OCR GCSE Computer Science Curriculum Progression Map – Year 10

Paper One: Computer Systems and Programming

Computer Science Education Vision at ELA:	At East Leake Academy we believe that our students should have the opportunity to follow a Computing curriculum that prepares them for life in modern Britain and take advantage of opportunity this can offer them in both Britain and the wider world. Good quality IT skills enable student to engage positively within the modern work place, while Computer Science skills enables students to take an active part in the design, development and creation of new technologies to be used in the world in which they live. The core to the subject is the understanding of how technology works, can be developed and utilised, and we draw and extend understanding from a range of other subjects outside of IT and Computing including DT, Graphics, Maths, Science and PHSE and embed clear and high quality literacy and numeracy skills through software development, problem solving and evaluation skills. We provide a broad range of skills and experiences at KS3 which are then further developed as students enter KS4 and then extended to KS5.
Paper 1: Computer Systems	Introduces students to the central processing unit (CPU), computer memory and storage, data representation, wired and wireless networks, network topologies, system security and system software. It also looks at ethical, legal, cultural and environmental concerns associated with computer science.

Time period	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Key Domains of Knowledge	**1.1 Systems architecture**	**1.2 Memory and storage**	**1.3 Computer networks, connections and protocols**	**1.4 Network security**	**1.5 Systems Software**	**1.6 Ethical, legal, cultural and environmental impact of technology**
Topics	**1. Primary storage** **2. Secondary storage** **3. Units** **4. Data storage** **5. Compression**	**1. Architecture of the CPU** **2. CPU performance** **3. Embedded systems**	**1. Networks and topologies** **2. Wired and wireless networks, protocols and layers**	**1. Threats to computer systems and networks** **2. Identifying and preventing vulnerabilities**	**1. Operating systems** **2. Utility software**	**1. Ethical, legal, cultural and environmental impact**

Crucial learning content	a) The need for primary and secondary storage b) The difference between RAM and ROM c) The purpose of ROM/RAM is a computer system d) Virtual memory e) Common types of storage f) Suitable storage devices for a specified scenario g) Units of data storage h) Need for data to be converted to binary i) Numbers j) Characters k) Images l) Sound m) Need and types of compression	a) The purpose of the CPU (FDE) b) Common CPU components and their function - ALU - CU - Cache - Registers c) Von Neumann architecture - MAR - MDR - Program Counter - Accumulator d) How common characteristics of the CPU affect performance: - Clock speed - Cache size - Number of cores e) The purpose and characteristics of embedded systems	a) Types of networks – LAN and WAN b) Factors that affect the performance of networks c) Client-server and peer-to-peer networks d) Hardware needed for a LAN e) Star and mesh network topologies f) Modes of connection (wired, wireless) g) Encryption h) IP and MAC addressing i) Common protocols j) Concept of layers	a) Forms of attack: - Malware - Social engineering - Brute force - Denial of service - Data interception and theft - SQL injections b) Common prevention methods: - Penetration testing - Anti-malware software - Firewalls - User access levels - Passwords - Encryption - Physical security	a) The purpose and functionality of operating systems: - User interface - Memory management and multitasking - Peripheral managements and drivers - File management b) The purpose and functionality of utility software c) Utility system software: - Encryption software - Defragmentation - Data compression	a) Impacts of digital technology on wider society including: - Ethical issues - Legal issues - Cultural issues - Environmental issues - Privacy issues b) Legislation relevant to Computer Science: - The Data Protection Act 2018 - Computer Misuse Act 1990 - Copyright Designs and Patents Act 1988 - Software licences

Programming	Students are to be given the opportunity to undertake a programming task(s) during their course of study which allows them to develop their skills to design, write, test and refine programs using a high-level programming language. Students will be assessed on these skills during the written examinations, in particular component 02 (section B). Students will spend one lesson per week programming in Python. Over the year they will work through the following concepts: - Sequence, selection and iteration - Data types - Functions and procedures - Validation					
Examination skills	**AO1 Demonstrate knowledge and understanding** of the key concepts and principles of Computer Science **AO2 Apply knowledge and understanding** of key concepts and principles of Computer Science **AO3 Analyse problems in computational terms** to make reasoned judgements and to design, program, evaluate and refine solutions					
End Point	By the end of Autumn Term 1 students should be able to recognise that computers only process binary be able to be able to convert between binary, denary and hex. Students should also understand how computers use binary to represent images and sound. Students should understand the differences between primary and secondary storage, and be able to identify a suitable storage device for a specific scenario.	By the end of Autumn Term 2 students should understand the concept of the FDE cycles (Von Neumann architecture) and name the components involved. They should also be able to identify factors that affect the speed of the CPU and be able to compare machines with different specifications and state which one will run faster. They will also be able to define an embedded system and identify devices within the home.	By the end of Spring Term 1 students should be able to draw different topologies with their associated hardware. They should also be able to describe the differences between the two types of networks and how data is sent across them.	By the end of Spring Term 2 students should be able to identify difference cybersecurity threats and how to deal with them. They should appreciate these are now part of our daily life, as well as an emerging international threat. Students should understand how these can be avoided, both on an individual and a global level.	By the end of Summer Term 1 students should be able to identify the role of the operating system and describe different utility functions. Students be able to discuss a range of user interfaces and identify why certain ones are used in certain situations and why.	By the end of the Summer Term 2 students will have an understanding of global tech issues and their impact on society. Students will be able to discuss relevant laws and identify which ones should be referred to in a given scenario. They will understand how to score marks on a long written examination question and will have practiced this skill.