Introduction to Computing and ICT at Ks3 and Ks4

"Across the three technology disciplines we aim to enthuse the next generation of technologists to develop the analytical and creative skills necessary to design and create amazing solutions.

We are fortunate enough to be able to rotate students between the Food Technology, Resistant Materials and Computing disciplines which offers the opportunities for them to design, make and critique through a medium that compliments their strengths or future aspirations.

The department are confident that the curricula offered will lay the practical and theoretical foundations to inspire entrepreneurs, who remember St Martins School as the place where their ideas and passionate pursuit of creativity was stimulated."

Computing and ICT at Key Stages 1-4

The Technology department (Computing & ICT) focuses on learning numeracy and literacy skills through the appropriate use of efficient computational thinking, effective/creative data presentation.

Key stage 3

Pupils are taught to:

- design, use and evaluate computational abstractions that model the state and behaviour of real-world problems and physical systems
- understand several key algorithms that reflect computational thinking [for example, ones for sorting and searching]; use logical reasoning to compare the utility of alternative algorithms for the same problem
- use 2 or more programming languages, at least one of which is textual, to solve a variety of computational problems; make appropriate use of data structures [for example, lists, tables or arrays]; design and develop modular programs that use procedures or functions
- understand simple Boolean logic [for example, AND, OR and NOT] and some of its uses in circuits and programming; understand how numbers can be represented in binary, and be able to carry out simple operations on binary numbers [for example, binary addition, and conversion between binary and decimal]
- understand the hardware and software components that make up computer systems, and how they communicate with one another and with other systems

- understand how instructions are stored and executed within a computer system; understand how data of various types (including text, sounds and pictures) can be represented and manipulated digitally, in the form of binary digits
- undertake creative projects that involve selecting, using, and combining multiple applications, preferably across a range of devices, to achieve challenging goals, including collecting and analysing data and meeting the needs of known users
- create, reuse, revise and repurpose digital artefacts for a given audience, with attention to trustworthiness, design and usability
- understand a range of ways to use technology safely, respectfully, responsibly and securely, including protecting their online identity and privacy; recognise inappropriate content, contact and conduct, and know how to report concerns

Understands a recursive solution to a problem repeatedly applies the same solution to smaller instances of the problem. Recognises that some problems share the same characteristics and use the same algorithm to solve both (generalisation). Understands the notion of performance for algorithms and appreciates that some algorithms have different performance characteristics for the same task.
Uses nested selection statements. Appreciates the need for, and writes, custom functions including use of parameters. Knows the difference between, and uses appropriately, procedures and functions. Understands and uses negation with operators. Uses and manipulates one dimensional data structures. Detects and corrects syntactical errors.

Understands how numbers, images sounds and character sets use the same bit patterns. Performs simple operations using b t patterns e.g. binary addition. Understands the relationship between resolution and colour depth, including the effect on file size. Distinguishes between data used in a simple program (a variable) and the storage structure for that data.
Understands the von Neumann architecture in relation to the fetch-execute cycle, including how data is stored in memory. Understands the basic function and operation of location addressable memory.

Knows the names of hardware e.g. hubs, routers, switches, and the names of protocols e.g. SMTP, iMAP, POP, FTP, TCP/IP, associated with networking computer systems. Uses technologies and online services securely, and knows how to identify and report inappropriate conduct.

Justifies the choice of and independently combines and uses multiple digital devices, internet services and application software to achieve given goals. Evaluates the trustworthiness of digital content and considers the usability of visual design features when designing and creating digital artefacts for a known audience. Identifies and explains how the use of technology can impact on society. Designs criteria for users to evaluate the quality of solutions, uses the feedback from the users to identify improvements and can make appropriate refinements to the solution.

Key stage 4

Pupils are currently studying for an OCR GCSE in Information Communication Technology (ICT)

Using knowledge, skills and understanding developed in Key Stage 3 students complete two pieces of coursework and study for examinations concerning ICT in Today's World and ICT in Context.

All pupils have the opportunity to study aspects of information technology and computer science at sufficient depth to allow them to progress to higher levels of study or to a professional career.

All pupils are taught to:

- develop their capability, creativity and knowledge in computer science, digital media and information technology
- develop and apply their analytic, problem-solving, design, and computational thinking skills
- understand how changes in technology affect safety, including new ways to protect their online privacy and identity, and how to report a range of concerns

Students apply knowledge and develop advanced practical skills about the following:

Hardware:
Computer Systems, Hardware, Input Devices, Output Devices, Storage Devices, Secondary Storage
Portable Computing, Networks, Types of Network

Software & Development:
Software, Operating Systems, User Interfaces, Teams, System Life Cycle

Manipulating Data:
Data and Information, Document Processing, Graphics, Software of the Web, Spreadsheets, Presentations, Databases, Data Capture, Computer Control, Data Logging, File and Compression
Security, Online Security

Modern Living:
The Internet, Online Safety, Online Services, Communications, Entertainment, Legal Matters
Social Issues, Modern Work Issues, Working with IT Systems