Computer Science Curriculum Map 2022/23

Our specialisms: Fundamentals of components of a computer, networking & the internet, programming and Different way computers represent data.

KS3

In Computer Science at Salvatorian, topics and skills will be covered over the three-year period, providing students with a comprehensive understanding of computer science. By the end of each year, students will have acquired a solid foundation in the fundamental concepts and principles of computer science, as well as practical skills in programming and software development. Year 7, students will be introduced to the basics of computer science, with a focus on topics such as e-safety, computer components, and different types of malware. The curriculum is designed to provide students with a comprehensive understanding of these topics, as well as practical skills in using technology safely and responsibly. Year 8, students will build on their prior knowledge and understanding of computer science, focusing on topics such as laws and regulations, logic gates, and network topologies. The curriculum is designed to provide students with a comprehensive understanding of these topics, as well as practical skills in using and applying the concepts learned. Laws and Regulations: In the area of laws and regulations, students will learn about the legal and ethical considerations involved in using technology, including intellectual property, data protection, and online privacy. They will also learn about the different laws and regulations that govern the use of technology, and how these laws apply to different situations and technologies. In year 9, students will be introduced to basic programming concepts, including algorithms and pseudocode, as well as how to write and test simple programs. They will also learn about computer hardware, software and digital systems, including how computers store and process data. They will be developing their skills in using programming languages such as Python. They will also have the opportunity to work on a project-based assessment, demonstrating their understanding of the topics covered.

KS4 GCSE:

The course will provide students with a comprehensive understanding of computer science, including both theoretical and practical components. Students will learn about a wide range of topics, including programming, algorithms, data representation, computer systems, databases, cyber security and artificial intelligence. By the end of the course, students will have developed a solid foundation in computer science, and will be equipped with the knowledge and skills necessary for further study or careers in the field. In year 10, students will build on their prior knowledge and understanding of computer science, focusing on core topics such as algorithms, programming and data representation. They will also begin to study more advanced topics such as computer systems, databases and cyber security, learning about the fundamental concepts and principles behind these areas. In year 11, students will deepen their understanding of computer science through a range of practical activities, including programming projects and assessments. They will also have the opportunity to study more advanced topics such as artificial intelligence, exploring the implications and applications of these technologies. The final year of the GCSE course will culminate in a formal written examination, allowing students to demonstrate their understanding and mastery of the topics covered. By the end of the two-year program, students will have developed a strong foundation in computer science, with the knowledge and skills necessary to pursue further study or careers in the field. Whether they are interested in software development, cybersecurity, artificial intelligence or any other aspect of computer science, the GCSE course will provide them with the foundation they need to succeed.

Term	Autumn 1	As se ss	Autumn 2	Pr ac tic	Spring 1	Spring 2	As se ss	Summer 1	Summer 2

Year 7	**E-safety** • Understanding how to stay safe online and outing the dangers that excise online. **Phishing** • Students will look at how this attack works, looking at real life examples and ways we can identify and avoid the attack. **Computers** • Students learn that computers are not just what they use to play games on but actually many things they use in their daily life is also a type of computer.		**Malware** • Identifying the different types of malwares and understanding how each one damages a computer is a different way. **Networking** • Understanding how Computers can communicate with each other, learning what LAN and WAN networks are and how we use them in everyday life. **Hardware** • Students take a look inside a computer to see what makes it tick. Identifying all the components and what role they serve is making the computer work.		**Practical assessment** • Students of year 7 are tasked with creating an eye-catching but professional PowerPoint presentation explaining and roles of 10 different computer components. The assessment has been broken down into two parts, Research and design.	**Computational thinking** • Student will learn the basics of programming by looking at algorithms and creating flowcharts. **Data representation** • Students will look at how we computer converts our instructions into binary code in order to understand what we have instructed it to do.		**CPU** • Outlining the characteristics of what determines the performance of a central processing unit. **Law** • Here students will learn about the different types of laws and regulations that have been created since the introduction of the internet.	**Practical assessment** • Putting togethers everything the students have learnt this year, students will be tasked with creating an outline plan for an app that students can use to help with their studies at home.

