Subject Curriculum Plan – KS4

Subject	Computer Science (AQA GCSE 8525)
Year Group	9

Subject Intent	The Key Stage 3 into Key Stage 4 transition curriculum in Year 9 introduces foundational GCSE Computer Science principles. Students master fundamental computational thinking, algorithmic design, and problem-solving techniques before advancing into rigorous text-based Python programming. Through hands-on programming projects, students develop key skills in sequencing, selection, iteration, list data structures and subroutines. The year concludes with an introduction to data representation, establishing core mathematical and computational foundations required for Key Stage 4.

TERM	TOPIC & CORE LEARNING	KEY CONCEPTS
Autumn (Term 1)	**Unit 2: Programming in Python (Basics to Control Structures)** Mastery of Python programming fundamentals: Python Syntax, variable declaration, primitive Data Types, basic Operators, Selection using complex IF/ELIF/ELSE conditional statements, Condition-Controlled Loops (WHILE), and Count-Controlled Loops (FOR). Application through practical problem-solving tasks.	Python Syntax, Variables, Data Types, Selection (If/Elif/Else), Iteration (While Loops), Iteration (For Loops), Computational Logic.
SEQUENCING	*Translates Unit 1 algorithmic designs directly into working text-based code, cementing foundational programming constructs.*	

TERM	TOPIC & CORE LEARNING	KEY CONCEPTS
Spring (Term 2)	**Unit 1: Fundamentals of Algorithms** Exploration of computational thinking principles including Abstraction, Decomposition, and Algorithmic Thinking. Designing and interpreting Flowcharts and Pseudocode. Conducting algorithmic trace execution using Trace Tables. Practical analysis and implementation of Searching Algorithms (Linear and Binary Search) and Sorting Algorithms (Bubble Sort and Merge Sort).	Computational Thinking, Abstraction, Decomposition, Flowcharts, Pseudocode, Trace Tables, Linear Search, Binary Search, Bubble Sort, Merge Sort.
SEQUENCING	*Establishes formal theoretical problem-solving techniques and algorithmic design essential for programming and GCSE Paper 1.*	

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TERM	TOPIC & CORE LEARNING	KEY CONCEPTS
Summer (Term 4)	**Unit 3: Data Representations (Part 1 - Up to Hexadecimal)** Introduction to computer data representation: Binary & Decimal number systems, conversion between binary and denary numbers, and Hexadecimal Number Systems including conversions between Binary, Hexadecimal, and Decimal.	Binary, Decimal, Hexadecimal, Number Systems, Conversions, Data Representation.
SEQUENCING	*Initiates the mathematical data representation domain, providing a seamless transition into Year 10 advanced binary arithmetic.*	

Subject	Computer Science (AQA GCSE 8525)
Year Group	10

Subject Intent	The Year 10 GCSE Computer Science (AQA 8525) curriculum completes all remaining content across the specification from Unit 3 to Unit 8. Building on the algorithmic and programming foundations established in Year 9, students cover advanced binary arithmetic, media representation, hardware and CPU architecture, computer networks, cyber security, technological legislation, and relational database management with SQL. Practical programming projects (Celebrity Dogs and Noughts & Crosses) are embedded to continuously reinforce and boost students' practical coding skills.

TERM	TOPIC & CORE LEARNING	KEY CONCEPTS
Autumn (Term 1)	**Unit 3: Data Representations (Part 2 - Binary Arithmetic to Compression)** Binary Arithmetic: 8-bit binary addition, overflow errors, and logical Left/Right Bit Shifts (multiplication and division). Representing Text: ASCII and Unicode character sets. Representing Images: pixels, color depth, resolution, and image file size calculations. Representing Sound: sample rate, bit depth, duration, and sound file size. Data Compression: Lossy vs. Lossless compression, Run-Length Encoding (RLE), and Huffman Coding.	Binary Addition, Overflow, Bit Shifts (Left/Right), ASCII, Unicode, Pixels, Color Depth, Sample Rate, Bit Depth, Lossy/Lossless Compression, RLE, Huffman Coding.
SEQUENCING	*Completes Unit 3 data representation, connecting low-level data structures directly to computer hardware and software processing.*	

Subject Curriculum Plan – KS4

TERM	TOPIC & CORE LEARNING	KEY CONCEPTS
Winter (Term 2)	**Unit 4: Computer Systems & Unit 5: Computer Networks** Unit 4 Computer Systems: Input & Output devices, Boolean Logic (AND, OR, NOT gates and truth tables), System & Application Software, CPU System Architecture (Fetch-Decode-Execute cycle, ALU, Control Unit, Registers), Primary Memory (RAM, ROM, Cache, Virtual Memory), Secondary Storage, Language Classifications, and Translators (Compilers/Interpreters). Unit 5 Computer Networks: LAN/WAN, Topologies (Star, Bus, Mesh), Transmission Media, Network Security, Protocols & Layers (TCP/IP model, HTTP, HTTPS, FTP, IP/MAC addresses).	Input/Output Devices, Logic Gates, Truth Tables, Systems Software, CPU Architecture, Fetch-Execute Cycle, RAM/ROM, Secondary Storage, Compilers/Interpreters, LAN/WAN, Topologies, Protocols, TCP/IP Layers.
SEQUENCING	*Builds complete physical systems and infrastructure knowledge, connecting local hardware operation to global network communication.*	

