

Springwood High School Computer Science Curriculum Plan

Computer Science is taught from Years 7 to 13. As such the curriculum attempts to lead the students in a logical progression. By the end of key stage all students at Springwood High School should be good digital citizens, ensuring that they can stay safe online and are confident at using technology in a responsible manner. The curriculum allows students to develop skills that will support their future employability.

At key Stage 3, all students are allocated 2 hours a fortnight for their computer science lessons. During these lessons we will introduce students to the school network, cover a wide range of applications, ensuring coverage of the National Curriculum and building on from their learning at Key Stage 2. We will consider a number of ethical topics as the students progress, including digital footprints, the use of personal data and also AI.

As students move into Key Stage 4 they can choose one of two options, if they wish: GCSE Computer Science, or Level 2 IT in the Digital World. Both courses are allocated 5 hours a fortnight. As students progress through their academic journey their understanding of computer science increases, as they apply logic, develop more complex algorithms and develop concepts such as abstraction and decomposition.

The school also offers A level Computer Science at Key Stage 5, which students study for ten hours a fortnight in the classroom, plus additional independent study.

The skills developed at all stages of Computer Science (and IT) support directly with other subjects, and also help to improve future life and employability skills. Students should be able to use computers and digital technology efficiently, competently and safely.

At Key Stage 3 all students build digital e-portfolios based on their work. Staff in all key stages will use recall questions, targeted questioning, quizzes and spaced practice to help secure knowledge, along with summative assessments to support with checking understanding.

Curriculum Overview

KS3 Overview

2 lessons a fortnight

Year	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
7	7.1 Introduction: Passwords, Logon, Email, Bromcom, shortcuts, Printing, Hardware, Software programming concepts	7.2 E safety: Cyberbullying; social media; Netiquette; Passwords; Digital footprint; Online privacy; Reporting concerns; Deepfakes	7.3 Basic functions and formulas; IF statements; Representing data; Formatting	7.4 Cryptology & Flowol: Flowcharts; Cryptology; Barcodes; E-commerce	7.5 Introduction to programming: Sequence-Block based programming	7.6: Introduction to text-based programming: (Turtle, Kodu, Python)
8	8.1 Database: Setting up a database; Relationships; Data types; Queries; Forms; Data entry; Simple reports; Mail merge	8.2 Logical Thinking: Problem solving with flowcharts; Sorting algorithms; Debugging; Code cracking; Logic gates	8.3 Networks Hardware; Addresses & protocols; Packets; Routing; Performance; Privacy	8.4 Websites: HTML – Notepad; Language; Tags; Key commands; Hypertext Web authoring - planning; design; creation; development; testing	8.5 Data Representation Binary numbers; Data storage; Hex and binary addition; Storing text & images; Compression	8.6 Animation & Video editing: File type; Frame rate; Transition
9	9.1: Impact of ICT: Evolving technology; Impacts – environmental, privacy, cultural, ethical, legal; Cloud computing	9.2 Image Editing: Bitmaps; Pixels; Vector graphics; Layers; Editing tools; AI and images	9.3 Cybersecurity: You and your data; social engineering; Scripts, Bots, Threats	9.4 Spreadsheets: More advanced functions and formulae; Formatting; What if modelling; Vlookup; Macros	9.5 AI Rights, safety and well-being; Daily impact; Limitations; Generative AI; Chatbots; Safety protocols; Deepfakes	9.6 - Python: Binary, logic, AND OR NOT, lists; Selection; Iteration; Sequence; Arrays

Key Stage 4

GCSE Computer Science

10 Computer Science	Unit 1 Computer hardware • Computer system • Input & output devices • Specialist devices • Converging & changing technology	Unit 1 Systems Architecture • CPU • Performance • Memory • Secondary storage	Unit 1 Software • Application • User interface • Functions of OS • System utilities	Unit 1 Networks • Internet • WAN • LAN • Wireless networking • Client server • P2P networks • Standards, Protocols & Layers	Unit 1 Network Security & Systems software • Network threats • Preventing vulnerabilities • OS • Utility software	Problem solving Battle of the Bands
	Unit 2 Computational thinking • Algorithms • Program control flow • Handling data • Programming languages • IDE • Testing	Unit 2 Practical programming skills • Fundamentals • Sequence • Selection • Iteration	Unit 2 Data Representation • Units • Binary numbers • Binary arithmetic • Hexadecimal • Characters • Images • Sound • Compression	Unit 2 Algorithms • Searching • Sorting	Unit 2 Practical programming skills • Arrays • Procedures • Functions • Records • Files	

