SUBJECT: A-Level Computer Science

NESTON HIGH SCHOOL

KS5 CURRICULUM PLAN 2020-21

KS4 Knowledge and key skills

YEAR 12	AUTUMN 1	AUTUMN 2	SPRING 1	SPRING 2	SUMMER 1	SUMMER 2
TOPIC	**Data types, web technologies, introduction to programming, programming techniques, data structures,**	**Types of processor, structure and function of the processor, operating systems, input, output and storage, networks, software development,**	**Computer related legislation, Boolean algebra, ethical, moral and cultural issues,**	**Logical thinking, abstraction, procedural thinking,**	**Thinking ahead, databases,**	**Applications generation, algorithms,**
Knowledge	The use of programming languages to create various applications depending on their purpose. Understand how web pages are developed, the mark-up languages involved with deciding the structure and design of a website and the use of JavaScript to program the behaviour of a website. Know the different data structures and methods to traverse them. Know the different data types and the calculations to perform to convert them into another form.	How the CPU works and different types of CPUs and their uses. Recognize machine language commands using Little Man Computer. Learn about the various software development methodologies and testing strategies software developers can use. Learn about the different types of networks, their protocols for communicating across the internet and security implications. Learn about different types of operating systems and how they manage access to memory and the CPU. Recognize suitable input, output and storage devices for a given situation.	Learn about different legislation that affects computer use in this country. Examine aspects of computer use in different ethical, moral and cultural scenarios to form an educated opinion.	Learn about techniques in solving computational problems, including logical, procedural and abstraction methods.	Learn about techniques in solving computational problems, including thinking ahead methods. Understand the structure of a database the relationships that form large database systems.	Recognizing the characteristics of different searching and sorting algorithms
Skills	Develop programming skills in Java and JavaScript. Develop web development skills using HTML and CSS. Convert data types, such as binary, decimal and hexadecimal. Perform binary calculations. Navigate through different data structures.	Identify operating systems by their behaviour. Identify types of processors by their primary purpose. Write low level CPU programs in Little Man Computer.	Skills in debating arguments for and against various ethical/moral/cultural issues in computing.	Solve computational problems using logical, procedural and abstraction techniques.	Solve computations problems using thinking ahead techniques. Write SQL commands to manage a database.	Write various search and sort algorithms. Write algorithms to solve a given problem. Use various pieces of software application programs.
Key Vocab	**HTML, CSS, JavaScript, Binary, Hexadecimal, Floating Point, Exponent, Mantissa, Decimal**	**Little Man Computer, Reduced Instruction Set Computer, Complex Instruction Set Computer, Arithmetic Control Unit, Processor, arithmetic logic Unit, Transmission Control Protocol Internet Protocol, Packet switching, Star, Mesh, Bus, Router, Gateway**	**Regulatory Investigation Powers Act, Computer Misuses Act, Data Protection Act, Copyright, Designed and Patents Act.**	**Logical, Procedural, Abstraction, Decomposition**	**SQL, Databases, Relationships,**	**Linear search, Binary search and sort, Bubble sort, Merge sort, Quick sort**

YEAR 13	SUMMER 2	SUMMER 1	SPRING 2	SPRING 1	AUTUMN 2	AUTUMN 1
TOPIC	**STUDY LEAVE**	**Thinking ahead, procedural thinking, logical thinking, concurrent thinking, programming techniques, computational methods, algorithms**	**Programming project ongoing, computer related legislation, ethical, moral and cultural issues, abstraction**	**Programming project ongoing, web technologies, data types, data structures, Boolean algebra,**	**Programming project ongoing, compression, encryption and hashing, databases, networks, input, output and storage, systems software, applications generation,**	**Programming project, structure and functions of the processor, types of processor, software development, object orientated programming,**

Knowledge		Build on knowledge from AS: Understanding the use of programming languages to create various applications depending on their purpose. Learning about techniques in solving computational problems. Understanding and recognizing the characteristics of different searching and sorting algorithms.	Build on knowledge from AS: Learning about different legislation that affects computer use in this country. Examine aspects of computer use in different ethical, moral and cultural scenarios to form an educated opinion. Learning about abstraction techniques to solve a computational problem.	Understand the page rank algorithm and how internet searches work. Build on knowledge from AS: understanding how web pages are developed, the mark-up languages involved with deciding the structure and design of a website and the use of JavaScript to program the behaviour of a website.	Different compression techniques used to transmit or display data across the internet. Understand encryption techniques used to encrypt and decrypt data, including hashing methods. Learn about threats to a network and the hardware involved in setting up a secure network. Build on knowledge from AS: Understanding the structure of a database the relationships that form large database systems. Learning about the different types of networks, their protocols for communication across the internet and security implications. Learning about different types of operating systems and how they manage access to memory and the CPU.. Recognizing suitable input, output and storage devices for a given situation.	Learn the aspects of object orientated programming and apply these to a OOP programming language. Build on knowledge from AS: Understanding how the CPU works and different types of CPUs and their uses. Recognizing machine language commands using Little Man Computer.. Learning about the various software development methodologies and testing strategies software developers can use.	
Skills		Build on existing skills from AS: Solving computational problems using logical, procedural, thinking ahead and concurrently, and abstraction techniques. Writing various search and sort algorithms. Writing algorithms to solve a given problem.	Develop a prototype based on a given criteria from a stakeholder. Develop skills from AS: Debating arguments for and against various ethical/moral/cultural issues in computing.	Develop a prototype based on a given criteria from a stakeholder.. Build on existing skills from AS: Web development skills using HTML and CSS. Converting data types, such as binary, decimal and hexadecimal. Performing binary calculations. Navigating through different data structures.	Develop a prototype based on a given criteria from a stakeholder. Build on existing skills from AS: Use various pieces of software application programs. Identifying operating systems by their behaviour. Writing SQL commands to manage a database.	Develop a prototype based on a given criteria from a stakeholder. Build on existing skills from AS: programming skills in Java and JavaScript. Identifying types of processors by their primary purpose. Writing low level CPU programs in Little Man Computer.	
Key Vocab		**Dijkstra's algorithm, A* algorithm, Linear search, Binary search and sort, Bubble sort, Merge sort, Quick sort, Pipelining, Backtracking, Heuristics, Decomposition, Concurrently**	**Regulatory Investigation Powers Act, Computer Misuses Act, Data Protection Act, Copyright, Designed and Patents Act., Abstraction**	**HTML, CSS, JavaScript, Binary, Hexadecimal, Floating Point, Exponent, Mantissa, Decimal**	**SQL, Databases, Relationships, Lossless, Lossy, Run Length Encoding, Dictionary Encoding, Asymmetric Encryption, Symmetric encryption, page rank Algorithm. Transmission Control Protocol Internet Protocol, Packet switching, Star, Mesh, Bus, Router, Gateway, Trojans, Spyware, Ransomware, Malware, Firewall**	**Little Man Computer, Reduced Instruction Set Computer, Complex Instruction Set Computer, Arithmetic Control Unit, Processor, arithmetic logic Unit**	

Key Knowledge Transfer