

Computer Science Department - Year 11

 Shirley High Curriculum Map	<i>The Proficient Computer Scientist will enhance their knowledge and skills focusing on practical programming, computer networks and security, ethical, legal and environmental impacts of digital technology in preparation for their GCSE</i>			
	Autumn 1	Autumn 2	Spring 1	Spring 2/Summer 1
	Theme/Topic/Skill:	Theme/Topic/Skill:	Theme/Topic/Skill:	Theme/Topic/Skill:
	Computer networks, connections and protocols Network Security	Ethical, Legal, cultural, and environmental impacts of digital technology	Practical Programming skills	Revision
Why Now?	The learner will extend their knowledge of networking hardware, e.g. hubs, routers, switches, and understand why protocols are important in networks. They will build on the Software System learnt back in Spring and focus on security aspects of networks.	The learner will learn about the use of technologies and online services and the impact they have on society. They will gain awareness of the need to use them securely and know how to identify and report inappropriate conduct.	The learners will tackle practical problems and apply their programming skills to provide appropriate solutions.	The learners will review the year's learning, revisit concepts and techniques, discuss Ethics, etc. and relate digital technology to personal experiences.
Fundamental Concepts	Wired and wireless networks, protocols and layers Threats to computer systems and networks Identifying and preventing vulnerabilities	Ethical, legal, cultural and environmental impact	Practical Programming skills	Revision
Students will learn	- o Modes of connection: • Wired • Ethernet • Wireless • Wi-Fi • Bluetooth - o Encryption - o IP addressing and MAC - o Common 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) - o The concept of layers - o Forms of attack: • Malware • Social engineering, e.g. phishing, people as the 'weak point' - o Brute-force attacks • Denial of service attacks • Data interception and theft • The concept of SQL injection. - o Identifying and preventing vulnerabilities - o Understand how to limit the threats posed. - o Understanding of methods to remove vulnerabilities. - o Common prevention methods: • Penetration testing • Anti-malware software - o Firewalls • User access levels • Passwords • Encryption • Physical security	- o The impacts of digital technology on wider society including: • Ethical issues • Legal issues • Cultural issues • Environmental issues • Privacy issues - o Legislation relevant to Computer Science: • The Data Protection Act 2018 • Computer Misuse Act 1990 • Copyright Designs and Patents Act 1988 - o Software licences (i.e. open source and proprietary)	- o Practical Programming skills will be assessed in Component 2 of the qualification, Section B. - o The programming task(s) must allow the students to develop skills within the following areas when programming: • Design • Write • Test • Refine	- o All the units to be covered in revision sessions - o A Summative written assessment (synoptic – mock exam style questions covering the theoretical aspects of networking). - o Question and answer – Exam style questions on all topics.
Language for Life (Key terms/Vocabulary)	- o LAN - o WAN - o Factors of networks - o DNS - o Hosting - o The cloud - o HTTP - o HTTPS - o FTP - o POPS - o IMAP - o SMTP	- o Ethical issues - o Legal issues - o Cultural issues - o Environmental issues - o Privacy issues - o Legislation relevant to Computer Science: - o The Data Protection Act 2018 - o Computer Misuse Act 1990 - o Copyright Designs and Patents Act 1988 - o Software licences (i.e. open source and proprietary)	o Robust Programs	
Extended writing Opportunities	Where possible, there will be an extended response question to enable the students to demonstrate their ability to construct and develop a sustained line of reasoning.	Learners can expand their knowledge on the 9 marks questions	Learners can expand their knowledge on the 9 marks questions	
Maths Across the Curriculum	Rules, Sequencing	Formula Combination	Number	
Links to careers/aspirations	Cyber security analyst Penetration tester Data analyst Database administrator	Penetration tester Data analyst	Software Developer	
Cultural Capital	Computer communication takes place through wired and/or wireless networks and any communication must follow strict rules. Security is of paramount importance to ensure privacy and safety of personal information is	The use of digital technology comes with many responsibilities. Learners must understand issues of correct and incorrect use, privacy, ethical issues, and environmental responsibilities.	Learners write programs to solve real problems and provide practical solutions. Diverse skills and ethical approach must be applied.	Group discussion on aspects of digital technology in real life and how it has affected, improved, or compromised everyday life. Examples include online shopping, social media, gaming, cybersecurity, etc. Discussion on various cases to enhance appreciation of Ethical, Cultural, legal and environmental concerns enforced.

	maintained. Ethical consideration must be followed.			
Practical Application of Skills	- End of topic exam questions - Component 1 - Computer Systems GCSE	Component 1 - Computer Systems GCSE	- This will be based on applied problems in computational terms, where students may use an algorithmic approach. - Practical Programming skills and their ability to design, write, test and refine programs will be assessed.	