Hutton Church of England Grammar School and Sixth Form

Computer Science and IT Curriculum Information, Intent and Map

Curriculum Vision

The curriculum we offer is designed to prepare our students for life outside of the classroom or for further study in our subject, by exposing them to real life or workplace problems. This is embodied in Timothy 3:17:

“That the man of God may be competent, equipped for every good work”

The Department’s Computing & ICT curriculum enable them to become decent, honest young adults who are able to make a positive contribution to their community, whether that be friends, family or the wider world. Through the development of a student’s technical knowledge they are able to pass on their understanding to those who need it and use it to help those who may be struggling in a fast developing technological world. It also ensures that each student who passes through the department has the necessary technical skills to enter into the world of employment or further study.

The Computing & ICT Department curriculum therefore covers three broad areas:

Digital literacy
Appropriate and responsible use of technology which includes online safety. The use of the Microsoft Office Suite of programs is taught discretely throughout the curriculum.

Principles of computing
Computational thinking, programming skills in different programming languages, understanding how computers work. Learning how to use computers to solve problems.

Information technology
Using ICT to analyse and solve problems and communicate and share ideas with others.

All aspects of the curriculum are delivered in a way that relates to real life situations and problems to deepen the understanding of the student as a whole.

Resilience, determination and problem solving skills should be evident in the students that experience and are engaged in our curriculum, skills which are reinforced in all aspects of school life and embodied in Colossians 3:23:

“Whatever you do work at it with all your heart”

Computing Programmes of Study: Key Stages 3 & 4 National Curriculum in England

Purpose of Study

A high-quality computing education equips pupils to use computational thinking and creativity to understand and change the world. Computing has deep links with mathematics, science, and design and technology, and provides insights into both natural and artificial systems. The core of computing is computer science, in which pupils are taught the principles of information and computation, how digital systems work, and how to put this knowledge to use through programming. Building on this knowledge and understanding, pupils are equipped to use information technology to create programs, systems and a range of content. Computing also ensures that pupils become digitally literate – able to use, and express themselves and

develop their ideas through, information and communication technology – at a level suitable for the future workplace and as active participants in a digital world.

Aims

The national curriculum for computing aims to ensure that all pupils:

- Can understand and apply the fundamental principles and concepts of computer science, including abstraction, logic, algorithms and data representation
- Can analyse problems in computational terms, and have repeated practical experience of writing computer programs in order to solve such problems
- Can evaluate and apply information technology, including new or unfamiliar technologies, analytically to solve problems
- Are responsible, competent, confident and creative users of information and communication technology.

Attainment Targets

By the end of each key stage, pupils are expected to know, apply and understand the matters, skills and processes specified in the relevant programme of study

Subject Content, Key Stage 3

Pupils should be 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; use logical reasoning to compare the utility of alternative algorithms for the same problem.
- Use two or more programming languages, at least one of which is textual, to solve a variety of computational problems; make appropriate use of data structures; design and develop modular programs that use procedures or functions.
- Understand simple Boolean logic 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.
- 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, re-use, revise and re-purpose 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.

Subject Content, Key Stage 4

All pupils must 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 should be 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 identify and report a range of concerns.

Computer Science — Key Stage 4 (GCSE)

Aims of the Course

GCSE Computer Science develops students' understanding of how computers work and how they are used to solve problems. The course builds on Key Stage 3 learning and introduces students to programming, computational thinking and problem-solving. Through studying Computer Science, students will:

- develop logical thinking and problem-solving skills;
- understand how computer systems operate and communicate;
- learn to design, write and test computer programs;
- gain insight into the role of technology in modern society.

Course Overview

Qualification
GCSE Computer Science follows the OCR specification and is studied over two years. The

course provides a strong foundation in both theoretical knowledge and practical programming skills.

What You Will Study

Students will explore a range of topics that develop both technical understanding and programming ability. These include:

- computer systems and how they work
- computational thinking, algorithms and programming
- problem-solving and logical reasoning
- designing and developing software solutions

Students will gain an understanding of what happens “behind the scenes” in technology and how software is created.

How Computer Science Is Taught

Learning takes place through a combination of theory lessons and practical programming tasks. Students will work both independently and collaboratively to design solutions and develop their coding skills. The course encourages logical thinking and structured problem-solving.

Assessment

Assessment consists of:

- Two written examinations (100%):
  - *Computer Systems*
  - *Computational Thinking, Algorithms and Programming*
- Students will also complete a practical programming project to develop their skills (not formally assessed).

