Year 11 Topics

In year 10 we teach the following topics over the course of the year. Each topic draws on prior learning from previous years and builds on understanding from the KS3 programme of study. Each topic develops and deepens the Core knowledge that will underpin all areas of the curriculum at KS4 and KS5.

Topic	Rationale	Knowledge acquisition	Key vocabulary	Skills and enrichment
NEA	The Programming Project provides an opportunity for learners to demonstrate their practical ability in the skills outlined in the specification, supporting the learning of Components 01 and 02.	Analyse problems in computational terms: - to make reasoned judgements - to design, program, evaluate and refine solutions	• Programming Development • Computational thinking • Programming techniques • Analysis • Design • Development • Testing • evaluation • conclusions	Independence Evaluation Analysis Literacy Oracy Research skills
1.4 Wired & Wireless Networks	This component will introduce learners to the fundamentals of networking	•types of networks: LAN (Local Area Network), WAN (Wide Area Network) • factors that affect the performance of networks • the different roles of computers in a client-server and a peer-to-peer network • the hardware needed to connect stand-alone computers into a Local Area Network: wireless access points routers/switches	• Network • LAN • WAN • Client-server • Peer-to-peer	Independence Evaluation Analysis Literacy Oracy Research skills Note taking skills

		NIC (Network Interface Controller/Card) transmission media • the internet as a worldwide collection of computer networks: DNS (Domain Name Server) hosting the cloud • the concept of virtual networks.		
1.5 Network Topologies, Protocols & Layers	This component will introduce learners to the networking protocols and networking design	• star and mesh network topologies • Wifi: frequency and channels •encryption • Ethernet • the uses of IP addressing, MAC addressing, and protocols including: TCP/IP (Transmission Control Protocol/Internet Protocol), HTTP (Hyper Text Transfer Protocol), HTTPS (Hyper Text Transfer Protocol Secure), FTP (File Transfer Protocol), POP (Post Office Protocol), IMAP (Internet Message Access Protocol), SMTP (Simple Mail Transfer Protocol) • the concept of layers • packet switching	• Topology • Mesh Network • Star Network • WiFi • Encryption • Ethernet	Independence Evaluation Analysis Literacy Oracy Research skills Note taking skills
2.5 Translators and facilities of languages	This component will introduce learners to the different levels of programming languages	• Characteristics and purpose of different levels of programming language, including low level languages • the purpose of translators • the characteristics of an assemble, a compiler and an interpreter • common tools and facilities in an integrated development environment	• Low Level Language • High Level Language • 1st Generation Language • Language Translator • Assembler • Machine Code • Assembly Language • 2nd Generation Language • 3rd Generation Language	Independence Evaluation Analysis Literacy Oracy Research skills Note taking skills

		(IDE): editors, error diagnostic, run-time environment, translators	• Compiler • Interpreter • Device Driver • Debug	
1.6 Systems Security	This component will introduce learners to the system security – both software and hardware	• forms of attack • threats posed to networks: malware, phishing, people as the 'weak point' in secure systems (social engineering), brute force attacks, denial of service attacks, data interception and concept of SQL injection, poor network policy • identifying and preventing vulnerabilities, penetration testing network forensics, network policies, anti-malware software, firewalls, user access levels, passwords, encryption	• Malware • Viruses • Worms • Trojan Horses • Phishing • Social Engineering • Data Interception Network Policies	Independence Evaluation Analysis Literacy Oracy Research skills Note taking skills
1.8 Ethical, legal, cultural and environmental concerns	This component will introduce learners to the impact of computing on society	• how to investigate and discuss Computer Science technologies while considering: ethical issues, legal issues, cultural issues, environmental issues, privacy issues • how key stakeholders are affected by technologies • environmental impact of Computer Science • cultural implications of Computer Science • open source vs proprietary software • legislation relevant to Computer Science: The Data Protection Act 1999, Computer Misuse Act 1990, Copyright Designs and Patents Act 1988, Creative	• Stakeholder • Ethics • Legislation • Cultural • Environmental • Privacy	Independence Evaluation Analysis Literacy Oracy Research skills Note taking skills

		Commons Licensing, Freedom of Information Act 2000		
2.2 Programming Techniques	This component will introduce learners to the more complex programming techniques	the use of variables, constants, operators, inputs, outputs and assignments • the use of the three basic programming constructs used to control the flow of a program: sequence, selection, iteration (count and condition controlled loops) • the use of basic string manipulation • the use of basic file handling operations: open, read, write, close • the use of records to store data • the use of SQL to search for data • the use of arrays (or equivalent) when solving problems, including both one and two dimensional arrays • how to use sub programs (functions and procedures) to produce structured code• the use of data types: integer, real, Boolean, character and string casting • the common arithmetic operators • the common Boolean operators	• Input • Output • Assignment • Pseudocode • Flowchart • Identifier • Variable • CONSTANT • Concatenation • RAM • Memory locations • Arithmetic • Boolean • String • Concatenate (join) • Substring • Delimiter • SPLIT • Left • Mid • Right • Addition • Subtraction • Division modular division • integer division • negation • AND • OR • NOT • Greater than	Independence Evaluation Analysis Literacy Oracy Research skills Note taking skills

			• Less than • Equal • not equal • Modulus • Quotient • Exponentiation	