

All Saints' Academy Computer Science Department KS4 Curriculum Overview - September 2023_4

Aims and Learning Outcomes

OCR's GCSE (9–1) in Computer Science will encourage students to:

- Understand and apply the fundamental principles and concepts of Computer Science, including abstraction, decomposition, logic, algorithms, and data representation
- Analyse problems in computational terms through practical experience of solving such problems, including designing, writing and debugging programs
- Think creatively, innovatively, analytically, logically and critically
- Understand the components that make up digital systems, and how they communicate with one another and with other systems
- Understand the impacts of digital technology to the individual and to wider society
- Apply mathematical skills relevant to Computer Science.

Assessment Overview			
Written paper: 1 hour and 30 minutes	Written paper: 1 hour and 30 minutes		
50% of total GCSE	50% of total GCSE 80 marks		
80 marks	This is a non-calculator paper.		
This is a non-calculator paper.			
	This paper has two sections: Section A and Section B. Students must		
	answer both sections		

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Cycle	Year 10	Enrichment
Careers	Software Developer/Engineer, Data Scientist, Cybersecurity Analyst, Web Developer	
1	Systems Architecture • The purpose of the CPU: The fetch-execute cycle • Common CPU components and their function: ALU (Arithmetic Logic Unit) CU (Control Unit) Cache, Registers • Von Neumann architecture: MAR (Memory Address Register), MDR (Memory Data Register), Program Counter, Accumulator, Clock speed, Cache size, Number of cores • The purpose and characteristics of embedded systems Memory and Storage •	Open Source – Raspberry pi configuration
	 The need for secondary storage. Note NOM The need for secondary storage and storage media for a given application The units of data storage How data needs to be converted into a binary format to be processed by a computer Data capacity and calculation of data capacity requirements Data Storage, including Characters, Images, Sound Compression Types – Lossy and Lossless 	
Careers	Systems Analyst, Network Administrator, Artificial Intelligence (AI) Engineer, UX/UI Designer, IT Project Manager, Database Administrator, Computer Programmer, IT Consultant & Game Developer	
2	Network and Topologies • Types of networks:: LAN (Local Area Network), WAN (Wide Area Network) • Factors that affect the performance of networks • The different roles of computers in a client-server and a peer-to-peer network • Hardware in Networking: Wireless access points, Routers o Switches, NIC (Network Interface Controller/Card), Transmission media • Connecting Networks: DNS (Domain Name Server), Hosting, The Cloud, Web servers and clients • Star and Mesh network topologies	Al projects SQL Injection Testing Mobile Game Development
	 Modes of connection: Wired Ethernet, Wireless Wi-Fi, Bluetooth Encryption, IP addressing and MAC addressing Standards & Common protocols: 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) Network Security Threats posed to devices/systems, Knowledge/principles of each form of attack including How the attack is used & The purpose of the attack Common prevention methods: Penetration testing, Anti-malware software, Firewalls, User access levels, Passwords, Encryption, Physical security 	

Careers	Digital Marketing Specialist, Cloud Architect, Mobile App Developer, Computer Systems Analyst, Information Security Analyst, IT Support Specialist & Technology Teacher/Instructor	
3	System Software The purpose and functionality of operating systems: • User interface o Memory management and multitasking • Peripheral management and drivers • User management o File management • User management of File management What each function of an operating system does Features of a user interface Memory management • e.g., the transfer of data between memory, and how this allows for multitasking ü Understand that: Data is transferred between devices and the processor • This process needs to be managed ü User management functions • Allocation of an account • Security, etc. File management, and the key features, e.g. Naming, Allocating to folders, Moving files, Saving, etc. The purpose and functionality of utility system software: o Encryption software o Defragmentation o Data compression Ethical, legal, cultural and environmental impact Impacts of digital technology on wider society including Ethical issues, Legal issues, Environmental issues, Privacy issues Legislation relevant to Computer Science: The Data Protection Act 2018, Computer Misuse Act 1990, Copyright Designs and Patents Act 1988, Software licences (i.e. open source and proprietary)	Grows event – SGS and Glocs Col