Computer Science – GCSE Curriculum Overview (Years 10–11)

Curriculum Intent

At GCSE, Computer Science builds on the foundations of computational thinking, systems knowledge and programming developed at Key Stage 3. Across the two-year course, students develop a secure understanding of how computer systems work, how data is represented and processed, and how programs are designed, written and evaluated. The curriculum is carefully sequenced to strengthen problem solving, logical thinking and technical accuracy, while preparing students effectively for GCSE assessment and further study in computing and digital technologies.

Structure of the GCSE Computer Science Course

GCSE Computer Science is taught as a coherent two-year programme, with clear progression from core system knowledge and programming fundamentals in Year 10 to application, depth and examination readiness in Year 11.

Across both years, students develop:

- understanding of computer systems, including CPU architecture, memory, storage and system software
- secure knowledge of data representation, including binary, images, sound and compression
- confidence in programming using Python, applying sequence, selection and iteration
- logical reasoning through Boolean logic and algorithmic thinking
- awareness of ethical, legal, cultural and environmental impacts of digital technology

Content is revisited and strengthened over time to support retention, accuracy and confidence.

Year 10 – Building Secure Foundations

In Year 10, students establish strong foundations in computer systems, data representation and programming.

Students study system architecture, exploring the purpose and performance of the CPU, including the fetch–decode–execute cycle, registers, cache and factors affecting CPU performance. This is followed by an in-depth study of memory and storage, comparing primary and secondary storage, virtual memory and different storage technologies.

Data representation is developed through study of binary, character sets, bitmap images and sound, including sampling and compression techniques. Alongside this, students begin programming fundamentals in Python, learning how to use variables, input and output, arithmetic operations, selection and iteration to create correct and purposeful programs.

Teaching in Year 10 prioritises accuracy, clear understanding of key concepts and the development of structured problem-solving skills, providing a secure base for more advanced application in Year 11.

Year 11 – Application, Depth and Examination Preparation

In Year 11, students apply and extend their knowledge with increasing independence and precision.

Programming skills are strengthened through further work on Python, including trace tables, data types, casting and more complex uses of selection and iteration. Students develop confidence writing, testing and refining programs and explaining how code works.

Students also study Boolean logic, learning how logic gates, truth tables and Boolean expressions are used to model decision making within computer systems. This supports deeper understanding of how hardware and software interact.

The course addresses the ethical, legal, cultural and environmental impacts of digital technology, including privacy, cybercrime, legislation, digital divide and e-waste. Students learn to apply knowledge to scenarios and evaluate the impact of technology on different stakeholders.

System software is studied in greater depth, focusing on operating systems, utility software and the differences between open source and proprietary software. This brings together understanding of hardware, software and user needs.

Spring Term, Year 11 – Consolidation and Examination Preparation

In the Spring term of Year 11, curriculum time is deliberately structured for consolidation and examination readiness. Students revisit core system concepts, data representation and programming content, practise exam-style questions and receive targeted feedback to address gaps in understanding. This phase ensures students approach the final examinations with secure knowledge, clear strategies and confidence in their ability to succeed.

Assessment and Progression

Assessment across Key Stage 4 includes regular retrieval practice, end-of-topic assessments, programming tasks, extended written responses and mock examinations. Assessment is used to identify gaps, inform teaching and support sustained progress.

By the end of Year 11, students can explain how computer systems work, write and evaluate programs using Python, analyse data representation and apply their knowledge to technical and ethical problems. GCSE Computer Science provides a strong foundation for post-16 study in computing, engineering and digital technologies and supports the development of logical thinking and problem-solving skills valued across many disciplines.