TERM	TOPIC & CORE LEARNING	KEY CONCEPTS
Spring (Term 3)	**Unit 2: Programming Projects & Advanced Constructs** Advanced programming constructs: List Data Structures (array handling), Subroutines (functions and procedures with parameters and return values), and File Handling (reading/writing external files). Practical skill development and boosting through capstone programming projects: Celebrity Dogs and naught & crosses (Tic-Tac-Toe).	Lists / Arrays, Data Structures, Subroutines, Functions, Procedures, Parameters, File Handling (Read/Write), Programming Projects, Debugging.
SEQUENCING	*Advances basic Python constructs into modular, persistent, and structured software development required for Paper 1 programming proficiency.*	

Subject Curriculum Plan – KS4

TERM	TOPIC & CORE LEARNING	KEY CONCEPTS
Spring (Term 4)	**Unit 6: Network Security & Unit 7: Ethical, Legal & Environmental Impact** Unit 6 Network Security: Cyber security threats, Social Engineering tactics (Phishing, Shoulder Surfing, Pharming), Malware types (Viruses, Trojans, Ransomware, Spyware), Threat Detection & Prevention (Firewalls, Encryption, Penetration Testing). Unit 7 Ethical, Legal & Environmental Impact: Ethical issues, Environmental impact (e-waste, energy consumption), Legal legislation (Data Protection Act 2018 / GDPR, Computer Misuse Act 1990, Copyright Designs and Patents Act 1988). Programming Boost: Applied code reinforcement via Celebrity Dogs / Noughts & Crosses project tasks.	Cyber Security, Threats, Social Engineering, Phishing, Malware, Firewalls, Encryption, Ethical Issues, Environmental Impact, Data Protection Act, Computer Misuse Act, Copyright Act.
SEQUENCING	*Examines vulnerability mitigation, places technology within legal/ethical frameworks, and boosts core programming skills.*	

TERM	TOPIC & CORE LEARNING	KEY CONCEPTS
Summer (Term 4)	**Unit 8: Relational Databases and SQL & Programming Reinforcement** Relational Database Concepts: Tables, Records, Fields, Primary Keys, and Foreign Keys. Structured Query Language (SQL): single table queries using SELECT, WHERE, ORDER BY; data manipulation commands including INSERT, UPDATE, and DELETE; and querying across multiple tables using JOIN operations. Practical programming skill booster through integrated Noughts & Crosses project extensions.	Relational Databases, Tables, Records, Fields, Primary Keys, Foreign Keys, SQL, SELECT, WHERE, ORDER BY, INSERT, UPDATE, DELETE, Multi-table JOINs.
SEQUENCING	*Completes the entire specification content by the end of Year 10, preparing students fully for synoptic revision and exam practice in Year 11.*	

Subject	Computer Science (AQA GCSE 8525)

Subject Curriculum Plan – KS4

Year Group	11

Subject Intent	The Year 11 GCSE Computer Science (AQA 8525) curriculum runs through Autumn, Winter, and Spring terms, concluding teaching at the end of April ahead of final examinations. Year 11 focuses entirely on comprehensive revision of the entire specification (Units 1 to 8), rigorous past paper practice, algorithm trace execution, code optimization, pseudocode writing, and targeted exam technique mastery for both Paper 1 (Computational Thinking & Programming) and Paper 2 (Computing Concepts).

TERM	TOPIC & CORE LEARNING	KEY CONCEPTS
Autumn (Term 1)	**Paper 1 Synoptic Revision & Practical Programming Mastery** Comprehensive revision and exam technique practice for Paper 1: Unit 1 (Algorithms, Computational Thinking, Flowcharts, Pseudocode, Searching & Sorting) and Unit 2 (Python Programming syntax, Selection, Iteration, Lists, Subroutines, File Handling). Intensive focus on trace tables, code output prediction, writing robust algorithms, and solving exam-style programming challenges.	Paper 1 Revision, Computational Thinking, Pseudocode Writing, Trace Tables, Searching/Sorting, Python Syntax, Array Handling, Subroutine Design, Exam Technique.
SEQUENCING	*Revises and secures all Paper 1 theoretical and practical programming content early in Year 11 to maximize mock exam performance.*	

TERM	TOPIC & CORE LEARNING	KEY CONCEPTS
Winter (Term 2)	**Paper 2 Synoptic Revision (Data, Systems, Networks & Security)** Comprehensive revision and exam technique practice for Paper 2: Unit 3 (Binary Arithmetic, Bit Shifts, Hexadecimal, ASCII/Unicode, Media Representation, Compression), Unit 4 (CPU Architecture, Logic Gates, Storage, Memory, Translators), Unit 5 (Networks, Topologies, Protocols, Layers), and Unit 6 (Cyber Security, Malware, Social Engineering).	Paper 2 Revision, Binary Arithmetic, Bit Shifts, Media Representation, CPU Architecture, Logic Gates, Network Protocols, Cyber Security, Threat Prevention.
SEQUENCING	*Secures understanding across the theoretical computing concepts assessed in Paper 2.*	

Subject Curriculum Plan – KS4

TERM	TOPIC & CORE LEARNING	KEY CONCEPTS
Spring (Term 3)	**Paper 2 Final Revision (Impacts & SQL) & Full Past Paper Practice** Targeted revision of Unit 7 (Ethical, Legal & Environmental Impacts of Technology) and Unit 8 (Relational Databases & SQL syntax). Full synoptic past paper practice under timed conditions for both Paper 1 and Paper 2. Focused feedback on mark scheme requirements, key command words, time management, and eliminating common student misconceptions prior to final May examinations.	SQL Query Writing, Tech Legislation, Ethical/Environmental Impact, Past Paper Mastery, Mark Scheme Analysis, Command Words, Final Exam Preparation.
SEQUENCING	*Completes all taught content and exam technique preparation by the end of April, equipping students for top performance in GCSE examinations.*	