Computing Year 10 Curriculum Map - Computer Science

Notre Dame Catholic College

YEAR 10	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Curriculum Content	**Component 01 Computer Systems link to KS4 Programme of Study.** **Composite = Understand the components that make up digital systems and how they communicate with each other:** This topic will focus on the hardware involved in running a computing device, specifically the CPU (Central Processing Unit). In this topic pupils will gain knowledge and understanding of how the CPU functions, how the von Nuemann architecture process functions in practice, what elements effects the performance of the CPU and the difference between general purpose computers compared to embedded systems. **Component 1.1.1** Investigate Von Nuemann Architecture **Component 1.1.2** Investigate common CPU components and their function **Component 1.1.3** Investigate how common characteristics of CPUs affect their performance **Component 1.1.4** Investigate embedded systems **Component 1.2.1** Investigate Memory – different types of primary storage **Component 1.2.2** Investigate Secondary Storage (Internal and External)	**Component 01 Computer Systems link to KS4 Programme of Study.** **Composite = Understand and apply the fundamental principles and concepts of data representation using mathematics skills:** This topic will focus on data storage by developing a knowledge of computer circuits and how they store data. Pupils will also gain a knowledge of different number systems and develop skills to be able to convert between these different number systems too. Pupils will also develop a knowledge of how characters, image and sound are translated digitally into binary. Pupils will also develop a understanding of is the process of compression (reducing file sizes). **Component 1.2.3** Investigate units of data storage and binary numbers **Component 1.2.4** Investigate binary arithmetic and hexadecimal **Component 1.2.5** Investigate how characters are digitally stored. **Component 1.2.6** Investigate how images are digitally stored. **Component 1.2.7** Investigate how sound is digitally stored. **Component 1.2.8** Investigate the process of compression.	**Component 01 Computer Systems link to KS4 Programme of Study.** **Composite = Understand how digital systems communicate with each other:** This topic will focus on how different types of networks function and pupils will consider the factors that affect network performance too. Pupil's will also develop a understanding of how different digital systems function within network models such as client-server and peer-to-peer. Pupil's will also develop an understanding of the hardware needed to connect digital systems to a network. Pupil's will finally develop a understanding of the internet and the standards and protocols that are used to transmit and receive data over a network. **Component 1.3.1** Investigate the Internet and wide area networks (WANs) **Component 1.3.2** Investigate Local Area Networks (LANs) **Component 1.3.3** Investigate wireless networking **Component 1.3.4** Investigate client-server and peer-to-peer networks models **Component 1.3.5** Investigate the purpose of standards, protocols and layers used for transmitting data.	**Component 01 Computer Systems link to KS4 Programme of Study.** **Composite = Understand the impacts of digital technology to the individual and to wider society:** This topic will focus on network security which will allow pupils explore the various types of network threats and also discover the prevention methods needed to protect a network. Pupil's will develop an understanding of different types of malware, social engineering, brute force attacks, denial of service attacks, data interception & theft and the concept of SQL injection threats. Pupil's will develop an understanding of prevention methods such as physical and digital security. **Component 1.4.1** Network threats **Component 1.4.2** Identifying and preventing vulnerabilities **Composite = Understand how software supports components communicate with each other:** This topic will focus on the systems software involved in running a computing device, specifically the operating system (OS). In this topic pupils will gain knowledge and understanding of how systems software communicates with hardware, provides an environment for applications to run and how the OS manages other aspects of a device too. Pupil's will also develop an understanding of utilities software that maintains the computer device. **Component 1.5.1** Systems software - the operating system (OS) **Component 1.5.2** Systems software - Utilities	**Component 01 Computer Systems link to KS4 Programme of Study.** **Composite = Understand the impacts of digital technology to the individual and to wider society** This topic will focus on considering the ethical uses of digital technology such as the effects on employment. Pupil's will also develop a understanding of the cultural changes digital technology has created such as online shopping and manufacturing. Pupil's will also develop a understanding of environmental impacts digital technologies has created such as the issues with disposing of this digital equipment. Pupil's will final develop an understanding of the legislation that is involved when using digital technology too. **Component 1.6.1** Computer systems in the modern world **Component 1.6.2** Ethical, cultural and environmental issues **Component 1.6.3** Legislation and privacy	**Component 02 Computational Thinking, Algorithms and Programming link to KS4 Programme of Study.** **Composite = Understand and apply the fundamental principles and concepts of abstraction, decomposition and algorithms** This topic will focus on developing an understanding of computational thinking such as abstraction, decomposition and algorithmic thinking and apply this theory to a range of problems. Pupil's will also develop a understanding of different types of algorithms such as constructs, searching and sorting and apply this theory by creating a variety of flowcharts, pseudocode and referencing language algorithms. Pupil's will also develop an understanding of identifying common errors using trace tables in a variety of algorithms too. **Component 2.1.1** Computational thinking **Component 2.1.2** Searching algorithms **Component 2.1.3** Sorting algorithms
Prior knowledge and skills (from previous year / key stage)	Pupils will have knowledge of computer hardware and how it functions. Pupil will have some prior knowledge of the function of the components inside the CPU and some factors that affect its performance too. Pupils may have little to no knowledge of the function of registers and their use during the fetch, decode and execute cycle.	Pupils will have some knowledge of data representation principles such as binary and denary number systems and how to convert between them. Pupils will have little to knowledge of the hexadecimal number system. Pupils will recognise characters, digital images and sound but will have limited knowledge of how these items are stored on a computer system.	Pupils will have some knowledge of how networks function. pupils may have a limited understanding of how data is transmitted on a network. Students will have no knowledge of packet switching, protocols, layers and domain names.	Pupils will have some knowledge of threats and prevention methods that can affect a digital device/network system such as viruses and antivirus software. Pupils will have no knowledge of different forms of attack such as Denial of Service Attack (DoS) and Brute Force Attacks.	Pupils may recognise some of the concepts of ethical and cultural impacts of digital technologies. Pupils may recognise some legal and privacy issues such as data security and copyright legislation.	Pupils will have some knowledge of algorithm develop i.e. flowcharts. Pupils will have some knowledge of constructs such as sequence, selection and iteration. Pupils will have no knowledge of computational thinking concepts such as abstraction and decomposition. Pupils will have no

