Key Stage 4: Year 10 Computer Science

Overall Curriculum Goals

- Understand, use, explain, determine and compare key algorithms and algorithmic terms
- Use, understand, know and be familiar with the key programming constructs and concepts
- Understand and use the various number bases including converting between them, including converting between units of information
- Understand the digital representation of sound and images – be able to calculate file sizes.
- Be able to explain the current ethical, legal and environmental impacts and risks of digital technology society including data privacy issues.
- Be familiar with the difference between hardware, including Boolean logic, and software and the different types of software
- Define computer networks. Be familiar with hardware, protocols and network security. Discus benefits and risks.

Half Term 1	Half Term 2	Half Term 3	Half Term 4	Half Term 5	Half Term 6
Algorithms and Data Representation 1 • Understanding Algorithms • Using pseudocode • Dry Runs and Trace Tables • Purpose of simple algorithms • Number bases • Binary Arithmetic • Conversion between bases • Character encoding • Links to Programming	**Algorithms and Data Representation 2** • Searching algorithms • Efficiency of algorithms • Sorting Algorithms • Representing images • Representing sound • Data compression • Links to Programming	**Hardware and Software** • Hardware and software • Software Classification • Systems Architecture • Boolean Logic	**Ethical Legal and Environmental** • GDPR • Copyright Design and Patents Act • Computer Misuse Act • Recycling • Information Poverty • Inclusivity	**Computer Networks** • Understand what a computer network is • Understand risks and benefits • Understand network topologies • Define Network protocols • Understand different methods of network security	**Programming and Project Practice** • Structured Programming techniques • Robust and secure programming • Relational and Boolean operations • Definite and indefinite iteration
Key Vocabulary/Concepts/Ideas	**Key Vocabulary/Concepts/Ideas**	**Key Vocabulary/Concepts/Ideas**	**Key Vocabulary/Concepts/Ideas**	**Key Vocabulary/Concepts/Ideas**	**Key Vocabulary/Concepts/Ideas**
Decomposition Abstraction Binary Denary Hexadecimal ASCII Unicode Data types	Linear search Binary search Bubble sort Merge sort Space and time efficiency Definite and indefinite loops	System software Applications Operating System Utilities Processor RAM and ROM Volatile and non-volatile Cache	Cyber security Mobile technologies Wireless networking Cloud storage Cracking Hacking Wearable technologies Computer based implants	PAN LAN WAN Topology Star Bus TCP, UDP, HTTP, HTTPS, SMTP, IMAP Authentication Encryption	Selection and nested iteration structures Meaningful Identifiers Not, And and Or Concatenation
CIAG	**CIAG**	**CIAG**	**CIAG**	**CIAG**	**CIAG**
Careers in cyber security	**BEBRAS Challenge**	**NCSC Competition** **Alan Turing Cryptography Competition** **Perse coding challenge**	**Oxford Computing Challenge**	**Tour of the school's server rooms and ancillary equipment.**	**Discussions re: programming careers and salaries.**

Key Stage 4: Year 11 Computer Science

Overall Curriculum Goals

- Understand and define cyber security threats and the methods to prevent and detect them
- Complete Programming Project
- Revision
- Exam preparation
- Use, understand, know and be familiar with the key programming constructs and concepts

Half Term 1	Half Term 2	Half Term 3	Half Term 4	Half Term 5	Half Term 6
Databases and SQL • **Explain the concept of a database** • **Explain the concept of a relational database** • **Be able to use SQL to retrieve data from a relational database**	**Project** • Pupils work on their programming project drawing on skills learnt in the course.	**Cyber /Cyber security** • Introduction to cyber and cyber security issues • Cyber crime • Cyber in sport • Data analysis • Password recovery	**Revision** • RAG Sheets • Group Work test • Individual tests	**Exam Preparation** • Exam technique • PPQ's	
Key Vocabulary/Concepts/Ideas	**Key Vocabulary/Concepts/Ideas**	**Key Vocabulary/Concepts/Ideas**	**Key Vocabulary/Concepts/Ideas**	**Key Vocabulary/Concepts/Ideas**	**Key Vocabulary/Concepts/Ideas**
Table Record Field Primary Key Foreign Key Elimination Consistency Redundancy SELECT FROM WHERE INSERT UPDATE ORDER BY…ASC | DESC	Validation Normal Extreme Erroneous	Malware Hacker Cryptography Social engineering – blagging, phishing, pharming, shouldering. Big data Personal information Cyber DDoS Open Source Data analysis/mining Deep web vs dark web			
CIAG	**CIAG**	**CIAG**	**CIAG**	**CIAG**	**CIAG**
		NCSC Competition **Alan Turing Cryptography Competition** **Perse coding challenge**	**Oxford Computing Challenge**		