Computer Science at Norbury High

Overview

Students study computer science for one and a half hours per week in years 8 and 9 and one hour per week in year 7. They study a range of topics; our aim is to have a mix of practical hands-on work and theoretical discussions about specific issues. We want all our students to be confident in their understanding of both software and hardware and how they work together.

Key Stage 3

Year 7

UNIT 1: Data representation

Students look at the base 2 number system that is made up of 1 and 0 and are offered brief explanations of how computers communicate through this code.

UNIT 2: Systems security

Students learn about staying safe online and some of the more frequent attacks on computers and individuals that can occur while connected to a network.

UNIT 3: Flowol

This unit examines some of the different ways we can plan out projects for efficiency.

UNIT 4: Scratch programming

Students learn the fundamental skills needed to start coding in the Python language.

UNIT 5: My heritage and computing

After learning about some of the pioneers of computing, students are asked to research a person who has made changes to the way we live today and give a presentation to the class.

Year 8

UNIT 1: Ethical computing

This unit examines how technology has changed the job market for large numbers of people and questions the ethics of replacing people in the workplace with machines. Students are also asked to consider how large amounts of computer waste can be avoided.

UNIT 2: Small Basic

This unit provides an introduction to programming in a textual language designed to make programming easy and approachable for beginners.

UNIT 3: HTML

This unit offers a study of how basic HTML websites are made, focusing on the structure and layout of a basic website while also allowing students to add their own content.

UNIT 4: Python programming

A more in-depth study of the programming language Python is offered by this unit. Students will enhance their skills and create more complicated programs.

UNIT 5: Appshed

Students will learn how to build their own apps using a web-based app builder. It will give them all the tools and resources to build a working web app which can be used on any HTML5 compatible device.

Year 9

UNIT 1: Logic and language

In this unit, students learn about computer circuits and Boolean logic operations as well as verification and validations.

UNIT 2: Ethical computing

Students examine the effects of social media on people's lives as well as the impact of computing law and the ramifications of our digital waste.

UNIT 3: Algorithms and programming

This unit takes a more in-depth look at flowcharts with the introduction of pseudocode and an explanation of how these two forms of planning can lead to a better, more thought-out program. These are used in the creation of programs created using Python - which will lead students nicely into GCSE Computing.

UNIT 4: HTML & CSS

Students learn how to move from a basic HTML website to one made with both HTML and CSS, focusing on the structure and layout of an intermediate website while also requiring students to add their own content.

UNIT 5: Back to the future

This unit looks in depth at how technology has evolved over time and how it is likely to continue evolving. What will the future hold for the technology industry?

Key Stage 4 Computer Science

Year 10 Computer Science

Students will sit OCR GCSE Computer Science (J277) at the end of year 11. The course provides students with in-depth knowledge about software and hardware. Students also practise their programming skills using Python; this builds on skills learned at Key Stage 3.

Paper 2: Computational thinking

UNIT 1: Programming fundamentals

Programming fundamentals, variables, constants, inputs, outputs and assignments are examined in this unit. Students look at sequence, selection and iteration as well as Boolean operators, different data types and basic file handling.

UNIT 2: Programming languages and IDE

This unit covers high level and low language; differences; the purpose of IDE and its use.

UNIT 3: Producing robust programs

Students will consider defensive design considerations, input validation, and the maintainability of programs. They will explore testing and types of testing as well as looking at errors and types of test data.

UNIT 4: Boolean logic

Students will look at different Boolean logics (AND/OR/NOT) and use truth tables to complete logic diagrams.

UNIT 5: Algorithms

This unit examines the principles of computational thinking, abstraction, decomposition and algorithmic thinking; students also identify inputs, processes and outputs for a problem. Pseudocode and flowcharts are created as well as trace tables. Students learn about bubble, merge and insertion sorts as well as search algorithms.

Year 11 Computer Science

Paper 1: Computer systems

UNIT 1: Ethical, legal, cultural and environmental impact of digital technology

This unit covers ethical, cultural, legal, privacy, environmental and different laws concerning computer science.

UNIT 2: System software

Students taking this unit look at operating systems and the purpose of them, what tasks they perform, utility software and its role

UNIT 3: Computer networks, connections and protocols

This unit examines different types of networks and how they can benefit a company or organisation. Students look at the hardware required for networks and learn about differences between different set ups, with comparisons in cost and equipment required. Students take a tour of the school server room (externally) and look at protocols used on the network.

UNIT 4: Network security

Different types of attacks that can take place on a computer network are considered in this unit. Differences between these are explored and students try to find real life examples. They explore the different ways we can identify vulnerabilities and prevent attacks by use of different types of preventative methods.

UNIT 5: Memory and storage

Primary and secondary storage is explored, and the differences between the two in terms of benefits and disadvantages. Students examine different units of data storage and the conversion of binary data, binary shifts and hexadecimal equivalents. Students look at character sets and images, specifically at compression and how images are stored.

UNIT 6: Systems architecture

Students will learn about the fetch-execute cycle, and common CPU components. Von Neumann architecture (MAR/MDR/Counter, accumulator), CPU performance and embedded systems are also examined.