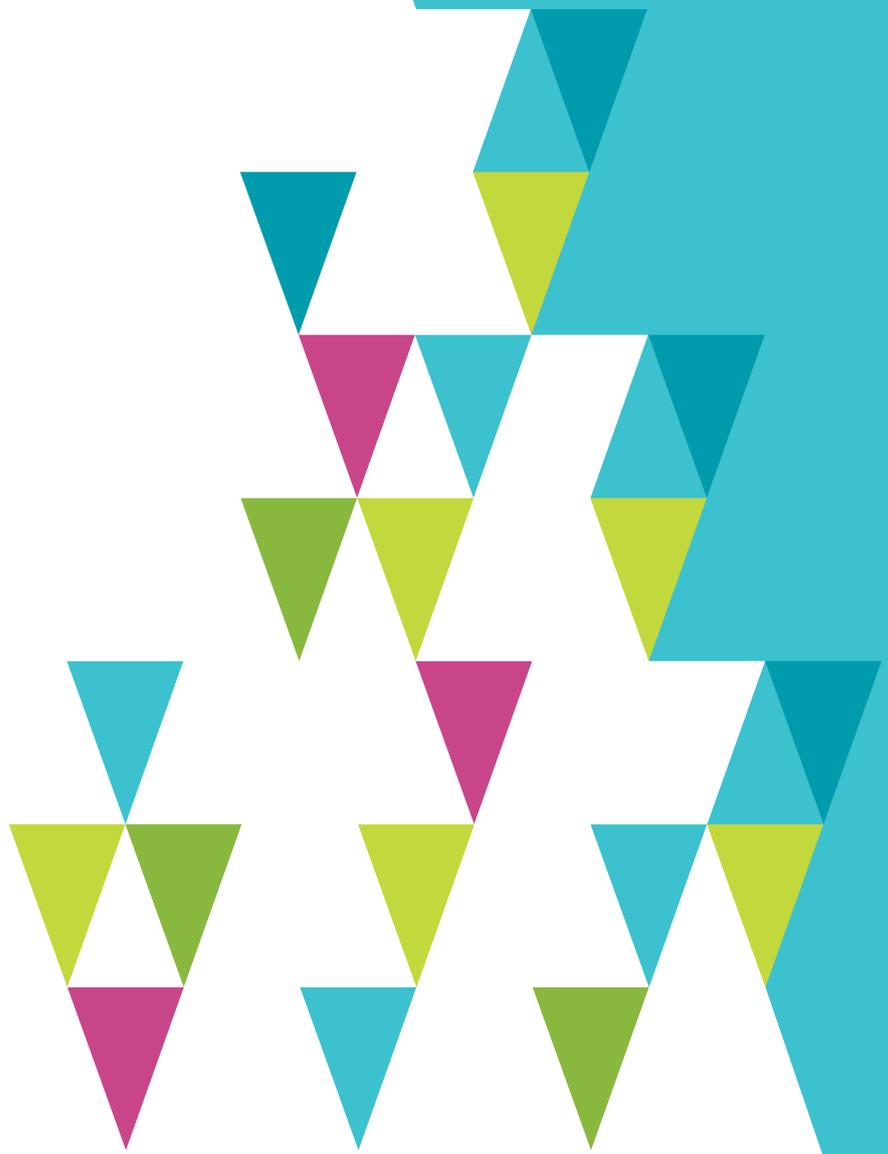


GCSE



# CCEA GCSE Specification in Digital Technology

For first teaching from September 2017  
For first assessment in Summer 2018  
For first award in Summer 2019  
Subject Code: 2650



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# 1 Introduction

This specification sets out the content and assessment details for our GCSE course in Digital Technology. We have designed this specification to meet the requirements of:

- Northern Ireland GCSE Design Principles;
- Northern Ireland GCE and GCSE Qualifications Criteria; and
- Subject Criteria and Requirements for Digital Technology.

First teaching is from September 2017. We will make the first award based on this specification in Summer 2019.

This specification is a unitised course. The guided learning hours, as for all our GCSEs, are 120 hours.

The specification supports the aim of the Northern Ireland Curriculum to empower young people to achieve their potential and to make informed and responsible decisions throughout their lives, as well as its objectives:

- to develop the young person as an individual;
- to develop the young person as a contributor to society; and
- to develop the young person as a contributor to the economy and environment.

If there are any major changes to this specification, we will notify centres in writing. The online version of the specification will always be the most up to date; to view and download this please go to [www.ccea.org.uk](http://www.ccea.org.uk)

## 1.1 Aims

This specification aims to encourage students to:

- become independent and discerning users of digital technology;
- acquire and apply knowledge and understanding of digital technology in a range of contexts;
- acquire creative and technical digital technology skills and apply these in a range of contexts;
- develop and evaluate digital technology based solutions to solve problems;
- develop their understanding of current and emerging technologies and the social and commercial impact of these technologies;
- develop their understanding of the legal, social, economic, ethical and environmental impact of digital technology;
- recognise potential risks when using digital technology and develop safe, secure and responsible practice; and
- develop the skills needed to work collaboratively.

## 1.2 Key features

The following are important features of this specification.

- It offers opportunities to build on the skills and capabilities developed through the delivery of the Northern Ireland Curriculum at Key Stage 3.
- This qualification is available as:
  - GCSE Digital Technology (Multimedia), a digital authoring qualification focusing on multimedia; and
  - GCSE Digital Technology (Programming), a digital development qualification focusing on programming.
- All students study Unit 1: Digital Technology. They then choose **either** the multimedia route **or** the programming route and study the relevant two units for their chosen route.
- Students cannot combine units from each route; they can only be entered for Units 1, 2 and 3 **or** Units 1, 4 and 5.
- The content relates directly to current software development trends and the study of digital technology based systems.
- The content is well balanced between knowledge and application.
- The specification develops practical skills using a range of generic software or in an object-oriented environment.
- It provides a sound basis for further study in both GCE Digital Technology and GCE Software Systems Development.

