

# **GCE AS and A Level Subject Criteria for Information and Communication Technology (ICT)**



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## **The criteria**

### **Introduction**

AS and A level subject criteria set out the knowledge, understanding, skills and assessment objectives common to all AS and A level specifications in a given subject.

They provide the framework within which the awarding organisation creates the detail of the specification.

### **Aims and objectives**

1. All specifications should encourage learners to become discerning users of ICT, developing a broad range of ICT skills and knowledge and understanding of ICT. This should form a basis for progression to further learning, including progression from AS to A2, and/or employment.
2. All specifications in ICT should encourage learners to develop:
  - the capacity for thinking creatively, innovatively, analytically, logically and, critically, the skills to work collaboratively;
  - the ability to apply skills, knowledge and understanding of ICT in a range of contexts to solve problems;
  - an understanding of the consequences of using ICT for individuals, organisations and society, and of social, legal, ethical and other considerations about the use of ICT;
  - an awareness of emerging technologies and an appreciation of the potential impact these may have on individuals, organisations and society.

### **Subject content**

3. AS and A level specifications in ICT should build on the skills, knowledge and understanding set out in the subject criteria for GCSE ICT.
4. AS specifications in ICT should provide opportunities to develop learners' skills, knowledge and understanding of ICT and to apply this to the solution of real or realistic problems. A level specifications should require learners to develop a broader and deeper knowledge and understanding of ICT and to develop further the skills associated with applying this to produce solutions to real or realistic problems.

### **Knowledge and understanding**

5. AS and A level specifications should require learners to develop a knowledge and understanding of the following topics. AS specifications must address each of the sections in a balanced way but need not make explicit requirements for every item.

#### ***Data and information***

- The characteristics of data and information
- The organisation and structuring of information to facilitate its effective use
- The methods of finding, selecting, exchanging and managing information to meet particular purposes
- The importance of adopting standards

#### ***Applications and effects***

- The use of ICT for a range of purposes
- An ICT system and its components
- How users interact with ICT systems
- How the use of ICT is influenced by social, cultural, legal, technical, ethical, economic and environmental considerations
- The consequences of the use of ICT for individuals, organisations and society
- Security issues, including disaster recovery

#### ***Hardware, software and communication***

- The functions of hardware and its suitability for purpose
- The importance of interoperability and adopting standards
- An awareness of the need for and function of systems software
- The need for and attributes of a range of applications software and their appropriateness for particular purposes
- The characteristics of networks and other communication technologies

- The criteria for selecting appropriate software, hardware and communication technologies

### ***Future developments***

- Emerging technologies
- Potential future uses of ICT
- Implications of future developments and future use of ICT

### ***Developing ICT solutions***

- Systems development methodologies
- Tools and techniques for collaborative working
- The roles of IT professionals

### **Skills**

6. AS and A level specifications should require learners to develop skills in the following topics. AS specifications must address these in a balanced way but need not make explicit requirements for every item.
- investigation and analysis;
  - definition of requirements;
  - design of a solution to meet a specification;
  - selection and use of appropriate application software;
  - testing and implementation of an ICT-related solution;
  - preparation of documentation;
  - evaluation;
  - collaborative working.

### **Assessment objectives**

7. AS and A level specifications have the same assessment objectives. In A level specifications, the assessment objectives relating to application, analysis and evaluation are given a higher weighting.

8. Knowledge, understanding and skills in ICT are closely linked. Specifications should require that learners demonstrate the following assessment objectives in the context of the content prescribed.
9. In each assessment scheme, the assessment objectives are to be weighted as follows.

<b>Assessment objectives</b>	<b>Weighting</b>		
	<b>AS level</b>	<b>A2 level</b>	<b>A level</b>
<p><b>AO1</b> Learners should be able to demonstrate knowledge and understanding of:</p> <ul style="list-style-type: none"> <li>■ the characteristics of data and information, and the need for their organisation and manipulation to facilitate effective use;</li> <li>■ the use of ICT for a range of purposes;</li> <li>■ the influence of social, cultural, legal, technical, ethical, economic and environmental considerations on the use of ICT;</li> <li>■ the consequences of using ICT for individuals, organisations and society;</li> <li>■ the components, characteristics and functions of ICT systems (including hardware, software and communication) which allow effective solutions to be achieved;</li> <li>■ the systematic development of high-quality ICT-related solutions to problems;</li> <li>■ emerging technologies and their implications for future use of ICT.</li> </ul>	55–70%	30–45%	42.5–57.5%
<p><b>AO2</b> Learners should be able to:</p> <ul style="list-style-type: none"> <li>■ investigate and analyse problems and produce a specification;</li> </ul>	30–45%	55–70%	42.5–57.5%

<ul style="list-style-type: none"> <li>■ design effective solutions;</li> <li>■ select and use appropriate application software;</li> <li>■ test and implement an effective ICT-related system;</li> <li>■ document specifications and solutions;</li> <li>■ evaluate solutions and their own performance.</li> </ul>			
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10. The assessment objectives apply to the whole specification.

