Croxley Danes School : Key Stage 4 Curriculum Map

Subject: Computer Science **Exam Board OCR**

Key Concepts

Components of a Computer System	Data Representation	Networks & Networks security and Systems software	Issues	Algorithms & Logic and languages	Programming
Computer Systems The CPU Memory CPU and System performance Secondary Storage Systems Software - The OS Systems Software - Utilities	Units Binary Numbers Hexadecimal numbers Characters Storing images Storing sound Compression	LANS and WANs Hardware Client -server and Peer to peer networks Network topologies Network protocols The internet Network security threats	Ethical and Cultural Issues Environmental issues Computer legislation Open source and proprietary software	Computational Thinking Writing Algorithms-Pseudocode Writing Algorithms-Flowcharts Search algorithms Sorting algorithms	Programming-Basics Constants and variables Boolean logic Arrays File handling Storing data Searching data Sub programs Defensive design Testing, Trace tables Translators,IDE

What is the Croxley vision for this subject at Key Stage 4?

At GCSE, we follow the OCR J277 Computer Science specification, chosen for its ability to equip students with valuable thinking and programming skills that are highly sought after in today's digital economy. This course offers a deep and practical understanding of computational thinking and its application through a chosen programming language. It is structured around two key components: *Computer Systems* and *Algorithms and Programming*, both of which build on the foundations established from Years 7 to 9.Students explore a wide range of topics including CPU architecture, binary representation and logic, computational thinking, algorithm development and correction, programming techniques, networks, and cybersecurity. Assessment is through two equally weighted written examinations—one focusing on computer systems, and the other on programming, computational thinking, and algorithms.This specification encourages students to think creatively and critically, develop logical and analytical reasoning, and understand how digital systems function and interact. It also promotes an awareness of the societal impact of digital technology and requires the application of mathematical skills relevant to computer science. In addition to the assessed content, students undertake a non-examined programming project, which not only supports their Paper 2 preparation but also develops transferable skills essential for further study and employment in the tech industry.

Key Stage 4 Year Group: 10			
	Autumn Term 1	**Autumn Term 2**	**Spring Term 1**
key concept	Systems Architecture	Data Representation	Networks
Content: (Know what…)	• Computer Systems • The CPU • Memory • CPU and System performance • Secondary Storage • Systems Software - The OS • Systems Software - Utilities	• Units • Binary Numbers • Hexadecimal numbers • Characters • Storing images • Storing sound • Compression	• LANS and WANs • Hardware • Client -server and Peer to peer networks • Network topologies • Network protocols • The internet • Network security threats
Key vocabulary (5- 10 words)	Fetch-execute, CPU, ALU (Arithmetic Logic Unit), CU (control unit),Von Neumann architecture, MAR (Memory Address Register), MDR (Memory Data Register)	bit depth, sample rate, colour depth, pixel, compression, lossy, lossless	bandwidth, latency, routers, switches, DNS, Domain Name Server, Ethernet, encryption, TCP/IP, Transmission Control Protocol/Internet Protocol.
End of Half term assessment	Baseline assessment at the start of Year 10 End of topic tests	End of topic tests	End of topic tests
Planned trips / Clubs / links			

Key Stage 4 **Year Group: 10**			
	Spring 2	**Summer 1**	**Summer 2**
Content: **(Know what…)**	• Computational Thinking • Writing Algorithms- Pseudocode • Writing Algorithms- Flowcharts • Search algorithms • Sorting algorithms	• Programming-Basics • Constants and variables • Boolean logic • Arrays • File handling	• Storing data • Sub programs • Defensive design • Testing, Trace tables • Translators,IDE
Skills: **(Know how…)**	Understand arithmetic operators and variables Define the data types integer, real, Boolean, character, string Understand the principles of computational thinking including Be able to produce structure diagrams to show: Understand and use different types of search Understand the standard sort algorithms: Be able to apply each algorithm to a data set Understand flowchart symbols	Write algorithms in pseudocode involving sequences Use arithmetic operators including MOD and DIV Use string handling and conversion functions Use selection and nested selection statements Write algorithms in pseudocode involving sequence, selection and iteration Use one- and two-dimensional arrays in the design of solutions to simple problems Understand the concept of subroutines Understand and use basic file handling operations: Use SQL (Structured Query Language) statements to search for data:	
Key vocabulary (5- 10 words)	abstraction, decomposition, syntax error, logical error, binary search, linear search,	Variables, constants, operators, assignment, sequence, selection, iteration, MOD, DIV, exponentiation, casting, string manipulation, concatenation	
End of Half term assessment	End of topic tests	End of topic tests	End of topic tests
Planned trips / Clubs / links	Bletchley park		

Key Stage 4 / Year Group: 11			
	Autumn Term 1	**Autumn Term 2**	**Spring Term 1**
Content: **(Know what…)**	• Ethical and Cultural Issues • Environmental issues • Computer legislation • Open source and proprietary software		
Skills: **(know how…)**	List ethical issues, cultural issues and environmental issues in relation to a given scenario Discuss the impacts of digital technology on the wider society including ethical issues, cultural issues and environmental issues Discuss the impact of manufacture, disposal, upgrading and replacing digital technology Discuss the impact of digital technology regarding legal issues and privacy issues Describe legislation relevant to Computer Science List the clauses of the Data Protection Act and Computer Misuse Act and give examples of situations in which they are relevant Evaluate the impact of and issues related to the use of computers in society		• Understand a variety forms of attacks and threats the pose at a basic level • Identify and understand the prevention of vulnerabilities including the use of: • Explain the need for the following functions of an operating system: • Understand forms of attack and threats posed to a network . • Identify and understand the prevention of vulnerabilities • Explain the need for the following functions of an operating system • Describe the purpose and functionality of common utility software
Key vocabulary **(5- 10 words)**	Ethical, cultural, environmental, legislation, manufacture, privacy, legal, data protection, computer misuse, copyright, copyright designs and patents act, open source, proprietary, software licence		Malware, denial of service attack, SQL injection, firewalls, user, encryption, physical security, operating system, user interface, memory
End of Half term assessment	End of topic tests		End of topic tests
Planned trips / Clubs / links			

Key Stage 4/ Year Group: 11			
	Spring 2	**Summer 1**	**Summer 2**
Key Concept	Logic and Languages		
Content: **(Know what…)**	• Logic gates • Truth tables • Defensive design		
Skills: **(Know how…)**	• Construct truth tables for the following logic gates: • Understand how to make maintainable programs including: • Construct truth tables for simple logic circuits • Create, modify and interpret simple logic circuit diagrams • Describe defensive design considerations:		
Key vocabulary (5- 10 words)	syntax error, logic error, test data, normal, boundary, invalid, erroneous, test plan, AND, OR, NOT, truth table, logical operators, logic gates, logic diagrams, conjunction, disjunction, negation, high-level language, low-level language, translators, compiler, interpreter, compiler, interpreter		
End of Half term assessment	Final Mock Exam		
Planned trips / Clubs / links			