## 1.3 Prior attainment

Students do not need to have reached a particular level of attainment before beginning to study this specification.

## **1.4 Classification codes and subject combinations**

Every specification has a national classification code that indicates its subject area. The classification code for this qualification is 2650.

Please note that if a student takes two qualifications with the same classification code, schools, colleges and universities that they apply to may take the view that they have achieved only one of the two GCSEs. The same may occur with any two GCSE qualifications that have a significant overlap in content, even if the classification codes are different. Because of this, students who have any doubts about their subject combinations should check with the schools, colleges and universities that they would like to attend before beginning their studies.

## 2 Specification at a Glance

The tables and diagram that follow summarise the structure of this GCSE course.

Unit 1: Digital Technology is compulsory for all students. Students also follow **either** Route A: Multimedia (Units 2 and 3) **or** Route B: Programming (Units 4 and 5).

The qualification they achieve is either:

- GCSE Digital Technology (Multimedia); **or**
- GCSE Digital Technology (Programming).

### Route A: Multimedia

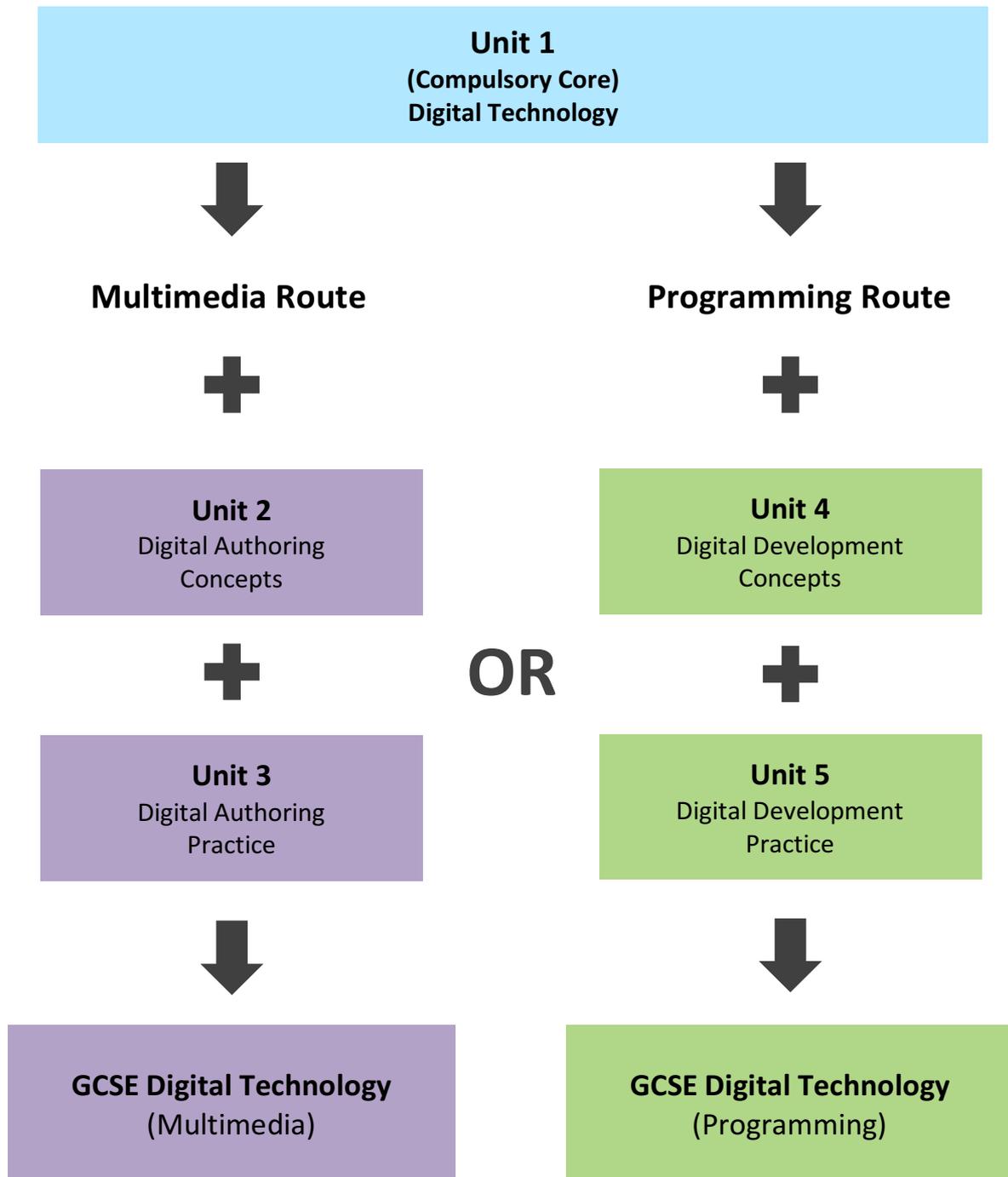
Content		Assessment	Weightings	Availability
<b>Compulsory core unit</b>	Unit 1: Digital Technology	External written examination  1 hour	30%	Summer from 2018
<b>Multimedia units</b>	Unit 2: Digital Authoring Concepts	External written examination  1 hour 30 mins	40%	Summer from 2019
	Unit 3: Digital Authoring Practice	Controlled assessment	30%	Summer from 2019

OR

### Route B: Programming

Content		Assessment	Weightings	Availability
<b>Compulsory core unit</b>	Unit 1: Digital Technology	External written examination  1 hour	30%	Summer from 2018
<b>Programming units</b>	Unit 4: Digital Development Concepts	External written examination  1 hour 30 mins	40%	Summer from 2019
	Unit 5: Digital Development Practice	Controlled assessment	30%	Summer from 2019

Students must take at least 40 percent of the assessment (based on unit weightings) at the end of the course as terminal assessment.