		Pupils will have limited knowledge of compression theory too.		Pupils may have some knowledge of systems software concepts such as GUI (Graphic User Interface). Pupils will have not knowledge of utilities software.		knowledge of search and sort algorithms or the use of trace tables.
Vocabulary / Key Subject Terminology	Hardware, Central Processing Unit (CPU), Arithmetic Logic Unit (ALU), Control Unit (CU), Registers, PC (Program Counter), Memory Address Register (MAR), Memory Data Register (MDR), Accumulator (ACC), Cache Memory, Cores, Clock Speed, Fetch, Decode, Execute, Cycle, Embedded Systems, Functions, Process, Data, Instructions, Performance, Affect.	Unit, Bit, Nibble, Byte, Kilobyte, Megabyte, Gigabyte, Terabyte, Petabyte, Language, Binary, Byte, Denary, Decimal, Hexadecimal, Hex, Number, Conversion, Character, Set, ASCII, Unicode, Digital, Image, Pixel, Colour Depth, Resolution, Binary, Bit, Power, Compression, Reduce, File, Size, Lossy, Lossless, Sound, Analogue, Sampling, Frequency, Waves, Rate.	Networks, Hardware, Network Interface Controller (NIC), Wireless Access Point (WAP), Switch, Router, Registers, Internet, Internet Service Provider (ISP), Client, Server, Functions, Data, Transmission Media, Ethernet, Fibre Optic, Copper, Wire, Model, Client Server, Central, Peer to Peer, Shared, Packets, Packet Switching, Data, Router, Protocols, Rules, Standards, TCP (Transmission Control Protocol), IP (Internet Protocol), HTTP (Hyper Text Transfer Protocol), FTP (File Transfer Protocol), IMAP (Internet Message Access Protocol), SMTP (Simple Mail Transfer Protocol), Internet, Domain Name, URL, Layers.	Networks, Devices, Malware, Virus, Worm, Trojan Horse, Spyware, Social Engineering, Phishing, Attacks, Cyber, Denial of Service (DoS), Brute Force, Data Interception, Criminal, Preventions, Solutions, Passwords, Antivirus, Software, Firewalls.	Digital, Technology, Devices, Ethical, Cultural, Legal, Environmental, Copyright, Data, Disposal.	Algorithms, Pseudo code, Flow charts, Sequence, Selection, Iteration, Loops, Files, Procedures, Functions, Python, Programming, Techniques, Problem Solve, Variable, Constant, Program and Code, Search, Binary, Linear, Sort, Bubble, Insertion, Merge.
Assessment 1	AO1 & AO2 – End of Topic Test – Systems Architecture	AO1 & AO2 – End of Topic Test – Units of Storage/Data Representation	AO1 & AO2 – End of Topic Test – Computer networks, connections and protocols	AO1 & AO2 – End of Topic Test – Network Security AO1 & AO2 – End of Unit Topic – System Software	AO1 & AO2 – End of Topic Test – Ethical, legal, cultural and environmental impacts of digital technology	AO3 – End of Topic Test – Algorithms (Part 1) Computational Thinking/Search & Sort Algorithms
Assessment 2	AO1 & AO2 – End of Topic Test – Memory and Storage	AP1 Computer Science Assessment focusing on AUT1/AUT2 theory		AP2 Computer Science Assessment focusing on and AUT1/AUT2/SPR1 theory		AP3 Computer Science Past Paper (80 Marks) Exam
Extra-Curricular Offer	Additional resources promoted – Seneca and BBC Bitesize for additional information.	Additional resources promoted – Seneca and BBC Bitesize for additional information.	Additional resources promoted – Seneca and BBC Bitesize for additional information.	Safer Internet Day. Additional resources promoted – Seneca and BBC Bitesize for additional information.	Additional resources promoted – Seneca and BBC Bitesize for additional information.	Coding after school club.
Time Allocation	Autumn 1, 8 weeks, 2.5 lessons per week	Autumn 2, 7 weeks, 2.5 lessons per week	Spring 1, 6 weeks, 2.5 lessons per week	Spring 1 & Spring 2, 6 weeks, 2.5 lessons per week	Summer 1, 4 weeks, 2.5 lessons per week	Summer 2, 6 weeks, 2.5 lessons per week