Why Study Computer Science?

Computer Science equips students with highly valuable skills for the modern world, including logical reasoning and programming. It supports progression into further study and careers such as software engineering, cybersecurity, artificial intelligence, game design and data science.

Information Technology — Key Stage 4 (Cambridge National)

Aims of the Course

The Cambridge National in IT is designed for students interested in the practical and creative use of technology. The course focuses on applying IT skills to real-life situations and developing solutions to modern digital challenges. Through studying IT, students will:

- develop practical skills in creating and managing digital products;
- understand how IT systems are used in the real world;

- build confidence in solving problems using technology;
- learn to design, create and evaluate IT solutions.

Course Overview

Qualification
This course follows the OCR Cambridge National in IT and is studied over two years. It combines examined content with practical coursework, offering a more vocational approach to computing.

What You Will Study

Students complete three mandatory units, including:

- IT in the Digital World (examined unit)
- Data Manipulation using Spreadsheets (coursework)
- Using Augmented Reality to Present Information (coursework)

These units allow students to apply their learning to real-world IT scenarios and develop practical digital skills.

How IT Is Taught

The course is taught through a combination of practical projects and theoretical lessons. Students will apply their knowledge to real-life tasks such as creating spreadsheets, developing digital products and exploring emerging technologies like augmented reality.

Assessment

Assessment is split between exam and coursework:

- Examined Unit (40%) – *IT in the Digital World*
- Coursework Units (60%) – practical assignments including spreadsheets and augmented reality projects

Grades are awarded from Pass to Distinction*.

Why Study IT?

IT provides practical, transferable skills that are highly valued in education and employment. It supports progression into further study and careers in areas such as digital media, business, computing, data analysis and IT support, as well as preparing students for the modern workplace.

Curriculum Maps

Key Stage 3 Computer Science

	Year 7	**Year 8**	**Year 9**
Half Term 1	Collaborating online respectfully	Computer crime and cyber security	Spreadsheet modelling
Half Term 2	Using Media - gaining support for a cause	Modelling in Small Basic	Python programming
Half Term 3	Computational thinking	Mobile App development	Computers and Networks
Half Term 4	Programming in Scratch	Python programming	AI and Data Science
Half Term 5	Spreadsheets	Databases	Cybersecurity
Half Term 6	Create an adventure story - PowerPoint	MicroBiT programming	Multimedia project

GCSE Computer Science Curriculum Map

We follow the OCR J277 GCSE specification for Computer Science

	Year 10	Year 11
Half Term 1	Systems architecture	Algorithms
Half Term 2	Memory and storage	Programming fundamentals
Half Term 3	Computer networks, connections and protocols	Producing robust programs
Half Term 4	Network security	Boolean logic
Half Term 5	Systems software	Programming languages and Integrated Development Environments
Half Term 6	Ethical, legal, cultural and environmental impacts of digital technology	GCSE Examinations

GCSE information Technology Curriculum Map

We follow the OCR J836 Cambridge Nationals specification for IT

	Year 10	**Year 11**
Half Term 1	R060 – Data manipulation using spreadsheets Design tools, functionality, data handling and testing.	R070 Using Augmented Reality to present information Designing an augmented reality model prototype
Half Term 2	R060 – Data manipulation using spreadsheets NEA	R070 Using Augmented Reality to present information NEA
Half Term 3	R060 – Data manipulation using spreadsheets NEA	R070 Using Augmented Reality to present information NEA
Half Term 4	R050 IT in the Digital World Design tools and Human Computer Interface in everyday life	R050 IT in the Digital World Digital Communications
Half Term 5	R050 IT in the Digital World Data and testing	R050 IT in the Digital World Internet of Everything
Half Term 6	R050 IT in the Digital World Cyber-security and legislation	GCSE Examinations

Curriculum Map

Key Stage 5 – A Level

	Year 12	**Year 13**
Half Term 1	Fundamentals of programming + OOP Data Representation	Programming Project Abstract Data Structures
Half Term 2	Fundamentals of programming + OOP Data Representation	Programming Project (to finish before Xmas) Algorithms
Half Term 3	Problem Solving Hardware and Software	Skeleton program analysis Communications (Ethics)
Half Term 4	Problem Solving Computer architecture Hardware and Software	Skeleton program - practical programming and questions Internet Functional programming
Half Term 5	Regular Languages Project Databases	Skeleton - revision theory Revision
Half Term 6	Project	EXAMS