Content	Learning Outcomes
<p><b>Representing sound</b></p> <p><b>Data portability</b></p> <p><b>Software</b></p> <p><b>Database applications</b></p>	<p>Students should be able to:</p> <ul style="list-style-type: none"> <li>• describe factors that affect sound quality when recording sound, including sample rate, bit depth and bit rate;</li> <li>• explain the need for analogue-to-digital conversion in sound recording;</li> <li>• demonstrate understanding of data portability and the following file formats that support it: jpeg, tiff, png, pict, gif, txt, csv, rtf, mp3, mp4, midi, mpeg, avi, pdf, wav and wma;</li> <li>• demonstrate understanding of the need for data compression;</li> <li>• describe the functions of system software, referring to allocating the following: <ul style="list-style-type: none"> <li>– memory;</li> <li>– storage; and</li> <li>– processing time;</li> </ul> </li> <li>• describe the following modes of processing: real-time, batch and multi-user;</li> <li>• describe the following tasks carried out by the utility applications: disk defragmenting, task scheduling, backup and restoring data;</li> <li>• describe the role of antivirus software and the importance of regular updates;</li> <li>• demonstrate understanding of and explain basic database concepts such as table, record, field, key field, query, form, report, macro, relationship and importing data;</li> <li>• identify and use appropriate data types when creating a database structure; and</li> <li>• demonstrate understanding of the need for data validation.</li> </ul>





Content	Learning Outcomes
<p><b>Network technologies (cont.)</b></p> <p><b>Cyberspace, network security and data transfer</b></p>	<p>Students should be able to:</p> <ul style="list-style-type: none"> <li>• describe the function of the following network resources: network interface card, network cables, switch and router;</li> <li>• describe the following network topologies: Bus, Star and Ring;</li> <li>• describe the advantages and disadvantages of using a network in an organisation;</li> <li>• define the term cybercrime and give examples of threats to cybersecurity, including:               <ul style="list-style-type: none"> <li>– hacking;</li> <li>– pornography;</li> <li>– cyber stalking;</li> <li>– data theft;</li> <li>– denial of service;</li> <li>– digital forgery;</li> <li>– cyber defamation;</li> <li>– spamming; and</li> <li>– phishing;</li> </ul> </li> <li>• define the term malware and describe the following forms of malware: virus, Trojan horse, worm, key logger and spyware;</li> <li>• explain how networks and data can be protected using encryption, passwords, levels of access, backup and firewalls;</li> <li>• describe the role of a protocol in data transfer; and</li> <li>• describe the purpose of the following protocols: File Transfer Protocol (FTP), HyperText Transfer Protocol (HTTP) and HyperText Transfer Protocol Secure (HTTPS).</li> </ul>

Content	Learning Outcomes
<p><b>Cloud technology Implementation and application, security, and impact on local systems</b></p> <p><b>Ethical, legal and environmental impact of digital technology on wider society</b></p> <p><b>Legislation</b></p> <p><b>Moral and ethical considerations</b></p>	<p>Students should be able to:</p> <ul style="list-style-type: none"> <li>• define the term cloud computing;</li> <li>• describe the advantages and disadvantages of cloud computing for an organisation;</li> <li>• describe the impact of cloud computing on gaming, file storage and sharing (including collaborative tools);</li> <li>• demonstrate knowledge and understanding of: <ul style="list-style-type: none"> <li>– the Consumer Contracts (Information, Cancellation and Additional Charges) Regulations 2013;</li> <li>– the Copyright, Designs and Patents Act 1988;</li> <li>– the Data Protection Act 1998; and</li> <li>– the Computer Misuse Act 1990;</li> </ul> </li> <li>• identify typical breaches of the Copyright, Designs and Patents Act 1988, including software piracy and software licensing infringements;</li> <li>• demonstrate and apply knowledge and understanding of: <ul style="list-style-type: none"> <li>– the eight principles of the Data Protection Act 1998; and</li> <li>– the rights of the data subject and the responsibilities of the data controller and Information Commissioner in ensuring the Data Protection Act 1998 is enforced;</li> </ul> </li> <li>• describe the terms hacker, virus and spyware and how these relate to the Computer Misuse Act 1990; and</li> <li>• describe the ethical impact of technology on society, referring to the following: <ul style="list-style-type: none"> <li>– internet misuse;</li> <li>– access to personal information;</li> <li>– social media misuse;</li> <li>– the implications of global positioning system (GPS) and tracking; and</li> <li>– concerns about the security of personal data.</li> </ul> </li> </ul>

Content	Learning Outcomes
<p><b>Changes in employment opportunities, skills requirements and work practices</b></p> <p><b>Health and safety</b></p> <p><b>Digital applications</b></p>	<p>Students should be able to:</p> <ul style="list-style-type: none"> <li>• describe the impact of digital technology on employment, including: <ul style="list-style-type: none"> <li>– increased job opportunities in the digital technology and computing sector;</li> <li>– job displacement;</li> <li>– changes in work patterns; and</li> <li>– the need for upskilling;</li> </ul> </li> <li>• demonstrate understanding of digital technology related health and safety issues, including repetitive strain injury (RSI), back strain and eye strain;</li> <li>• identify the measures that both the employee and employer should take to promote good health and safety practice in the workplace;</li> <li>• describe the main features of gaming applications, simulations and mobile phone applications and how they can be used to support the following: <ul style="list-style-type: none"> <li>– education and training;</li> <li>– social interactions; and</li> <li>– work practices; and</li> </ul> </li> <li>• evaluate the impact of the following digital applications on our everyday lives: online banking, online training and e-commerce.</li> </ul>



