OCR GCSE Computer Science (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	Lesson	Focus / Topic	Knowledge & Skills	Assessment
Aut1	Week A	Computer systems *part 1/3*	✓ Describe the role of the CPU. ✓ Explain the processes of the fetch-decode-execute cycle.	Formative ✓ 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 *Google Collaboratory* Summative to inform data entry ✓ Multiple Choice Quiz ✓ Exam questions from AO1 and AO2 prior to the end of half-term.
	Week B	Programming *part 1/6* Sequence	✓ Determine the need for translators. ✓ Use sequence, variables, and input in Python. ✓ Design programs using a flowchart.	
Aut2	Week A	Computer systems *part 2/3*	✓ Determine the role of main memory and secondary storage. ✓ Construct truth tables for three input logic circuits. ✓ Write a program using assembly language (LMC).	
	Week B	Programming *part 2/6* Selection	✓ Use randomisation in programs. ✓ Work with arithmetic and logical expressions. ✓ Use selection and nested selection in Python.	

Year 10	Lesson	Focus / Topic	Knowledge & Skills	Assessment
Spr1 6 weeks	Week A	Computer systems *part 3/3*	✓ Construct truth tables for three input logic circuits. ✓ Write a program using assembly language (LMC).	Formative and Summative assessment as *Aut1* and *Aut2.*
	Week B	Programming *part 3/6* Iteration	✓ Use a **while** loop and a **for** loop in Python. ✓ Perform validation checks on data entry. ✓ Design programs using pseudocode.	
Spr2	Week A	Algorithms *part 1/2*	✓ Define the terms 'decomposition', 'abstraction', and 'algorithmic thinking'. ✓ Use trace tables.	
	Week B	Programming *part 4/6* Subroutines	✓ 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.	
Sum1	Week A	Data representations *part 1/2*	✓ Explain how numbers, text, images, and sound are represented using binary digits.	Formative and Summative assessment as *Aut1* and *Aut2.*
	Week B	Programming *part 5/6* Strings and lists	✓ 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.	
Sum2	Week A	Data representations *part 2/2*	✓ Perform operations on binary digits. ✓ Convert between units of measurement.	
	Week B	Algorithms *part 2/2*	✓ Describe a linear and binary search. ✓ Explain the key algorithms for a bubble, merge, and insertion sort.	

Year 11	Lesson	Focus / Topic	Knowledge & Skills	Assessment
Aut1	Week A	Impacts of technology	✓ Determine the ethical, legal, environmental, and cultural impacts of technology.	Formative ✓ 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 *Google Collaboratory* Summative to inform data entry ✓ Multiple Choice Quiz ✓ Exam questions from AO1 and AO2 prior to the end of half-term.
	Week B	Programming *part 6/6* Dictionaries and data files	✓ Use a record and a dictionary data structure. ✓ Access and modify external data files. ✓ Complete a complex programming project.	
Aut2	Week A	Networks	✓ 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.	
	Week B	Programming *part 6/6* Dictionaries and data files	✓ Use a record and a dictionary data structure. ✓ Access and modify external data files. ✓ Complete a complex programming project.	
Spr1	Week A	Security	✓ 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.
	Week B	Programming *part 6/6* Dictionaries and data files	✓ Use a record and a dictionary data structure. ✓ Access and modify external data files. ✓ Complete a complex programming project.	Formative ✓ Rubric to assess project-based programming work.
Spr2	Week A	Revision	✓ Targeted consolidation and revision of Component 01	Formative ✓ Practice exam questions from AO1, AO2 and AO3. Self and Peer assessed and then recorded for posterity.
	Week B	Revision	✓ Targeted consolidation and revision of Component 02	
Sum1	Week A	Revision	✓ Targeted consolidation and revision of Component 01	
	Week B	Revision	✓ Targeted consolidation and revision of Component 02	

Year 11	Lesson	Focus / Topic	Knowledge & Skills	Assessment
	Paper 1 — expected during the third week of May ✓ 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 **Paper 2 —** expected during the fourth week of May ✓ 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.			