**Subject Year Curriculum Overview – A Level Computer Science (Year 1)**

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|  | **Autumn** | | **Spring** | | **Summer** | |
|  | **Learning Cycle 1** | **Learning Cycle 2** | **Learning Cycle 3** | **Learning Cycle 4** | **Learning Cycle 5** | **Learning Cycle 6** |
| **Topic** | **Theory:**  GCSE Data representation  GCSE Boolean logic  GCSE Systems  GCSE Networking  **Practical:**  GCSE Programming concepts | **Theory:**  1.1.1. Structure and Function of the Processor  1.1.2. Types of Processor  1.1.3. Input, Output and Storage  **Practical:**  Procedural programming  Programming concepts  String handling  Subroutines | **Theory:**  1.2.1. Systems Software  1.2.2. Applications Generation  **Practical:**  File handling  IDE's  Procedural programming  Programming concepts  String handling | **Theory:**  1.2.3. Software Development  1.2.4. Types of Programming Language  1.3.3 Networks  1.3.4 Web Technologies  **Practical:**  Subroutines  File handling  IDE's | **Theory:**  1.3.1. Compression, Encryption and Hashing  1.3.2. Databases  **Practical:**  Object-oriented programming  Programming Project/NEA | **Theory:**  1.4.1. Data Types  1.4.2. Data Structures  **Practical:**  Event-driven programming  Software engineering principles  Programming project/NEA |
| **Critical Prior Knowledge** | Basic python programming, fundamentals of CS | How the CPU works.  Variety of input, output and storage devices.  Procedures and subroutines. | What the Operating Systems is and what Memory Management is for.  How Utility Software fits into system software.  File handling. | Writing basic algorithms, low level language and high level language  What a network is.  Subroutines. | What compression and encryption is.  Basic databases and SQL. | Basic binary (addition and shifts) and Hex.  Project life cycle (analysis, design, implementation, testing and evaluation) |
| **Overall Intent**  **(Big ideas and key concepts)** | Transition between GCSE, Summer work and links to the content for the two years.  Practical programming | Fetch-decode-execute cycle, how registers work, understanding of clock speed and cores.  Overall understanding of the computer system.  Practical programming | The use of software within the computer system and how it is developed.  Practical programming linked to the NEA. | How software is developed and the different phases of developed and methodologies.  Characteristics of a network, structure of the internet and web based languages.  Practical programming linked to the NEA. | Different types of compression and different types of encryption and their uses. | How binary fits into the overall computer system.  The different types of data structures. Starting the NEA |
| **Essential**  **Knowledge milestones**  **(What students must master)** | Binary addition, shifts and hex.  Logic Gates.  Network hardware.  The purpose of the CPU, RAM and storage  Programming strings, inputs, outputs and data types. | What the f-d-e is. How clock speed and cores effect the f-d-e.  What a register is used for within the CPU.  Creating a sub routine. | What the function and purpose of the OS is.  The different Translators and their characteristics.  How to use and IDE to debug a program. | The characteristics of the different methodologies and the different types of programming languages.  What a protocol is, the basics of HTML and CSS.  Creating a subroutine for a program and understanding the fundamental benefits of it. | Lossy and lossless compression. Describe encryption and the purpose.  Database terminology and SQL commands.  What objects and classes are within OOP. | Representing positive and negative values in binary. Bitwise Manipulation combined with logic gates.  Using arrays in programming.  What a data structure is. |
| **Cultural Capital** | Real world scenarios of programming using python. | Uses of different computers for different purposes and the hardware specifically for it. | How different operating systems are used for different purposes – e.g. real time use in a train station for up-to-date timetables taking into account delays of trains etc. | How project management (and methodologies) work and can be applied to any project that students could be working on in the future. | Databases sitting in the background of most websites that collect data. Being able to analyse this and extract the information for a specific purpose. | How data structures are used within social networks, transport networks and the internet. |
| **Assessment Points** | Debugging python programs, and python challenges. Quizzes on topics and challenge grid / retrieval grids. Exam questions. | Debugging python programs, and python challenges. Quizzes on topics and challenge grid / retrieval grids. Exam questions. | Debugging python programs, and python challenges. Quizzes on topics and challenge grid / retrieval grids. Exam questions. | Debugging python programs, and python challenges. Quizzes on topics and challenge grid / retrieval grids. Exam questions. | Debugging python programs, and python challenges. Quizzes on topics and challenge grid / retrieval grids. Exam questions. | Debugging python programs, and python challenges. Quizzes on topics and challenge grid / retrieval grids. Exam questions. |
| **ECC Student Characteristics** | H&S = Healthy and safe  R = **Resilient learners including activities beyond the classroom**  Car = Careers and aspirations  R&B = Respect and good behaviours  CCS = **Confidence and communication skills (including literacy, numeracy, extended writing, reading and listening**  CED = Mutual tolerance and awareness of cultures, equality and diversity | H&S = Healthy and safe  R = **Resilient learners including activities beyond the classroom**  Car = Careers and aspirations  R&B = Respect and good behaviours  CCS = Confidence and communication skills (including literacy, numeracy, extended writing, reading and listening  CED = Mutual tolerance and awareness of cultures, equality and diversity | H&S = Healthy and safe  R = **Resilient learners including activities beyond the classroom**  Car = Careers and aspirations  R&B = Respect and good behaviours  **CCS = Confidence and communication skills (including literacy, numeracy, extended writing, reading and listening**  CED = Mutual tolerance and awareness of cultures, equality and diversity | H&S = Healthy and safe  R = **Resilient learners including activities beyond the classroom**  Car = Careers and aspirations  R&B = Respect and good behaviours  CCS = Confidence and communication skills (including literacy, numeracy, extended writing, reading and listening  CED = Mutual tolerance and awareness of cultures, equality and diversity | H&S = Healthy and safe  R = **Resilient learners including activities beyond the classroom**  Car = **Careers and aspirations**  R&B = Respect and good behaviours  **CCS = Confidence and communication skills (including literacy, numeracy, extended writing, reading and listening**  CED = Mutual tolerance and awareness of cultures, equality and diversity | H&S = Healthy and safe  R = **Resilient learners including activities beyond the classroom**  Car = **Careers and aspirations**  R&B = Respect and good behaviours  **CCS = Confidence and communication skills (including literacy, numeracy, extended writing, reading and listening**  CED = Mutual tolerance and awareness of cultures, equality and diversity |
| **Connection to future learning**  **(When is this developed / revisited)?** | Practical learning will always connect to future learning. Also with the practical programming project.  Theory will link in with cycles 2, 3, 4, 5 and 6 | Practical learning will always connect to future learning. Also with the practical programming project.  Theory will link in with cycles 3, 4, 5 and 6 | Practical learning will always connect to future learning. Also with the practical programming project.  Theory will link in with cycles 4, 5 and 6 | Practical learning will always connect to future learning. Also with the practical programming project.  Theory will link in with cycles 5 and 6 | Practical learning will always connect to future learning. Also with the practical programming project.  Theory will link in with cycle 6 | Practical learning will always connect to future learning. Also with the practical programming project.  Theory will link in with year 13. |