**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 representationGCSE Boolean logicGCSE SystemsGCSE Networking**Practical:**GCSE Programming concepts | **Theory:**1.1.1. Structure and Function of the Processor1.1.2. Types of Processor1.1.3. Input, Output and Storage**Practical:** Procedural programmingProgramming conceptsString handlingSubroutines | **Theory:**1.2.1. Systems Software1.2.2. Applications Generation**Practical:**File handlingIDE'sProcedural programmingProgramming conceptsString handling | **Theory:**1.2.3. Software Development1.2.4. Types of Programming Language1.3.3 Networks1.3.4 Web Technologies**Practical:**SubroutinesFile handlingIDE's | **Theory:**1.3.1. Compression, Encryption and Hashing1.3.2. Databases**Practical:**Object-oriented programmingProgramming Project/NEA | **Theory:**1.4.1. Data Types1.4.2. Data Structures**Practical:**Event-driven programmingSoftware engineering principlesProgramming 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 languageWhat 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 storageProgramming 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. |