidates cannot re-sit individual components.

Equality and inclusion

We have taken great care to avoid bias of any kind in the preparation of this syllabus and related assessment materials. In compliance with the UK Equality Act (2010) we have designed this qualification to avoid any direct and indirect discrimination.

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

Candidates who cannot access the assessment of any component may be able to receive an award based on the parts of the assessment they have completed.

Information on access arrangements is in the *Cambridge Handbook* at **www.cambridgeinternational.org/examsofficers**

Language

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

After the exam

Grading and reporting

Grades 9, 8, 7, 6, 5, 4, 3, 2 or 1 indicate the standard a candidate achieved at Cambridge IGCSE (9–1).

9 is the highest and 1 is the lowest. 'Ungraded' means that the candidate's performance did not meet the standard required for grade 1. 'Ungraded' is reported on the statement of results but not on the certificate. In specific circumstances your candidates may see one of the following letters on their statement of results:

- Q (result pending)
- X (no result)
- Y (to be issued).

These letters do not appear on the certificate.

How students and teachers can use the grades

Assessment at Cambridge IGCSE has two purposes:

- to measure learning and achievement
  The assessment:
  - confirms achievement and performance in relation to the knowledge, understanding and skills specified in the syllabus, to the levels described in the grade descriptions.
- to show likely future success
  The outcomes:
  - help predict which students are well prepared for a particular course or career and/or which students are more likely to be successful
  - help students choose the most suitable course or career.

Grade descriptions

Grade descriptions are provided to give an indication of the standards of achievement candidates awarded particular grades are likely to show. Weakness in one aspect of the examination may be balanced by a better performance in some other aspect.

Grade descriptions for Cambridge IGCSE (9–1) Information and Communication Technology will be published after the first assessment of the IGCSE in 2020. Find more information at **www.cambridgeinternational.org/igcse**

‘While studying Cambridge IGCSE and Cambridge International A Levels, students broaden their horizons through a global perspective and develop a lasting passion for learning.'

Zhai Xiaoning, Deputy Principal, The High School Affiliated to Renmin University of China