11 Computer Science	Unit 1 System security & software: • Network threats • Preventing vulnerabilities • OS • Utility software Unit 2 Algorithms • Searching • Sorting	Unit 1 Database: • Tables, records & fields • Entities & Relationships • Queries & SQL • Data independence • DBMS Unit 2 Logic & Languages • Logic diagrams • Truth tables • Defensive design • Errors & Testing • Translators • IDE	Unit 1 Impacts of digital technology • Ethical • Cultural • Environmental • Legislation • Privacy Unit 2 Computational Thinking: • Algorithms • Program control flow • Handling data • Programming languages • IDE • Testing	Revision using PLCs and Practice papers	Practice papers	External exams
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Level 2 IT in the Digital World

10 & 11 IT	R050: IT in the digital world This is assessed by taking an exam. In this unit you will learn about design and testing concepts for creating an IT solution or product, and the uses of IT in the digital world. Topics include: • Design Tools • Human Computer Interface (HCI) in everyday life • Data and testing • Cyber-security and legislation • Digital Communications • Internet of Everything (IoE).	R060: Data manipulation using spreadsheets This is assessed by completing a set assignment. In this unit you will learn how to plan, design, create, test and evaluate a data manipulation spreadsheet solution to meet client's requirements. You will be able to evaluate your solution based on the user requirements. Topics include: • Planning and designing the spreadsheet solution • Creating the spreadsheet solution • Testing the spreadsheet solution • Evaluating the spreadsheet solution.	R070: Using Augmented Reality to present Information This is assessed by completing a set assignment. In this unit you will learn how to design, create, test and review an Augmented Reality model prototype to meet a client's requirements. Topics include: • Augmented Reality (AR) • Designing an Augmented Reality (AR) model prototype • Creating an Augmented Reality (AR) model prototype • Testing and reviewing.
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Key Stage 5

A Level Computer Science

Year 12 OCR Computer Science	Unit 1 Systems & architecture: • Processor components • Processor performance • Types of Processor • Input devices • Output devices • Storage devices • Fetch decode, Execute Data types, data structures and algorithms: • Binary hexadecimal and denary • ASCII & Unicode • Binary	Unit 1 Assembly Language • FDE cycle • LMC Software Development: • Systems analysis • Writing & following algorithms • Programming Paradigms	Unit 1 Systems Software: • OS functions • Types of OS • Nature of applications • Programming languages • Assembly code Boolean Algebra: • Logic Gates • Boolean expressions • Karnaugh maps • Adders & D type flip flops	Unit 1 Networks: • Internet • Internet communication • Security & Threats • HTML & CSS • JavaScript • Search engine indexing • Client server • P2P	Unit 1 Ethical, Cultural and Moral issues: • Computers in the workplace • Artificial Intelligence • Automated decision making • Analysis of personal information • Privacy
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	arithmetic • Floating point • Bitwise manipulation • masks Unit 2 Programming techniques: • Programming basics • Selection • Iteration	Unit 2 Programming techniques: • Subroutines • Recursion • OOPS	Unit 2 Elements of Computational Thinking • parameter passing by value and reference • Identify the components of • a solution to a problem	Unit 2 Algorithms • Analysis & design Searching • bubble sort, • insertion sort • Merge sort • Quick sort Unit 2 Object-oriented languages • Tkinter • Pygame	Unit 3 Practical programming project • Analysis • Design
13 OCR Computer Science	Unit 1 Networks: • HTML & CSS • JavaScript • Search engine indexing • Client server • P2P Elements of computational	Unit 1 Exchanging Data: • Compression & Encryption • Database concepts • Relational database normalisation • SQL • Transaction processing Algorithms &	Unit 1 System Life cycle • Stages • Waterfall • Agile • RAD • Spiral • Extreme Algorithms & complexity: • Graph traversal • Optimisation	Unit 1 Legal, ethical & cultural issues: • Computers in the workplace • Artificial • Intelligence • Automated decision making • Analysis of personal information • Privacy Topic revision based on PLCs	

	thinking: • parameter passing by value and reference • Identify the components of a solution to a Problem Unit 2 Data structures: • Arrays, tuples • Queues • Lists & linked lists • Stacks • Hash tables • Graphs • Trees Unit 3 Practical Programming Project • Design	complexity: • Analysis & design • Searching • bubble sort, • insertion sort • Merge sort • Quick sort Unit 2 OOPs: • classes, • objects, • methods, • attributes, • inheritance, • encapsulation polymorphism Unit 3 Practical Programming Project • Development • Iterative testing	Unit 2 Encryption Unit 3 Practical Programming Project • Testing • Evaluation	and practice papers	
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