KS4 Curriculum Overview

Year 10
During Year 10 students learn how computers process data and how programs are written. They study the following units.

Autumn Term
Algorithms – Pupils develop an understanding of Computational Thinking. They learn about decomposition and abstraction of a problem in order to understand how to program a solution. Pupils learn about algorithms (flow charts, pseudocode, and program code) and use sequence, selection and iteration to solve problems. Pupils also learn about variables, constants and one and two dimensional arrays. They use trace tables to be able to work out values based on different algorithms and learn to test for errors in algorithms. There is a focus on how algorithms are used in real life and pupils learn how computers search and sort data using bubble sorts, merge sorts, linear search and binary search.

Spring Term
Data – In this unit pupils learn about how data is stored in a computer as binary values. They learn about positive and negative numbers and how to convert between binary and denary, how text is stored in binary as an ASCII value, images represented in binary and how analogue sound is sampled to create a digital sound that can be stored as binary. Pupils also look at how the size of data is measured and how the file size can be compressed using lossy or lossless compression.

Summer Term
Developing Code – This unit teaches pupils to read and write high level programming code using Python. They learn how to convert flowcharts and pseudocode into program code and learn techniques to improve their programs by using indentation, comments, meaningful variable names and white space to make code easier to read and understand. Pupils are taught how to identify errors in code and how to fix them.

Year 11
During Year 11 students develop an understanding of how computers works.

Autumn Term
In this unit pupils learn about the von Neumann concept in relation to computers. They learn how memory registers store data and instructions and how this works. Pupils learn about devices that store data and the advantages and disadvantages to each. They also learn how computers are embedded in other devices. This unit also teaches pupils about the operating system of a computer and utility software that supports the maintenance of a computer system.

Spring Term
During this term pupils learn about computer networks and how they work. They learn about network protocols and network security (cyber security). Pupils also learn about the environmental, ethical and legal aspects of using a computer.

Summer Term
As pupils have their exam during this term, lesson time is about retrieval of knowledge and exam familiarity.