**Scheme of assessment**

11. All AS specifications in ICT may have a maximum weighting of 40 per cent for internal assessment.

12. All A level specifications must have internal assessment with a weighting of between 15 and 40 per cent. No more than 40 per cent of the A2 should be internally assessed.

13. Specifications must make clear how reliability and fairness are secured in internal assessment, by setting out requirements that ensure the robustness of each stage of that assessment i.e.:

- the specific skills to be assessed;
- setting of tasks;
- extent of supervision in carrying out of tasks;
- conditions under which assessment takes place;
- marking of the assessment and internal standardising procedures;
- any moderation process.

14. Assessment in AS specifications in ICT should:

- allow learners to demonstrate their knowledge and understanding of ICT systems;
- include at least one piece of work addressing a problem at an appropriate level that allows learners to demonstrate at least two of

the skills of analysing, designing, implementing, testing and evaluating systems.

15. In addition, assessment in A level specifications in ICT should require learners to undertake one substantial piece of work over an extended period of time that allows learners to demonstrate the techniques of system development and documentation associated with a more substantial piece of work.
16. This work should complement the assessment carried out in the examination.

### **Synoptic assessment**

17. Synoptic assessment should be included at A2, drawing on both assessment objectives, and should be designed to test learners' understanding of the connections between different elements of the subject.
18. Synoptic assessment in ICT should require learners to make connections between different areas of ICT represented in the specification and test their holistic understanding of the subject. In particular, learners should be required to draw on their knowledge and understanding of information, software, hardware, communication, applications and effects when demonstrating the skills associated with analysis, design, implementation and evaluation of ICT-based systems.
19. Synoptic assessment draws on both assessment objectives and will test learners' understanding of the connection between different elements of the subject. The statements within the assessment objectives contain an element of synoptic assessment.

## A2 performance descriptions for information and communication technology

	<b>Assessment objective 1</b>	<b>Assessment objective 2</b>
<b>Assessment objectives</b>	<p>Learners should be able to demonstrate knowledge and understanding of:</p> <ul style="list-style-type: none"> <li>■ the characteristics of data and information, and the need for their organisation and manipulation to facilitate effective use;</li> <li>■ the use of ICT for a range of purposes;</li> <li>■ the influence of social, cultural, legal, technical, ethical, economic and environmental considerations on the use of ICT;</li> <li>■ the consequences of using ICT for individuals, organisations and society;</li> <li>■ the components, characteristics and functions of ICT systems (including hardware, software and communication) which allow effective solutions to be achieved;</li> <li>■ the systematic development of high-quality ICT-related solutions to problems;</li> <li>■ emerging technologies and their implications for future use of ICT.</li> </ul>	<p>Learners should be able to:</p> <ul style="list-style-type: none"> <li>■ investigate and analyse problems and produce a specification;</li> <li>■ design effective solutions;</li> <li>■ select and use appropriate application software;</li> <li>■ test and implement an effective ICT-related system;</li> <li>■ document specifications and solutions;</li> <li>■ evaluate solutions and their own performance.</li> </ul>

<p><b>A/B boundary performance descriptions</b></p>	<p>Learners characteristically demonstrate:</p> <ul style="list-style-type: none"> <li>a) an understanding of the characteristics of data and information;</li> <li>b) a clear understanding of the need for organisation of data and information to facilitate effective use of ICT;</li> <li>c) a knowledge of how ICT is used for a range of purposes;</li> <li>d) an understanding of how social, cultural, legal, technical, ethical, economic and environmental considerations affect the use of ICT</li> <li>e) an understanding of the consequences of the use of ICT on society, individuals and organisations;</li> <li>f) a thorough knowledge of the characteristics and functions of the hardware components and application software that make up an ICT system and how these are used to provide effective ICT solutions;</li> <li>g) an understanding of the communications systems that support ICT use;</li> </ul>	<p>Learners characteristically demonstrate:</p> <ul style="list-style-type: none"> <li>a) the ability to use subject-specific terminology appropriately and accurately;</li> <li>b) the ability to analyse a complex problem and produce a specification;</li> <li>c) the ability to design effective solutions, documented appropriately;</li> <li>d) the selection and use of application software to implement effective solutions;</li> <li>e) the ability to design and implement an appropriate testing strategy;</li> <li>f) evaluation skills which analyse their own performance and that of their solution.</li> </ul>
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	<p>h) an understanding of the need for a systematic approach when developing ICT solutions to problems;</p> <p>i) an understanding of the development of ICT technologies and the implications of emerging technologies for the future use of ICT.</p>	
<p><b>E/U boundary performance descriptions</b></p>	<p>Learners should be able to demonstrate knowledge and understanding of:</p> <p>a) the characteristics of data and information, and the need for their organisation and manipulation to facilitate effective use;</p> <p>b) the use of ICT for a range of purposes</p> <p>c) the influence of social, cultural, legal, technical, ethical, economic and environmental considerations on the use of ICT;</p> <p>d) the consequences of using ICT for individuals, organisations and society;</p> <p>e) the components, characteristics and functions of ICT systems (including hardware, software and communication) which allow effective solutions to be</p>	<p>Learners should be able to:</p> <p>a) investigate and analyse problems and produce a specification;</p> <p>b) design effective solutions;</p> <p>c) select and use appropriate application software;</p> <p>d) test and implement an effective ICT-related system;</p> <p>e) document specifications and solutions;</p> <p>f) evaluate solutions and their own performance.</p>

