

Computer Science Curriculum Overview – Year 10

Sequencing of topics	What knowledge will students develop? (Including key terminology)	What skills will students develop? (Including literacy & numeracy)	Assessment opportunities	Homework opportunities	Personal development (Ursuline Values, Catholic Social Teaching, Cultural Capital, Cross-curricular, Careers)	Curriculum links
Autumn Term 1						
<p>The Von Neuman architecture of a computer system</p> <p>Main Memory</p> <p>The need for secondary storage</p> <p>Embedded Systems</p>	<ul style="list-style-type: none"> • The Basics of a computer System: Input Process Output Memory • Architecture of the CPU: Registers, ALU, Memory, Control Unit • Architecture of the CPU 2 : The Fetch Decode Execute Cycle • Factors that affect CPU Performance: Cores , Cache, Processor speed • End of Topic test • The different types of memory: RAM, ROM and Cache L1, L2, L3 • Why computers need secondary storage • Optical, magnetic and solid-state secondary storage • The features of secondary storage: • Speed, capacity, robustness, price • Different types of firmware 	<ul style="list-style-type: none"> • Students can identify and describe the role of components of the CPU • Students can describe the stages of the fetch decode execute cycle. • Students can describe factors that affect performance such as cache size memory and number of cores • Students can describe the features and roles of RAM ROM and Cache in a computer system • Students learn the need to store data and instructions while the computer is turned off. • Students can identify the most suitable type of secondary storage for different tasks. • Student can explain what firmware is and give suitable examples. 	<ul style="list-style-type: none"> • Mid-topic assessments • End of topic assessment • Use of questioning in class • Topic questions set online using ISAAC computer Science 	<p>Exam questions set online using Satchel One or ISAAC computer Science</p>	<p>Grateful for the gifts that modern technology has given to us.</p> <p>Listening and attentive to technical information</p> <p>Courageous and resilient when overcoming problems.</p> <p><i>Links to careers in Network Management and Network Technical Services</i></p> <p><i>Cultural Capital: Students learn about the history of early computers and their use to break codes by Von Neumann</i></p> <p><i>Links to History; Role of Computers in World War 2</i></p>	<p>1.1.1 Architecture of the CPU</p> <p>1.1.2 CPU Performance</p> <p>1.1.3 Embedded systems</p> <p>1.2.1 Primary storage (Memory)</p> <p>1.2.2 Secondary storage</p>

Autumn Term 2

Data Storage	<ul style="list-style-type: none"> • Units of capacity • How bitmap images are stored in a computer system • How sounds are stored in a computer system • Character sets: ASCII extended ASCII and UNICODE • Compression: Lossless and Lossy methods 	<ul style="list-style-type: none"> • Students learn binary storage units: bit byte MB GB TB and are able to carry out capacity calculations • learn how sound and images are stored in binary. • understand the relationship between sample frequency and file size. • explain the need for compression and identify the most suitable method of compression for different tasks. 	<ul style="list-style-type: none"> • Mid-topic assessments • End of topic assessments • Use of questioning in class • Topic questions set online using ISAAC computer Science 	Questions set on Satchel One once a week		<ul style="list-style-type: none"> 1.2.4 Data storage – Numbers 1.2.4 Data storage - Characters 1.2.4 Data storage - Images 1.2.4 Data storage - Sound 1.3.1 Networks and topologies 1.3.2 Wired and wireless networks, protocols and layers 1.3.2 Wired and wireless networks, protocols and layers 1.3.2 Wired and wireless networks, protocols and layers
Networks and Network topologies	<ul style="list-style-type: none"> • Networks: LANs and WANS • The use of IP and MAC addresses in networks • Network hardware • mesh and star topologies • Wired and wireless networks • Networks protocols and layers • Packet Switching • The Domain Name System • Protocols and Layers; TCP/IP, FTP, POP IMAP SMTP HTTP HTTPS 	<ul style="list-style-type: none"> • Students learn similarities and differences between LANS and WANS. • Describe star and mesh networks. • Identify protocols for different tasks • Describe the advantages and disadvantages of wired and wireless networks. 				