Content	Learning Outcomes
<p><b>Digital development considerations (cont.)</b></p> <p><b>Multimedia applications</b></p> <p><b>Multimedia authoring</b></p>	<p>Students should be able to:</p> <ul style="list-style-type: none"> <li>• describe how each of the following improves cross-platform compatibility: plugins, portable document formats (PDFs) and optimised file formats;</li> <li>• identify and evaluate key multimedia and interactive features used in: <ul style="list-style-type: none"> <li>– websites supporting e-commerce;</li> <li>– social media; and</li> <li>– gaming;</li> </ul> </li> <li>• define the term multimedia authoring;</li> <li>• demonstrate understanding of the following features and their role in multimedia authoring: <ul style="list-style-type: none"> <li>– hypertext;</li> <li>– video;</li> <li>– animation;</li> <li>– sound; and</li> <li>– scripting;</li> </ul> </li> <li>• use scripting to implement sequencing, selection, repetition, and event programming in multimedia authoring software; and</li> <li>• demonstrate understanding of how HyperText Mark-up Language (HTML) tags are used to manage the following elements in website creation: <ul style="list-style-type: none"> <li>– titles; and</li> <li>– page body, including the following: <ul style="list-style-type: none"> <li>colours and fonts;</li> <li>headers;</li> <li>lines of text;</li> <li>paragraphs;</li> <li>images;</li> <li>sound;</li> <li>video;</li> <li>tables;</li> <li>links; and</li> <li>lists.</li> </ul> </li> </ul> </li> </ul>







Content	Learning Outcomes
<p><b>Building a solution (cont.)</b></p>	<p>Students should be able to:</p> <ul style="list-style-type: none"> <li>• use the following features of a database application to support the implementation of a solution from a design document: <ul style="list-style-type: none"> <li>– relationships;</li> <li>– simple and complex queries;</li> <li>– menus and macros;</li> <li>– validation;</li> <li>– lookup lists;</li> <li>– input masks;</li> <li>– forms and subforms; and</li> <li>– reports (incorporating grouping, sorting, calculations, and headers and footers);</li> </ul> </li> </ul>
<p><b>Testing a solution</b></p>	<ul style="list-style-type: none"> <li>• create a test plan that: <ul style="list-style-type: none"> <li>– is presented in tabular format;</li> <li>– tests all navigational elements, all interactive elements and the load time of any assets used in the solution;</li> <li>– tests the accessibility elements of the application;</li> <li>– uses appropriate test data;</li> <li>– shows expected output;</li> <li>– identifies errors and performance issues;</li> <li>– reflects the general robustness of the system; and</li> <li>– measures the extent to which the solution meets the user requirements;</li> </ul> </li> <li>• test the solution using the test plan and document the observed outcomes from each test; and</li> </ul>
<p><b>Evaluating a solution</b></p>	<ul style="list-style-type: none"> <li>• evaluate the solution, referring to the following: <ul style="list-style-type: none"> <li>– user requirements;</li> <li>– performance and robustness during testing;</li> <li>– refinements required following testing; and</li> <li>– possible improvements to the solution.</li> </ul> </li> </ul>

### 3.4 Unit 4: Digital Development Concepts

In this unit, students analyse trends in software development and the concepts involved in designing and building digital systems using coded solutions.

Content	Learning Outcomes
<p><b>Contemporary trends in software development</b></p> <p><b>Digital data</b></p>	<p>Students should be able to:</p> <ul style="list-style-type: none"> <li>• describe the following programming paradigms:                             <ul style="list-style-type: none"> <li>– procedural programming; and</li> <li>– object-oriented programming;</li> </ul> </li> <li>• explain the significance of the following aspects of software development environments:                             <ul style="list-style-type: none"> <li>– editing features; and</li> <li>– high-level code translation and execution;</li> </ul> </li> <li>• describe how a number is converted to a binary pattern for storage in a computer;</li> <li>• demonstrate understanding of the following units of data:                             <ul style="list-style-type: none"> <li>– bit;</li> <li>– nibble;</li> <li>– byte;</li> <li>– kilobyte;</li> <li>– megabyte;</li> <li>– gigabyte; and</li> <li>– terabyte;</li> </ul> </li> <li>• demonstrate understanding of the following types of character representation:                             <ul style="list-style-type: none"> <li>– ASCII (7-bit and 8-bit); and</li> <li>– Unicode;</li> </ul> </li> <li>• demonstrate understanding of and use number representation and convert between denary, binary and hexadecimal;</li> <li>• perform the addition of two bytes and explain the meaning of overflow; and</li> <li>• describe and use appropriately the following data types: numeric (integer and real), date/time, character and string.</li> </ul>

Content	Learning Outcomes
<p><b>Digital data (cont.)</b></p> <p><b>Digital design principles</b></p> <p><b>Programming constructs</b></p>	<p>Students should be able to:</p> <ul style="list-style-type: none"> <li>• demonstrate understanding of and use Boolean operators (AND, OR and NOT) and truth tables;</li> <li>• explain in simple terms the underlying concepts of computational thinking – abstraction and decomposition;</li> <li>• design solutions using algorithms, flow diagrams and pseudo-code;</li> <li>• create and evaluate algorithms, including those for basic sorting and searching;</li> <li>• refine a solution to a problem during design;</li> <li>• identify data requirements for a solution and develop an appropriate user interface;</li> <li>• use a dry run to test a solution; and</li> <li>• demonstrate understanding of and use the functionality of the following constructs in a programming language: <ul style="list-style-type: none"> <li>– variables, constants, and Boolean and arithmetic operators;</li> <li>– input, output and assignment statements;</li> <li>– one-dimensional array structures;</li> <li>– simple sorting techniques such as the bubble sort and the insertion sort;</li> <li>– simple searching techniques such as linear and binary searching;</li> <li>– string manipulation functions, including splitting, concatenating, character searching and substring searching;</li> <li>– controlling the flow of a program through sequence, selection and iteration;</li> <li>– building reusable code that utilises user-defined functions or methods; and</li> <li>– basic file handling.</li> </ul> </li> </ul>

