

Computer Science

A level

Examination Board: AQA

Aims of course:

To encourage candidates to develop an understanding of the fundamental principles and concepts of computer science, including abstraction, decomposition, logic, algorithms, and data representation; to gain the ability to analyse problems in computational terms and apply creative solutions using programming and system design; to understand the relationships between hardware, software, data, and communication technologies; and to appreciate the impact of computer science on society, including ethical, legal, and environmental considerations.

Programme of study

Module Name	Module Description
Programming and Algorithms	Problem solving, algorithm design and analysis, structured and object-oriented programming, recursion, computational thinking, and program development in languages such as Python or C#.
Data Structures and Representation	Understanding how data is stored and manipulated, including arrays, stacks, queues, trees, and graphs, as well as binary, hexadecimal, and floating-point representation.
Computer Systems	The structure and function of the CPU, memory, storage, networking, operating systems, and the principles of system architecture.
Theory of Computation	Finite state machines, regular expressions, and Turing machines, exploring how computation and problem-solving are formally defined.

Approaches to learning:

In Computer Science, learners study the full A-level course over two years, developing both their theoretical understanding and programming capability. The course encourages independent thinking, logical problem solving, and creativity in designing computational systems.

There are three overarching themes:

- **Computational Thinking** – applying logical reasoning and abstraction to real-world problems.
- **Programming Practice** – developing robust, maintainable, and efficient code solutions.
- **Theory and Impact** – understanding the hardware and software foundations of digital systems and their influence on society.

Assessment and learning objectives:

Learners are assessed through:

- **Paper 1:** On-screen programming and problem-solving exam (2 hours 30 minutes).
- **Paper 2:** Written exam covering theoretical topics (2 hours 30 minutes).
- **Non-Exam Assessment (NEA):** A practical programming project worth 20% of the qualification.

Learning objectives include:

- Applying computational thinking and problem-solving skills.
- Designing, writing, and testing programs.
- Demonstrating understanding of computer systems and theoretical principles.
- Evaluating the ethical and social implications of digital technologies.

Who is this course aimed at?

This course is ideal for students who enjoy logical thinking, problem solving, and understanding how computers work. It provides a strong foundation for further study in computer science, software engineering, data science, or related STEM disciplines. The qualification is highly regarded by universities and employers for careers in programming, cyber security, artificial intelligence, and systems development.

Minimum entry requirement:

Five GCSEs at grade 9-5, including Mathematics and English.

Please note: The course is dependent on numbers registering their interest to study at A-level. The subject will only run if there are sufficient student numbers.