COMPUTER SCIENCE YEAR 10

Fundamentals of Algorithms	Programming	Fundamentals of Data Representation	Fundamentals of computer networks	Ethical, legal & Environmental impacts of digital technology on wider society, including issues of privacy	Fundamentals of cyber security	Computer systems
OVERVIEW – Know the elements required to create an effective and efficient algorithm. Decomposition and abstraction, looking at specific algorithms for sorting and searching, including the bubble and merge sorts. Efficiency of algorithms on the same data set.	**OVERVIEW** – Translating pseudocode solutions to programme code and testing them. Know data types and arithmetic operations. Sequence, selection and iteration.	**OVERVIEW** – Know how numbers can represented in Binary, HEX, ASCII and denary. Understand that computers transfer data in the form of binary and can demonstrate how to use conversations between the different systems. Understand the relationship between resolutions, including the effect on file size and the need for data compression.	**OVERVIEW** –Compare wired and wireless networks, including PANs, LANs, WANs and network topologies. Know common networking and internet protocols with reference to TCP/IP protocol stack and the concept layers. Know and understand network security including encryption and MAC address filtering and develop and consolidate an understanding of each concept.	**OVERVIEW** – Understand the cultural implications of digital technology and algorithms. Consider the ethical and environmental impact. Know and understand government interventions and security, copyright and licensing (including that of algorithms).	**OVERVIEW** – Examine and understand the threats to, and vulnerabilities of networks, computers and programs including the concept of social engineering. Know and understand the various forms of malicious code and its effects and know how to detect and prevent cyber security threats.	**OVERVIEW** – Know and understand software classifications including the functions of the operating systems. Know and understand systems architecture and factors that affect the performance. Know and understand the many forms of memory available in modern computers including RAM, ROM and cache along with secondary storage devices and their uses. Know and understand Boolean logic and embedded systems.
Lesson 1 – Algorithms, decomposition and abstraction **Lesson 2 – Developing algorithms using flowcharts** **Lesson 3 – Developing algorithms using pseudocode** **Lesson 4 – Searching algorithms** **Lesson 5 – Sorting algorithms** **Lesson 6 - Assessment** **From PG Online – Unit 1 Fundementals of algorithms**	**Lesson 1 – Data types and operations** **Lesson 2 – Sequence and selection** **Lesson 3 – Iteration** **Lesson 4 – Arrays** **Lesson 5 – Records and files** **Lesson 7 - Assessment** **Lesson 8 – Procedures and functions** **Lesson 9 – Validation and Authentication** **Lesson 10 – Determining the Purpose of algorithms** **Lesson 11 – Errors and testing** **Lesson 12 – Classification of programming languages** **Lesson 13 – Assessment** **From PG Online – Unit 2a and unit 2b Programming**	**Lesson 1 – Storage units and binary numbers** **Lesson 2 – Binary arithmetic and hexadecimal** **Lesson 3 – ASCII and Unicode** **Lesson 4 – Images** **Lesson 5 – Sound** **Lesson 6 – Compression** **Lesson 7 - Assessment** **From PG Online – Unit 3 Fundamentals of data representation**	**Lesson 1 – Wired and wireless networks** **Lesson 2 – Network topologies and transmission** **Lesson 3 – Network security** **Lesson 4 – Protocols and layers** **Lesson 5 - Assessment** **From PG Online – Unit 5 Fundamentals of computer networks**	**Lesson 1 – Ethical issues** **Lesson 2 – Digital technology in society** **Lesson 3 – Legislation and privacy** **Lesson 4 - Assessment** **From PG Online – Unit 7 Impacts of digital technology**	**Lesson 1 – Social engineering** **Lesson 2 – Malicious code** **Lesson 3 – Detecting and preventing cyber security threats** **Lesson 4 - Assessment** **From PG Online – Unit 6 Fundamentals of cyber security**	**Lesson 1 – Boolean logic** **Lesson 2 – Application and system software** **Lesson 3 – Systems architecture** **Lesson 4 – The CPU and Fetch-Execute cycle** **Lesson 5 – Memory** **Lesson 6 – Secondary storage** **Lesson 7 - Assessment** **From PG Online – Unit 4 Computer systems**