Content	Learning Outcomes
<p><b>Simple error handling techniques</b></p> <p><b>Developing test plans and testing a solution</b></p> <p><b>Evaluation of digitally authored systems against a set of user requirements</b></p>	<p>Students should be able to:</p> <ul style="list-style-type: none"> <li>• demonstrate understanding of and use the following: <ul style="list-style-type: none"> <li>– data validation, including presence, length, type and format checks;</li> <li>– detection and correction techniques for syntax, execution and logic errors; and</li> <li>– simple error trapping techniques;</li> </ul> </li> <li>• explain the following iterative approaches to testing: <ul style="list-style-type: none"> <li>– white box;</li> <li>– black box; and</li> <li>– system, unit and integration testing;</li> </ul> </li> <li>• create and use a test plan that identifies test procedures for use during and after development to check a system against success criteria;</li> <li>• devise and use the following types of test data: valid, invalid and extreme; and</li> <li>• explain how evaluation is used to ensure that a solution: <ul style="list-style-type: none"> <li>– meets the original design criteria;</li> <li>– is a full and complete solution;</li> <li>– is an efficient solution; and</li> <li>– is a robust solution.</li> </ul> </li> </ul>



Content	Learning Outcomes
<p><b>Building a solution (cont.)</b></p>	<p>Students should be able to:</p> <ul style="list-style-type: none"> <li>• use the following features of a programming language to build a solution from a structured design: <ul style="list-style-type: none"> <li>– data types: <ul style="list-style-type: none"> <li>numeric;</li> <li>character;</li> <li>string;</li> <li>Boolean; and</li> <li>date/time;</li> </ul> </li> <li>– control structures: <ul style="list-style-type: none"> <li>conditional execution if;</li> <li>conditional execution with alternative if else; and</li> <li>looping: for, while and repeat;</li> </ul> </li> <li>– functions: <ul style="list-style-type: none"> <li>user-defined functions;</li> <li>in-built functions; and</li> <li>mathematical functions;</li> </ul> </li> <li>– data structures: <ul style="list-style-type: none"> <li>arrays; and</li> <li>writing to text files;</li> </ul> </li> <li>– string handling (using simple string handling functions);</li> <li>– basic arithmetic: <ul style="list-style-type: none"> <li>addition, subtraction, multiplication and division;</li> <li>powers; and</li> <li>modulo arithmetic; and</li> </ul> </li> <li>– logical and relational operators (and complex combinations of these): <ul style="list-style-type: none"> <li>equal to or not equal to;</li> <li>&lt;, &gt;, &lt;= and &gt;=; and</li> <li>logical AND, OR and NOT;</li> </ul> </li> </ul> </li> </ul>
<p><b>Testing a solution</b></p>	<ul style="list-style-type: none"> <li>• create a test plan that: <ul style="list-style-type: none"> <li>– is presented in tabular format;</li> <li>– incorporates black box and white box testing;</li> <li>– uses appropriate test data;</li> <li>– shows expected output;</li> <li>– identifies run-time and logic errors;</li> <li>– reflects the general robustness of the system; and</li> <li>– measures the extent to which the solution meets the user requirements; and</li> </ul> </li> <li>• test the solution using the test plan and document the observed outcomes from each test.</li> </ul>

<b>Content</b>	<b>Learning Outcomes</b>
<b>Evaluating a system</b>	Students should be able to: <ul style="list-style-type: none"><li>• evaluate the solution, referring to the following:<ul style="list-style-type: none"><li>– user requirements;</li><li>– performance and robustness during testing; and</li><li>– refinements required following testing; and</li></ul></li><li>• make recommendations for improving the system.</li></ul>

## 4 Scheme of Assessment

### 4.1 Assessment opportunities

For the availability of examinations and controlled assessment, see Section 2.

This is a unitised specification; candidates must complete at least 40 percent of the overall assessment requirements at the end of the course, in the examination series in which they request a final subject grade. This is the terminal rule.

Candidates may resit individual assessment units once before cash-in. The better of the two results will count towards their final GCSE grade unless a unit is required to meet the 40 percent terminal rule. If it is, the more recent mark will count (whether or not it is the better result). Results for individual assessment units remain available to count towards a GCSE qualification until we withdraw the specification.

### 4.2 Assessment objectives

There are three assessment objectives for this specification. Candidates must:

- AO1** demonstrate knowledge and understanding of the concepts, characteristics, components and functions of digital technology;
- AO2** apply knowledge and understanding of digital technology to investigate and analyse problems and propose solutions; and
- AO3** design, develop and evaluate solutions to solve problems, making reasoned judgements and presenting conclusions.

### 4.3 Assessment objective weightings

The table below sets out the assessment objective weightings for each assessment component and the overall GCSE qualification.

Assessment Objective	Unit Weighting (%)			Overall Weighting (%)
	External Assessment		Controlled Assessment	
	Unit 1	Unit 2 or Unit 4	Unit 3 or Unit 5	
<b>AO1</b>	10	12	8	30
<b>AO2</b>	13	19	14	46
<b>AO3</b>	7	9	8	24
<b>Total Weighting</b>	30	40	30	100
A tolerance of +/-3% is applicable to the weightings above.				

