

Programme of Study: Computer Science



KS2 Underpinning Concepts		Year 10	Year 11	KS5 & CEIAG Opportunities	Links to SMSC
Computational Thinking Logical reasoning Programming and Algorithms Writing and debugging simple programs Using sequence, selection, and repetition and variables Data and Information Collecting, analysing, and presenting data Computer Systems and Networks Understanding how computer networks work and understanding the internet Digital Literacy Using technology safely, respectfully, and responsibly Understanding online risks and how to report concerns Creativity with Digital Tools Creating digital content (e.g. presentations, animations, music) Evaluating digital work for effective	Autumn 1	Programming Fundamentals Introduction - Demonstrate understanding of basic programming concepts including variables, data types, input/output, and operators. - Apply sequence, selection, and iteration to solve problems using a high-level programming language. - Write, test, and debug simple programs using structured code and appropriate syntax. - Explain the purpose and function of key programming constructs.	Computer Networks, Connections and Protocols - Describe the structure and function of different types of networks (LAN, WAN). - Explain the role of protocols (e.g. TCP/IP, HTTP, FTP) in data transmission. - Identify network hardware components and their functions. - Evaluate different network topologies and their advantages/disadvantages.	Academic Opportunities at KS5: - A-level Computing / Computer Science - BTEC Level 3 in Computing - BTEC Level 3 in IT - Cambridge Technicals Career Pathways: - Software Developer - Web Developer - App Developer - Data Scientist - Data Engineer - AI / Machine Learning Engineer - Cybersecurity Analyst - Penetration Tester - Cloud Architect - Network Engineer - Game Developer - Computer Vision Engineer - UI/UX Designer - IT Support Technician - Systems Analyst - Database Administrator - DevOps Engineer - Robotics Engineer - Digital Forensics Analyst - Technical Project Manager	Spiritual development: - The impact of technology on human identity and relationships (e.g. AI, virtual reality) - Ethical dilemmas in computing (e.g. surveillance, data privacy) - Creativity in programming and digital design Moral Development: - Digital ethics: plagiarism, hacking, copyright - Responsible use of technology: social media, cyberbullying - Consequences of actions in coding and data handling Social Development: - Teamwork and collaboration in coding projects - Understanding of online communities and digital citizenship - Awareness of diversity in tech and inclusion Cultural Development: - Global impact of computing: digital divide, tech innovation - Cultural representation in media and games - International laws and standards in computing
	Autumn 2	Algorithms - Understand and describe common algorithms such as linear search, binary search, bubble sort, and merge sort. - Represent algorithms using flowcharts and pseudocode. - Analyse the efficiency of algorithms in terms of time and space complexity. - Apply logical reasoning to trace and debug algorithmic solutions.	Network Security - Identify common security threats (e.g. malware, phishing, denial of service). - Explain methods of protection including firewalls, encryption, and authentication. - Evaluate the effectiveness of different security measures. - Understand the importance of cybersecurity in personal and organisational contexts.		
	Spring 1	Systems Architecture - Identify and describe the main components of the CPU and their functions (e.g. ALU, CU, registers). - Explain the fetch-decode-execute cycle and how it relates to CPU performance. - Compare different types of processors and evaluate factors affecting performance. - Understand the Von Neumann architecture and its relevance to modern computing.	Systems Software - Describe the functions of an operating system including memory management, multitasking, and user interface. - Identify types of utility software and their purposes (e.g. antivirus, backup, compression). - Evaluate the role of systems software in managing hardware and software resources. - Understand how software interacts with hardware components.		
	Spring 2	Memory and Storage - Distinguish between primary memory (RAM, ROM) and secondary storage devices. - Evaluate different types of storage (optical, magnetic, solid state) based on characteristics such as speed, cost, and capacity. - Explain how data is stored and accessed in memory and storage systems. - Understand the role of virtual memory and cache in system performance.	Ethical, legal, cultural and environmental impacts of digital technology - Discuss ethical issues related to computing such as privacy, surveillance, and digital divide. - Understand legal frameworks including the Data Protection Act and Computer Misuse Act. - Evaluate the cultural impact of technology on communication, education, and society. - Analyse the environmental effects of digital technology including e-waste and energy consumption.		
	Summer 1	Boolean Logic - Use logic gates (AND, OR, NOT) to construct and interpret truth tables. - Apply Boolean expressions to solve logical problems. - Simplify logical expressions using Boolean algebra. - Understand how logic circuits are used in computing systems.	Revision - Consolidate understanding of all topics through structured revision activities. - Apply knowledge to exam-style questions and case studies. - Demonstrate exam technique including time management and question analysis. - Identify areas for improvement and develop targeted revision strategies.		
	Summer 2	Producing Robust programs, Programming Languages and Integrated Development Environments - Implement defensive programming techniques such as validation and error handling. - Use testing strategies (e.g. black box, white box) to ensure program reliability. - Compare different programming languages and their uses. - Demonstrate proficiency in using an Integrated Development Environment (IDE) for coding and debugging	GCSE FINAL EXAMINATIONS		