

Computer Science

Examination board: AQA

Why should I study Computer Science?

We use computer systems for work, leisure, communication and indeed many areas of our lives. Studying Computer Science at A Level will prepare you not only for university study in this subject, but also for numerous careers. It will expand your understanding of how computers work and enable you to develop a range of valuable transferable skills, not least the ability to think logically, analytically and creatively to solve problems.

What will I learn about?

This course will enable you to develop both theoretical knowledge and practical programming skills. You will learn how to develop complex algorithms and how to implement them. Python 3 will be your main programming language, but you will also gain familiarity with other languages and study procedural, object-oriented and functional programming techniques. You will learn more about computer architecture, communications and networking, fundamentals of data representation and data structures as you develop your understanding of the theory that underpins computer systems.

Course content and assessment

The A Level comprises three units: two examinations taken in Year 13 and one unit of non-examination assessment (NEA).

Paper One

1. Fundamentals of programming
2. Fundamentals of data structures
3. Systematic approach to problem solving
4. Theory of computation
5. Fundamentals of algorithms

Paper Two

1. Fundamentals of data representation
2. Fundamentals of computer systems
3. Fundamentals of computer organisation and architecture
4. Consequences of uses of computing
5. Fundamentals of communication and networking
6. Fundamentals of databases
7. Big Data
8. Fundamentals of functional programming

NEA – the computing practical project

You will work independently on a topic that interests you, developing your practical programming skills to develop a solution to a realistic problem. You will analyse the problem, design, create, test and evaluate a solution; your technical solution will be the most important element of this. Below are a few examples of the type of problem you might choose to solve:

- A computer game
- A control system operated using a device such as a Raspberry Pi
- A website with dynamic content driven by a database back-end
- An app for a mobile phone
- A simulation of a business or scientific nature such as modelling flu epidemics
- A solution to a data processing problem for an organisation such as a membership system
- A solution to an optimisation problem such as production of a rota.

Assessment format:

Level	Component	Requirements	Duration	Marks
A Level	Paper 1 On-screen examination	Topics 1 - 5	2 hrs 30 mins	150 40% of A Level
A Level	Paper 2 Written examination	Topics 6 - 13	2 hrs 30 mins	150 40% of A Level
A Level	NEA	Solve a practical problem		75 20% of A Level

Application beyond school

Studying Computer Science will equip you with technical and transferrable skills which are highly regarded by universities and employers, skills such as the ability to apply logic creatively and to problem solve. The ability to write computer programs is a valuable skill, not just if you are looking to undertake a degree in Computer Science, but also if you are considering a degree in a range of other subjects, particularly STEM subjects such as Physics and Engineering. Computer Science can lead to a wide range of careers including as a programmer, software designer, software engineer or scientific researcher as well as in the fields of finance, business, government and teaching to name a few.