## 4.4 Quality of written communication

In GCSE Digital Technology, candidates must demonstrate their quality of written communication. They need to:

- ensure that text is legible and that spelling, punctuation and grammar are accurate so that meaning is clear;
- select and use a form and style of writing that suit their purpose and complex subject matter; and
- organise information clearly and coherently, using specialist vocabulary where appropriate.

Quality of written communication is assessed in responses to questions and tasks that require extended writing.

## 4.5 Reporting and grading

We report the results of individual assessment units on a uniform mark scale that reflects the assessment weighting of each unit. We determine the grades awarded by aggregating the uniform marks that candidates obtain in individual assessment units.

We award GCSE qualifications on a grade scale from A\* to G, with A\* being the highest. The nine grades available are as follows:

<b>Grade</b>	A*	A	B	C*	C	D	E	F	G
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If candidates fail to attain a grade G or above, we report their result as unclassified (U).

## 5 Grade Descriptions

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

Grade	Description
<b>A</b>	<p>Candidates recall, select and communicate a thorough knowledge and understanding of the function, application, merits and implications of a broad range of computer hardware and software and other related technologies.</p> <p>They apply knowledge, understanding and skills to a variety of situations, selecting and using a range of digital technology tools efficiently, including high-level programming languages, to solve problems and produce effective digital technology based solutions.</p> <p>They manipulate and process data efficiently and effectively. They model situations, sequence instructions, and interpret information effectively, and explore and develop ideas creatively.</p> <p>They work systematically and understand and adopt safe, secure and responsible practices.</p> <p>They analyse problems systematically, identifying needs and opportunities.</p> <p>They review their work iteratively and make improvements where appropriate.</p> <p>They use digital technology to communicate effectively, demonstrating a clear sense of purpose and audience.</p>

Grade	Description
<b>C</b>	<p>Candidates recall, select and communicate a good knowledge and understanding of the function, application, merits and implications of a broad range of computer hardware and software and other related technologies.</p> <p>They apply knowledge, understanding and skills in a range of situations, selecting and using a range of digital technology tools, including high-level programming languages, to solve problems and produce digital technology based solutions.</p> <p>They select information and process data. They model situations, sequence instructions, select and use information, and explore ideas.</p> <p>They work using safe, secure and responsible practices.</p> <p>They analyse problems, identifying needs and opportunities.</p> <p>They review their work and make improvements where appropriate.</p> <p>They use digital technology to communicate, demonstrating a clear sense of purpose and audience.</p>
<b>F</b>	<p>Candidates recall, select and communicate a basic knowledge and understanding of the function and application of a broad range of computer hardware and software and other related technologies.</p> <p>They apply limited knowledge, understanding and skills using a range of digital technology tools, including high-level programming languages, to solve problems and produce basic digital technology based solutions.</p> <p>They select information and process data. They use simple model situations to select and use information.</p> <p>They demonstrate some awareness of the need for safe, secure and reasonable practices.</p> <p>They respond to needs using digital technology.</p> <p>They sometimes review their work and make some modifications.</p> <p>They use digital technology to communicate, demonstrating a limited sense of purpose and audience.</p>

## 6 Guidance on Controlled Assessment

### 6.1 Controlled assessment review

We will replace our controlled assessment task every year to ensure that it continues to set an appropriate challenge and remains valid, reliable and stimulating.

The controlled assessment task is worth 60 marks and will take a maximum of 36 hours to complete.

### 6.2 Skills assessed by controlled assessment

Teachers must assess the following skills through controlled assessment:

- investigating and analysing problems;
- designing effective solutions;
- developing solutions;
- testing and implementing solutions; and
- evaluating solutions.

There may also be external assessment of elements of all these skills.

### 6.3 Level of control

Rules for controlled assessment in GCSE Digital Technology are defined for the three stages of the assessment:

- task setting;
- task taking; and
- task marking.

### 6.4 Task setting

The level of control for task setting is **high**. This means that we set the task.

We will provide centres with details of a scenario-based controlled assessment task, along with guidance on how to complete and submit it. We will also provide information on the availability of and access to resources.

Teachers must ensure that the completed task conforms to the specification requirements. We will publish a new scenario-based task for Unit 3 and Unit 5 in June each year.

## 6.5 Task taking

The level of control for task taking is **medium**.

Areas of Control	Detail of Control
<b>Authenticity</b>	Teachers must be aware of any third party copyright or intellectual property issues in candidates' work. They must sign a declaration to certify that, to the best of their knowledge, all the work that candidates have submitted for assessment is their own.
<b>Feedback</b>	Teachers must guide and supervise candidates by: <ul style="list-style-type: none"> <li>• monitoring their progress;</li> <li>• preventing plagiarism;</li> <li>• complying with health and safety requirements;</li> <li>• providing advice and guidance if there are any problems;</li> <li>• ensuring that the work aligns with the specification requirements; and</li> <li>• ensuring that the work can be marked using the marking criteria.</li> </ul>
<b>Time Limit</b>	Candidates should be assigned 36 hours to complete the task. The task is worth 60 marks.
<b>Collaboration</b>	Candidates can work in pairs or groups, but it is essential that the teacher can identify individual contributions. They could do this by, for example, beta testing the candidates' solutions or providing feedback on their original storyboards.
<b>Resources</b>	Candidates must reference appropriately all the materials they use in their work, including any online resources.

## 6.6 Task marking

The level of control for task marking is **medium**. This means that teachers mark the task and we moderate the results.

Teachers mark the controlled assessment task using assessment criteria that we provide. They should use professional judgement to select and apply the criteria in each successive mark band appropriately and fairly to candidates' work. They should follow a 'best fit' approach when selecting a candidate's mark, making allowance for balancing strengths and weaknesses in each response.