	<p>achieved;</p> <p>f) the systematic development of high-quality ICT-related solutions to problems;</p> <p>g) emerging technologies and their implications for future use of ICT.</p>	
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## A2 performance descriptions for information and communication technology

	<b>Assessment objective 1</b>	<b>Assessment objective 2</b>
<b>Assessment objectives</b>	<p>Learners should be able to demonstrate knowledge and understanding of:</p> <ul style="list-style-type: none"> <li>■ the characteristics of data and information, and the need for their organisation and manipulation to facilitate effective use;</li> <li>■ the use of ICT for a range of purposes;</li> <li>■ the influence of social, cultural, legal, technical, ethical, economic and environmental considerations on the use of ICT;</li> <li>■ the consequences of using ICT for individuals, organisations and society;</li> <li>■ the components, characteristics and functions of ICT systems (including hardware, software and communication) which allow effective solutions to be achieved;</li> <li>■ the systematic development of high-quality ICT-related solutions to problems;</li> <li>■ emerging technologies and their implications for future use of ICT.</li> </ul>	<p>Learners should be able to:</p> <ul style="list-style-type: none"> <li>■ investigate and analyse problems and produce a specification;</li> <li>■ design effective solutions;</li> <li>■ select and use appropriate application software;</li> <li>■ test and implement an effective ICT-related system;</li> <li>■ document specifications and solutions;</li> <li>■ evaluate solutions and their own performance.</li> </ul>

<p><b>A/B boundary performance descriptions</b></p>	<p>Learners characteristically demonstrate:</p> <ul style="list-style-type: none"> <li>a) a clear understanding of the characteristics of data and information;</li> <li>b) a thorough understanding of the need for organisation of data and information to facilitate effective use;</li> <li>c) a thorough knowledge of how ICT is used for a wide range of purposes;</li> <li>d) an in-depth understanding of how social, cultural, legal, technical, ethical, economic and environmental considerations affect the use of ICT;</li> <li>e) a full understanding of the consequences of the use of ICT on society, individuals and organisations;</li> <li>f) an in-depth knowledge of the characteristics and functions of the hardware components and application software which make up an ICT system and how these are used to provide effective ICT solutions;</li> </ul>	<p>Learners characteristically demonstrate:</p> <ul style="list-style-type: none"> <li>a) the ability to use subject-specific terminology appropriately and accurately;</li> <li>b) the ability to analyse a complex problem and produce a detailed specification;</li> <li>c) the ability to design an effective and efficient solution, with clear and detailed documentation;</li> <li>d) the selection and use of appropriate software, using advanced features, to implant an effective solution;</li> <li>e) the ability to design and implement a rigorous testing strategy using evaluation skills which analyse in depth their own performance and that of their solution.</li> </ul>
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	<ul style="list-style-type: none"> <li>g) a clear understanding of the communications systems that support ICT use;</li> <li>h) a full understanding of the systematic approach required to develop high-quality ICT solutions to problems;</li> <li>i) a comprehensive understanding of the development of ICT technologies and the implications of emerging technologies for the future use of ICT.</li> </ul>	
<p><b>E/U boundary performance descriptions</b></p>	<p>Learners characteristically demonstrate:</p> <ul style="list-style-type: none"> <li>a) some understanding of the characteristics of data and information;</li> <li>b) a basic understanding of the need for organisation of data and information to facilitate effective use;</li> <li>c) a basic knowledge of how ICT is used for a range of purposes;</li> <li>d) a superficial understanding of how social, cultural, legal, technical, ethical, economic and environmental considerations affect the use of ICT;</li> <li>e) a basic understanding of the consequences of the use of ICT on society, individuals and organisations;</li> </ul>	<p>Learners characteristically demonstrate:</p> <ul style="list-style-type: none"> <li>a) a basic use of subject-specific terminology appropriately and accurately;</li> <li>b) the ability to analyse a problem and draw up a basic specification;</li> <li>c) the ability to design a solution with basic documentation;</li> <li>d) the ability to select appropriate software with which to produce a solution and justify their choice to some extent;</li> <li>e) the use of appropriate features of application software to implement working solutions;</li> </ul>

	<ul style="list-style-type: none"><li>f) an basic knowledge of the characteristics and functions of the hardware components and application software which make up an ICT system and how these are used to provide effective ICT solutions;</li><li>g) a basic understanding of the communications systems that support ICT use;</li><li>h) a basic understanding of the systematic approach required to develop ICT solutions to problems;</li><li>i) a basic understanding of the development of ICT technologies and the implications of emerging technologies for the future use of ICT.</li></ul>	<ul style="list-style-type: none"><li>f) the ability to design and implement a limited testing strategy;</li><li>g) evaluation skills which analyse both their own performance and that of their solution.</li></ul>
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