

GCSE Computer Science (Cambridge OCR J277): Long term overview

GCSE Option: students will study aspects of information technology and computer science at sufficient depth to allow them to progress to higher levels of study or to a professional career.

Students will be taught to:

- develop their capability, creativity and knowledge in computer science, digital media and information technology
- develop and apply their analytical, problem-solving, design, and computational thinking skills
- understand how changes in technology affect safety, including new ways to protect their online privacy and identity, and how to identify and report a range of concerns.

Source: [DfE Computing](#)

Assessment Objective:

- AO1. Demonstrate knowledge and understanding of the key concepts and principles of Computer Science.
- AO2. Apply knowledge and understanding of key concepts and principles of Computer Science.
- AO3. Analyse problems in computational terms:
 - to make reasoned judgements
 - to design, program, evaluate and refine solutions.

Source: [Specification](#), page 34

Year 10	Focus / Topic	Knowledge & Skills	Assessment
Autumn 1	Computer systems <i>part 1/3</i>	<ul style="list-style-type: none"> ✓ Describe the role of the CPU. ✓ Explain the processes of the fetch-decode-execute cycle. 	Formative <ul style="list-style-type: none"> ✓ 'Do Now!' starters and plenaries as retrieval practice. ✓ Frequent checking of understanding. ✓ Self-assessment of class activities (recorded using green pen) ✓ Teacher feedback of coding via <i>Google Collaboratory</i> Summative to inform data entry <ul style="list-style-type: none"> ✓ Multiple Choice Quiz ✓ Exam questions from AO1 and AO2 prior to the end of half-term.
	Programming <i>part 1/6</i> Sequence	<ul style="list-style-type: none"> ✓ Determine the need for translators. ✓ Use sequence, variables, and input in Python. ✓ Design programs using a flowchart. 	
Autumn 2	Computer systems <i>part 2/3</i>	<ul style="list-style-type: none"> ✓ Determine the role of main memory and secondary storage. ✓ Construct truth tables for three input logic circuits. ✓ Write a program using assembly language (LMC). 	
	Programming <i>part 2/6</i> Selection	<ul style="list-style-type: none"> ✓ Use randomisation in programs. ✓ Work with arithmetic and logical expressions. ✓ Use selection and nested selection in Python. 	

Year 10	Focus / Topic	Knowledge & Skills	Assessment
Spring 1	Computer systems <i>part 3/3</i>	<ul style="list-style-type: none"> ✓ Construct truth tables for three input logic circuits. ✓ Write a program using assembly language (LMC). 	Formative and Summative assessment as <i>Aut1</i> and <i>Aut2</i> .
	Programming <i>part 3/6</i> Iteration	<ul style="list-style-type: none"> ✓ Use a while loop and a for loop in Python. ✓ Perform validation checks on data entry. ✓ Design programs using pseudocode. 	
Spring 2	Algorithms <i>part 1/2</i>	<ul style="list-style-type: none"> ✓ Define the terms 'decomposition', 'abstraction', and 'algorithmic thinking'. ✓ Use trace tables. 	
	Programming <i>part 4/6</i> Subroutines	<ul style="list-style-type: none"> ✓ Explain the differences between a procedure and a function. ✓ Describe scope of variables. ✓ Use functions and procedures as part of the structured approach to programming. ✓ Test a program for robustness. 	
Summer 1	Data representations <i>part 1/2</i>	<ul style="list-style-type: none"> ✓ Explain how numbers, text, images, and sound are represented using binary digits. 	Formative and Summative assessment as <i>Aut1</i> and <i>Aut2</i> .
	Programming <i>part 5/6</i> Strings and lists	<ul style="list-style-type: none"> ✓ Define the term 'graphical user interface' (GUI). ✓ Perform string handling operations. ✓ Describe the differences between a list and an array. ✓ Manipulate a list. ✓ Work with 2D lists. 	
Summer 2	Data representations <i>part 2/2</i>	<ul style="list-style-type: none"> ✓ Perform operations on binary digits. ✓ Convert between units of measurement. 	
	Algorithms <i>part 2/2</i>	<ul style="list-style-type: none"> ✓ Describe a linear and binary search. ✓ Explain the key algorithms for a bubble, merge, and insertion sort. 	

Year 11	Focus / Topic	Knowledge & Skills	Assessment
Autumn 1	Impacts of technology	<ul style="list-style-type: none"> ✓ Determine the ethical, legal, environmental, and cultural impacts of technology. 	Formative <ul style="list-style-type: none"> ✓ Do Now! starters and plenaries as retrieval practice. ✓ Frequent checking of understanding. ✓ Self-assessment of class activities (recorded using green pen) ✓ Teacher feedback of coding via <i>Google Collaboratory</i> Summative to inform data entry <ul style="list-style-type: none"> ✓ Multiple Choice Quiz ✓ Exam questions from AO1 and AO2 prior to the end of half-term.
	Programming <i>part 6/6</i> Dictionaries and data files	<ul style="list-style-type: none"> ✓ Use a record and a dictionary data structure. ✓ Access and modify external data files. ✓ Complete a complex programming project. 	
Autumn 2	Networks	<ul style="list-style-type: none"> ✓ Describe network components. ✓ Explain connectivity and distinguish between the various types. ✓ Describe the four layers of the TCP/IP model. ✓ Protect a network from threats. 	
	Programming <i>part 6/6</i> Dictionaries and data files	<ul style="list-style-type: none"> ✓ Use a record and a dictionary data structure. ✓ Access and modify external data files. ✓ Complete a complex programming project. 	
Spring 1	Security	<ul style="list-style-type: none"> ✓ Describe the various ways that users and organisations can be affected by cyberattacks. ✓ Demonstrate how organisations can prevent cyberattacks. 	Formative assessment as for Autumn term, followed by summative MCQ.
	Programming <i>part 6/6</i> Dictionaries and data files	<ul style="list-style-type: none"> ✓ Use a record and a dictionary data structure. ✓ Access and modify external data files. ✓ Complete a complex programming project. 	Formative <ul style="list-style-type: none"> ✓ Rubric to assess project-based programming work.
Spring 2	Revision	✓ Targeted consolidation and revision of Component 01	Formative <ul style="list-style-type: none"> ✓ Practice exam questions from AO1, AO2 and AO3. Self and Peer assessed and then recorded for posterity.
	Revision	✓ Targeted consolidation and revision of Component 02	
Summer 1	Revision	✓ Targeted consolidation and revision of Component 01	
	Revision	✓ Targeted consolidation and revision of Component 02	

Year 11	Focus / Topic	Knowledge & Skills	Assessment
			<p>Paper 1 — expected during the third week of May</p> <ul style="list-style-type: none"> ✓ Component 01, worth 80 marks, representing 50% of the total marks. 90 minutes. ✓ There will also be one 8-mark extended response question. This question will enable students to demonstrate the ability to construct and develop a sustained line of reasoning <p>Paper 2 — expected during the fourth week of May</p> <ul style="list-style-type: none"> ✓ Component 02, worth 80 marks, representing 50% of the total marks. 90 minutes. ✓ Section A is worth 50 marks, and assesses students' knowledge and understanding of Computer Science. Students then apply these to problems in computational terms, where they may use an algorithmic approach. ✓ Section B is worth 30 marks and assesses students' Practical Programming skills and their ability to design, write, test and refine programs.