Teachers must ensure that the work they mark is the candidate's own. For up-to-date advice on plagiarism, or any kind of candidate malpractice, see *Suspected Malpractice in Examinations and Assessments: Policies and Procedures* on the Joint Council for Qualifications website at [www.jcq.org.uk](http://www.jcq.org.uk)

## 6.7 Internal standardisation

Centres with more than one teaching group must carry out internal standardisation of controlled assessment tasks before submitting their marks to us. This is to ensure, as far as possible, that each teacher has applied the assessment criteria consistently when marking assessments. Centres may need to adjust an individual teacher's marking:

- to bring assessments into line with those of other teachers in the centre; and
- to match the standards established at the agreement trial.

If marks do change, centres must amend the total/final mark on their Candidate Record Sheet.

## 6.8 Moderation

Centres must submit their marks and samples to us by May in any year. We may adjust centres' marking to bring the assessment of the candidates' work into line with our agreed standards.

We issue full instructions each year on:

- our moderation procedures;
- which samples we require; and
- the deadlines for submitting marks and samples to us.

Teachers and centre staff may contact us at any stage if they require advice, assistance or support relating to any aspect of controlled assessment.

## 6.9 Drafting/Redrafting

Teachers must not correct candidates' work in detail and return it to them to write up a fair copy. Responsibility for drafting a piece of work towards completion lies entirely with the candidate. Once a candidate has submitted the controlled assessment and it has been awarded a mark, that mark is final. The candidate may not carry out further work.

**See Appendix for a glossary of controlled assessment terms.** For more details, see the Joint Council for Qualifications document *Instructions for Conducting Controlled Assessments*, available at [www.jcq.org.uk](http://www.jcq.org.uk)

## 7 Curriculum Objectives

This specification builds on the learning experiences from Key Stage 3 as required for the statutory Northern Ireland Curriculum. It also offers opportunities for students to contribute to the aim and objectives of the Curriculum at Key Stage 4, and to continue to develop the Cross-Curricular Skills and the Thinking Skills and Personal Capabilities. The extent of the development of these skills and capabilities will be dependent on the teaching and learning methodology used.

### 7.1 Cross-Curricular Skills at Key Stage 4

<b>Communication</b>
<p>Students should be able to:</p> <ul style="list-style-type: none"> <li>• communicate meaning, feelings and viewpoints in a logical and coherent manner, <i>for example discussing the ethical impact of software piracy such as purchasing a pirated video game;</i></li> <li>• make oral and written summaries, reports and presentations, taking account of audience and purpose, <i>for example creating a database report showing monthly sales figures grouped by product;</i> and</li> <li>• interpret, analyse and present information in oral, written and ICT formats, <i>for example creating a website to advertise an organisation's products.</i></li> </ul>
<b>Using Mathematics</b>
<p>Students should be able to:</p> <ul style="list-style-type: none"> <li>• use mathematical language and notation with confidence, <i>for example using mathematical and logical operators within a programme method;</i></li> <li>• use mental computation to calculate, estimate and make predictions in a range of simulated and real-life contexts, <i>for example evaluating the storage capacity of a range of storage devices;</i></li> <li>• select and apply mathematical concepts and problem-solving strategies in a range of simulated and real-life contexts, <i>for example using what-if analysis in a spreadsheet;</i></li> <li>• interpret and analyse a wide range of mathematical data, <i>for example inputting data into a spreadsheet containing formulae and absolute cell referencing to interpret the effect;</i> and</li> <li>• present mathematical data in a variety of formats which take account of audience and purpose, <i>for example using a variety of graphical formats, such as pie charts and scatter graphs, in a spreadsheet to present results of a subject test.</i></li> </ul>

### Using ICT

Students should be able to make effective use of information and communications technology in a wide range of contexts to access, manage, select and present information, including mathematical information, *for example interrogating a database by using complex queries to find a sorted list of all customers from a particular area who bought a product in the second half of the year.*

## 7.2 Thinking Skills and Personal Capabilities at Key Stage 4

### Self-Management

Students should be able to:

- plan work, *for example creating a storyboard solution to a website design brief;*
- set personal learning goals and targets to meet deadlines, *for example learning the skills for each subsection of the controlled assessment task and allocating adequate time to complete each task within the overall time frame;*
- monitor, review and evaluate their progress and improve their learning, *for example refining and evaluating the design solution, following feedback from the end user and/or teacher;* and
- effectively manage their time, *for example ensuring they manage their time effectively within the controlled assessment time limit.*

### Working with Others

Students should be able to:

- learn with and from others through co-operation, *for example beta testing each other's solutions;* and
- listen actively to others and influence group thinking and decision-making, taking account of others' opinions, *for example holding a group discussion on ethical considerations relating to social media.*

## Problem Solving

Students should be able to:

- identify and analyse relationships and patterns, *for example recognising repetition of coding structures;*
- propose justified explanations, *for example justifying a chosen approach to a software solution;*
- reason, form opinions and justify their views, *for example evaluating whether or not a solution has met user requirements;*
- analyse critically and assess evidence to understand how information or evidence can be used to serve different purposes or agendas, *for example explaining the principles of the Data Protection Act 1998 and their effect on individuals and organisations;*
- analyse and evaluate multiple perspectives, *for example using feedback from beta testing to evaluate a solution;*
- weigh up options and justify decisions, *for example analysing test results and considering alternative solutions;* and
- apply and evaluate a range of approaches to solve problems in familiar and novel contexts, *for example suggesting improvements to a developed solution.*

Although not referred to separately as a statutory requirement at Key Stage 4 in the Northern Ireland Curriculum, **Managing Information** and **Being Creative** may also remain relevant to learning.

