We aim to develop the knowledge and skills required for our students to play an active role in the digital world that surrounds them. Developing a firm grasp of computing concepts will help them get the best from the systems they use, solve problems when they go wrong and develop new systems when they are required.

We believe all students will find it empowering to study a combination of computational thinking, computing principles and a computational approach to problem-solving. The ability to focus this combination of academic and practical skills on a problem will help bring success in all curriculum subjects and the CAST challenge projects.

There can sometimes be confusion about the differences between IT and Computer Science. Computer Science refers to the processes used to create usable computer programmes and applications together with all the theory behind those processes. Information Technology, on the other hand, refers to the application of computer programmes to solve problems.

Computing in industry is essentially a practical subject which applies theory to design and develop products for clients. With this in mind, we have developed our curriculum to reflect modern business practice. Most learning is delivered through projects, which involve project management, teamwork, report writing and the use of industry standard tools.

Content

In Year 10 and 11 students follow the OCR Computer Science Specification. The course aims to develop students' understanding and practical application of computational thinking, problem-solving and theoretical knowledge of Computer Science.

This course material covers 11 taught sections over two components:

Component 1:Systems Architecture

Memory & Storage

Computer Networks, connections and protocols

Network Security

Systems Software

Ethical, legal, cultural and environmental impacts of digital technology

Component 2:

Algorithms

Programming fundamentals (using VB.net and SQL)

Producing robust programs

Boolean logic

Programming languages and Integrated Development Environments

Each component is assessed with a 1hr 30minute written paper.

Year 10

Autumn Term - develop understanding of algorithms and programming using Visual Basic, covering: variables, arrays, selection, subroutines/functions, for and while loops. They will work through a variety of projects including: a grade calculator; a programme using functions to calculate the area of different shapes; and a traffic light simulation. Students finish the term by using their new skills to design and develop a Dungeons and Dragons game.

Spring Term - start with several new programming constructs: string manipulation, random numbers, records and 2-dimensional arrays. We also broaden the focus of the course to include machine architecture, Boolean algebra and logic circuits. Students design and develop a 'Computer versus Human' battleships game.

Summer Term - students will complete projects which will provide them with the practical programming skills they will need for these exams and for further study of Computer Science. The projects include creating a garden design budget calculator and an encryption project. Also, we will start to focus on the theoretical aspects of the course, which will cover machine code, search and sort algorithms.

Year 11

We start with a recap of the coding constructs students have learnt in Year 10. Students will then begin learning the remaining theory needed for the course whilst building on their programming skills. It is important that students understand the context for applying the theory they are learning. With this in mind, we have developed projects and tasks that allow our learners to see how Computer Science affects the wider world:

Networking and network security. Students are given a plan for a two-story building and asked to design a secure physical network suitable for a Computer Science company. They will cover network topologies, protocols, and security.

Extending project 1. Students focus on the protocols need to run a network by developing an interactive presentation covering TCP/IP.

In the Spring term students design a series of public information posters that cover aspects of cyber security, including social engineering, malware, ethical hacking. The final task of the year is to research and create a presentation that explains the ethical, legal and environmental responsibilities that Computer Scientists have in the modern world.