

# Year 10 – GCSE COMPUTER SCIENCE Programme of Study

Term	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
<b>Unit</b>	Numbers and Logic	Pseudocode, Flowcharts, Embedded Systems, Hardware	The CPU, Data Representation	Databases	Systems Software, Structured Programming	Networking
<b>Key Content</b>	<ul style="list-style-type: none"> <li>Representing numbers</li> <li>Binary, Denary and Hexadecimal conversions</li> <li>Bit shifts</li> <li>Binary addition</li> <li>Logic gates, truth tables, circuits</li> </ul>	<ul style="list-style-type: none"> <li>Understanding and representing algorithms</li> <li>Flowchart creation and logic</li> <li>Pseudocode</li> <li>Embedded vs. non-embedded systems</li> <li>Input and output devices</li> <li>Components of a system</li> </ul>	<ul style="list-style-type: none"> <li>CPU Metrics</li> <li>CPU internals</li> <li>CPU purpose</li> <li>CPU The FDE cycle</li> <li>Data encoding and compression</li> <li>Recording and representing sound</li> <li>Displaying images</li> <li>Displaying characters,</li> <li>ASCII and Unicode</li> </ul>	<ul style="list-style-type: none"> <li>Storing data</li> <li>Databases</li> <li>Relational Databases</li> <li>The RDBMS</li> <li>SQL queries, including selection from multiple tables with multiple conditional clauses</li> </ul>	<ul style="list-style-type: none"> <li>The Operating System</li> <li>Utility Software</li> <li>Application Software</li> <li>Translators, including Compilers, Interpreters and Assemblers</li> <li>Authentication vs. Authorisation</li> </ul>	<ul style="list-style-type: none"> <li>Types of networks</li> <li>Network topologies</li> <li>Network hardware</li> <li>The TCP/IP model</li> <li>The TCP/IP stack</li> <li>Common protocols</li> </ul>
<b>Milestone Assessment</b>	Numbers and Logic test	Algorithms test	CPU test * Data Representation test	RDB and SQL test	Computer Systems test *	

In addition to the content for Paper 2: Computing Concepts, significant time is given to coding, which forms the bulk of Paper 1: Computational Thinking and Programming Skills. For GCSE, pupils switch from C# and JavaScript to Python 3, and study the following coding structures and features in order to solve real-world problems.

<b>Data Types</b>	Using char, strings, ints, floats and Booleans
<b>Maths operators</b>	Using common arithmetic operators as well as modulo (remainder), understanding BIDMAS
<b>Variables, constants and scope</b>	The notion that a variable is a named location of data of a specific type in the computer's memory, that a constant can't change once set, and that scope determines where variables can be used and altered.
<b>Using and manipulating strings</b>	A string as an array (or list) of characters; methods that apply to strings, using strings in comparisons
<b>Selection</b>	Using if/else blocks to change the flow of execution of a program. (Conditional execution.)
<b>Loops</b>	Using count-controlled and condition-controlled loops; for loops as iterators over collections; for loops over ranges as iterators over number series
<b>Arrays and lists</b>	Storing multiple values within one reference. Manipulating elements. Accessing ranges of elements.
<b>Records</b>	Structures that hold values (of different types) for a given thing
<b>Subroutines</b>	The idea of reusing a block of code as a function or method, or as a procedure. The notion of returning a value from a function. Function signatures.
<b>Libraries</b>	The use of function libraries to add features to code, including, for example, date and time, random numbers, reading and writing to files.