	Year 11	Year 10
	Master/Secure	*Embed/Develop*
Aims	Students will continue with Component 2: Theory but will look at the more challenging topics. Students will also in this year focus more on Computational Thinking and problem solving through the use of code. They will learn how break down a client brief into a system life cycle: ADITE in order to create suitable solutions	Students will start Component 1: Theory They will look at a number of topics that will allow them to develop their understanding of Computer Science. Students will also learn coding- 'Principles of programming' to a much greater depth than at KS3 for help with NEA. They will study Python as well as HTML
Core knowledge/key concepts	Component 1 Theory- Students know and understand how: 8- Architecture- CPU- components, fetch-decode execute cycle, Performance. RISC and CISC. 9- Logical operations- Logical operators, Boolean logic 10- Organisation and structure of data (2)- Hexadecimal, shift functions, binary addition, overflow. 11- Organisation and structure of data (3)- Representation of graphics and sound: storage, sampling, Metadata, Storage of characters: binary, standardised character sets. Data types: integer, Boolean, real, character and string. 12- Organisation and structure of data (4)- Data structures: Describe, design, interpret. Select, identify. File design- files and records. Data validation and verification- appropriate techniques 13- Principles of programming- Levels of computer language, software engineering 14- Program construction	Component 1 Theory- Students know and understand how: 1-Organisation and structure of data- Binary Addition Hexadecimal binary shift 2- Hardware- Input/output, Primary storage, Secondary storage, storage requirements 3- Networks - LAN/WAN, Topologies, Wired and Wireless, Network devices Routers switches, DNS. 4- Operating systems- Managing resources 5- System Software- Providing an interface Utility software 6- Security and data management- Data security. Data management, Compression, Network security, Cybersecurity. 7- Ethical, legal and environmental impacts of digital technology on wider society- Ethical, Legislation Environmental issues Component 2/programming project NEA Assessment & NEA Programming Skills: 1-Problem solving & Software Development

	Component 2/programming project NEA Assessment & NEA Programming Skills: 1-Problem solving & Software Development	
Skills and knowledge developed	Component 1 knowledge and skills to be developed in: 8- Characteristics of CPU architecture, including Von Neumann architectures. Identify and explain the role of the components of the CPU. How performance is affected by the cache, size, clock speed and number of cores. Explain the difference between RISC and CISC types of processors 9- Use AND, OR, NOT and XOR logical operators Simplify Boolean expressions using Boolean identities and rules. 10- Explain the use of hexadecimal notation as shorthand for binary numbers. Use arithmetic shift functions and explain their effect. Apply binary addition techniques. Explain the concept of overflow. 11- Explain the digital storage of graphics. Explain the digital storage and sampling of sound Describe the use of metadata in files. Describe how characters are stored as a binary number. Describe standardised character sets, including Unicode and American Standard Code for Information Interchange (ASCII Describe the concept of data types. 12- Describe, design, interpret and manipulate data structures including records, one-dimensional and two-dimensional arrays. Select, identify and justify appropriate data structures for given situations	Component 1 knowledge and skills to be developed in: 1-Representation of numbers- Use and convert between denary, binary (up to 16 bits) and hexadecimal counting systems. 2- Characteristics, (RAM), Read Only Memory (ROM), flash memory and cache memory durability, portability and speed. Magnetic, optical and solid state nibble, byte, kilobyte data capacity, GPU, sound cards and motherboards 3- Characteristics of networks LAN and WAN. topologies, including ring, star, bus and mesh, and their advantages and disadvantages Explain the importance of connectivity, both wired and wireless. 4- Describe the purpose and functionality of the operating 5- System in managing resources, including peripherals, processes, memory and backing store. interface Describe the purpose and functionality of the operating system in providing a user interface. Utility software Explain the purpose and functionality of a range of utility software 6- Dangers, methods that protect the security of data including access levels, suitable passwords for access and encryption techniques backups and generations of files- archiving files lossy and lossless data compression algorithms are used. Network security 7- Impacts of digital technology, privacy and cybersecurity, conforming to professional standards Current legislation impacts on security, privacy, data protection and freedom of information. Environmental impacts wider society

Design files and records appropriate for a particular application. Explain and use appropriate techniques for data validation and verification. Design algorithms and programming routines that validate and verify data 13- purpose of high-level and low-level languages situations that require the use of a high-level or a low-level role of Integrated Development Environment (IDE) debugging programs 14- Compilers, interpreters and assemblers- Describe the purpose and give examples of the use of compilers, interpreters and assemblers. Explain the principal stages involved in the compilation process: lexical analysis, symbol table construction, syntax analysis, semantic analysis, code generation and optimisation. Describe and give examples of programing errors Component 2/programming project NEA Assessment & NEA Programming: 1-Problem solving & Software Development NEA completion Feb 2021 Exam Written paper May 2021 Exam Written paper May 2021	Component 2/programming project NEA Assessment & NEA Programming Skills: 1-Algorithms and programming constructs / Variables identifiers/ Mathematical operations
Wider curriculum links to CC/SMSC/PD and CEIAG	Learn how to revise using different methods Practice exam questions. Know how to retain information To understand other people's opinions Understand how laws support the people who work in technology sectors Understand how laws impact on technology Use good communication skills with others Research into wider and diverse cultural ideas.

	Developing a personal voice and responding to other's opinions and ideas Demonstrating initiative, self- motivation and resilience Sensitivity towards feelings and opinions of others Communication of ideas and opinions to others – being able to discuss them. Developing an enquiring and questioning mindset Understanding the importance and role of Technology in society