Spring Term 1

<p>Identifying and preventing vulnerabilities to networks</p>	<ul style="list-style-type: none"> • Threats to computer systems and networks • Malware: viruses, worms, trojans, spyware • Denial of Service and brute force attacks • Humans as the weak point in systems • Software approaches: Filters, antimalware and back up strategies • Network policies and their content • Penetration testing and ethical hacking 	<ul style="list-style-type: none"> • Students can identify and describe common threats to networks; Malware, DDOS, Brute Force Attack • Students can describe common prevention methods • Students can describe why humans are the weak link in computer systems and the need for strong network policies. 	<ul style="list-style-type: none"> • Mid-topic assessment • End of topic assessment • Use of questioning in class • Topic questions set online using ISAAC computer Science 	<p>Exam questions set on Satchel One once a week</p>	<p>Listening and attentive to technical information</p> <p>Courageous and resilient when overcoming problems</p> <p><i>Links to careers in Network Management and Network and Cyber Security</i></p> <p><i>Cultural Capital: Students learn about the use of cyphers such as the CAESAR cypher throughout history and the work of Bletchley park and Alan Turing during the war.</i></p> <p><i>Links to History; Role of encryption and decryption in Elizabethan England</i></p>	<p>1.4.1 Threats to computer systems and networks</p> <p>1.4.2 Identifying and preventing vulnerabilities</p>
<p>Spring Term 2</p>						
<p>System software</p> <p>The impact of the use of computers</p>	<ul style="list-style-type: none"> • The role of an operating system • Utility software: Memory management, security, disk defragmentation software • The role of device drivers • The environmental ethical and cultural impact of the use of computers. • Computers and the Law: Freedom of Information, Copyright, Computer Misuse and Data Protection Legislation. 	<p>Students can describe the role of the operating system and separate utilities such as disk defragmentation .</p> <p>Students can identify the characteristic of different user interfaces.</p> <p>Students are aware of and can discuss the impact of computer use on ethical legal environmental and cultural issues</p>	<ul style="list-style-type: none"> • Mid-topic assessment • End of topic assessment • Use of questioning in class • Topic questions set online using 	<p>Exam questions set on Satchel One once a week</p>	<p>Listening and attentive to</p> <p>Courageous and resilient when overcoming problems.</p> <p>Leading for justice when considering the impact of the user of computers and e waste on different societies</p> <p><i>Links to Geography</i></p>	<p>1.5.1 Operating systems</p> <p>1.5.2 Utility software</p> <p>1.5.2 Utility software</p> <p>1.6.1 Ethical, legal, cultural and environmental impact</p>

		Students can list the main provisions of legislation that governs the use of computers.	ISAAC computer Science			
Summer Term 1						
Programming fundamental and data types	<ul style="list-style-type: none"> • Programming fundamentals: Abstraction and decomposition • The use of pseudocode and flowcharts in algorithmic thinking • Variables and Constants • Data types String Real Boolean INT • ARRAYS • Use of selection IF CASE • Use of iteration FOR WHILE, REPEAT UNTIL 	<p>Students learn programming concepts: abstraction, losing unnecessary data and decomposition breaking down a problem. Students learn how to solve a problem using flowchart symbols and simple pseudocode commands.</p> <p>The use of data types: string, real, integer Boolean How arrays are zero indexed.</p> <p>Pseudocode commands Use of iteration and selection in algorithms</p>	<ul style="list-style-type: none"> • Mid-topic assessment • Year 10 examination • Use of questioning in class • Topic questions set online using ISAAC computer Science 	Questions set on Satchel One once a week	<p>Listening and attentive to the technical information shared in class</p> <p>Courageous and resilient when overcoming problems.</p> <p>Links to careers in program development and design</p>	<p>2.1.2 Designing, creating and refining algorithms</p> <p>2.2.1 Programming fundamentals</p> <p>2.2.2 Data types</p> <p>2.2.2 Data types</p>
Summer Term 2						
Programming techniques in Python	<p>Naming and assigning variables in Python</p> <p>The use of selection in Python, the IF command</p> <p>Iteration in Python: For I in range and While</p> <p>The use of lists in Python</p> <p>Python subroutines: The DEF command</p>	<p>Student develop their skills in Python using a range of resources and become more independent in their use of Python by taking on individual exam board assignments</p>	<p>Topic questions set online using ISAAC computer Science</p> <p>Python programming skills assessed</p>	Questions set on Satchel One once a week	<p>Listening and attentive to the technical information shared in class</p> <p>Courageous and resilient when overcoming problems.</p> <p>Links to careers in program development and design</p>	<p>2.2.1 Programming fundamentals</p> <p>2.2.3 Additional programming techniques</p>

	Calling subroutines in Python Practical Programming activities Assessment		regularly in class through the independent programming challenges and questioning.			
--	---	--	---	--	--	--