## 8 Links and Support

### 8.1 Support

The following resources are available to support this specification:

- our Digital Technology microsite at [www.ccea.org.uk](http://www.ccea.org.uk) and
- specimen assessment materials.

We also intend to provide:

- past papers;
- mark schemes;
- fact files;
- Chief Examiner's reports;
- Principal Moderator's reports;
- guidance on progression from Key Stage 3;
- planning frameworks;
- centre support visits;
- support days for teachers;
- agreement trials;
- controlled assessment guidance for teachers;
- controlled assessment guidance for candidates;
- a resource list; and
- exemplification of examination performance.

### 8.2 Examination entries

Entry codes for this subject and details on how to make entries are available on our Qualifications Administration Handbook microsite, which you can access at [www.ccea.org.uk](http://www.ccea.org.uk)

Alternatively, you can telephone our Examination Entries, Results and Certification team using the contact details provided.

### 8.3 Equality and inclusion

We have considered the requirements of equality legislation in developing this specification and designed it to be as free as possible from ethnic, gender, religious, political and other forms of bias.

GCSE qualifications often require the assessment of a broad range of competences. This is because they are general qualifications that prepare students for a wide range of occupations and higher level courses.

During the development process, an external equality panel reviewed the specification to identify any potential barriers to equality and inclusion. Where appropriate, we have considered measures to support access and mitigate barriers.

We can make reasonable adjustments for students with disabilities to reduce barriers to accessing assessments. For this reason, very few students will have a complete barrier to any part of the assessment.

It is important to note that where access arrangements are permitted, they must not be used in any way that undermines the integrity of the assessment. You can find information on reasonable adjustments in the Joint Council for Qualifications document *Access Arrangements and Reasonable Adjustments*, available at [www.jcq.org.uk](http://www.jcq.org.uk)

## 8.4 Contact details

If you have any queries about this specification, please contact the relevant CCEA staff member or department:

- Specification Support Officer: Nuala Tierney  
(telephone: (028) 9026 1200, extension 2292, email: [ntierney@ccea.org.uk](mailto:ntierney@ccea.org.uk))
- Subject Officer: Michael McEnery  
(telephone: (028) 9026 1200, extension 2170, email: [mmcenery@ccea.org.uk](mailto:mmcenery@ccea.org.uk))
- Examination Entries, Results and Certification  
(telephone: (028) 9026 1262, email: [entriesandresults@ccea.org.uk](mailto:entriesandresults@ccea.org.uk))
- Examiner Recruitment  
(telephone: (028) 9026 1243, email: [appointments@ccea.org.uk](mailto:appointments@ccea.org.uk))
- Distribution  
(telephone: (028) 9026 1242, email: [cceadistribution@ccea.org.uk](mailto:cceadistribution@ccea.org.uk))
- Support Events Administration  
(telephone: (028) 9026 1401, email: [events@ccea.org.uk](mailto:events@ccea.org.uk))
- Moderation  
(telephone: (028) 9026 1200, extension 2236, email: [moderationteam@ccea.org.uk](mailto:moderationteam@ccea.org.uk))
- Business Assurance (Complaints and Appeals)  
(telephone: (028) 9026 1244, email: [complaints@ccea.org.uk](mailto:complaints@ccea.org.uk) or [appealsmanager@ccea.org.uk](mailto:appealsmanager@ccea.org.uk)).

## Appendix

### Glossary of Terms for Controlled Assessment Regulations

Term	Definition
Component	<p>A discrete, assessable element within a controlled assessment/qualification that is not itself formally reported and for which the awarding organisation records the marks</p> <p>May contain one or more tasks</p>
Controlled assessment	A form of internal assessment where the control levels are set for each stage of the assessment process: task setting, task taking, and task marking
External assessment	A form of independent assessment in which question papers, assignments and tasks are set by the awarding organisation, taken under specified conditions (including detailed supervision and duration) and marked by the awarding organisation
Formal supervision <b>(High level of control)</b>	The candidate must be in direct sight of the supervisor at all times. Use of resources and interaction with other candidates is tightly prescribed.
Informal supervision <b>(Medium level of control)</b>	<p>Questions/Tasks are outlined, the use of resources is not tightly prescribed and assessable outcomes may be informed by group work.</p> <p>Supervision is confined to:</p> <ul style="list-style-type: none"> <li>ensuring that the contributions of individual candidates are recorded accurately; and</li> <li>ensuring that plagiarism does not take place.</li> </ul> <p>The supervisor may provide limited guidance to candidates.</p>
Limited supervision <b>(Limited level of control)</b>	Requirements are clearly specified, but some work may be completed without direct supervision and will not contribute directly to assessable outcomes.

Term	Definition
Mark scheme	<p>A scheme detailing how credit is to be awarded in relation to a particular unit, component or task</p> <p>Normally characterises acceptable answers or levels of response to questions/tasks or parts of questions/tasks and identifies the amount of credit each attracts</p> <p>May also include information about unacceptable answers</p>
Task	A discrete element of external or controlled assessment that may include examinations, assignments, practical activities and projects
Task marking	<p>Specifies the way in which credit is awarded for candidates' outcomes</p> <p>Involves the use of mark schemes and/or marking criteria produced by the awarding organisation</p>
Task setting	<p>The specification of the assessment requirements</p> <p>Tasks may be set by awarding organisations and/or teachers, as defined by subject-specific regulations. Teacher-set tasks must be developed in line with awarding organisation specified requirements.</p>
Task taking	<p>The conditions for candidate support and supervision, and the authentication of candidates' work</p> <p>Task taking may involve different parameters from those used in traditional written examinations. For example, candidates may be allowed supervised access to sources such as the internet.</p>
Unit	<p>The smallest part of a qualification that is formally reported</p> <p>May comprise separately assessed components</p>





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