Year 8	**E-safety** • Focusing on different types of scams and what identify theft is. **Embedded systems** • Students will dive deeper into what a computer is by looking at the different types that excised, such as embedded systems are and what they are used for. **Secondary Storage** • students will learn about the different types of storage devices, their advantages and disadvantages, and how data is stored and retrieved from them. They will also learn about file systems, storage capacity, and data management techniques.	**Assessment 1: theory paper**	**Computer components** • Students will learn about the functions of each component, how they work together to process and store data, and how they interact with software and other systems. **Networking** • students will learn about the various physical devices used to build computer networks. This includes routers, switches, hubs, and modems. They will learn about the functions of each component, how they work together to transmit and receive data, and how they impact the performance and security of the network.	**Assessment 2: Cooked Meal**	**Practical assessment** • Students of year 8 will create an interesting and creative logo using a photo editing software. Here Student will learn the basics of Photoshop then apply their knowledge to create their own logo designs and posters.	**Binary and hexadecimal** • Students will learn how to convert decimal numbers (base 10) to binary (base 2) and hexadecimal (base 16) representations. They will learn the concepts and algorithms used to perform these conversions, as well as the advantages and disadvantages of different number systems. **Data representation** • When learning about computer encoding systems, students will learn about the process of converting letters, numbers, and symbols into binary code so that computers can understand and process them.	**Assessment 3: Cereal Box or Cereal Illustration**	**Logic gates** • When learning about logic gates, students will learn about the basic building blocks of digital circuits and computer systems. Logic gates are the fundamental elements of digital circuits, used to process and transmit binary signals. **Networking** • students will learn about the technology that enables computers and other devices to communicate with each other over a network.	**Ethical, cultural, environmental issues** • They will learn about the ethical and moral considerations surrounding the use of technology, such as privacy, security, and intellectual property rights. **CPU** • Outlining the characteristics of what determines the performance of a central processing unit.

Year 9	**Law** • Here students will learn about the different types of laws and regulations that have been created since the introduction of the internet. **Embedded systems** • Students will dive deeper into what a computer is by looking at the different types that excised, such as embedded systems are and what they are used for. **Secondary Storage** • students will learn about the different types of storage devices, their advantages and disadvantages, and how data is stored and retrieved from them. They will also learn about file systems, storage capacity, and data management techniques.		**Logic gates** • When learning about logic gates, students will learn about the basic building blocks of digital circuits and computer systems. Logic gates are the fundamental elements of digital circuits, used to process and transmit binary signals. **Binary and hexadecimal** • Students will learn how to convert decimal numbers (base 10) to binary (base 2) and hexadecimal (base 16) representations. They will learn the concepts and algorithms used to perform these conversions, as well as the advantages and disadvantages of different number systems. **Networking** • students will learn about the technology that enables computers and other devices to communicate with each other over a network.		**Practical assessment** • Students of year 9 learn the basics of Python Programming, looking at topics such as, variables, user inputs, for loops and functions. At the end of the term, they will have an assessment that will ask them to create small programs relating the questions given.	**Networking** • students will learn about the various physical devices used to build computer networks. This includes routers, switches, hubs, and modems. They will learn about the functions of each component, how they work together to transmit and receive data, and how they impact the performance and security of the network. **CPU fetch, decode, execute cycle** • When learning about the fetch-decode-execute cycle (also known as the instruction cycle), students will learn about the basic steps that a computer's central processing unit (CPU) follows to execute a program.		**Data representations** • When learning about data representation with images and sound, students will learn about the different methods and technologies used to store, process, and transmit multimedia data such as images, audio, and video.	**Ethical, cultural, environmental issues** • They will learn about the ethical and moral considerations surrounding the use of technology, such as privacy, security, and intellectual property rights. **Defensive design** • When learning about defensive design in computer systems, students will learn about the techniques and strategies used to ensure the security and reliability of computer systems.

Year 10	Students will gain a fundamental understanding of digital logic and computer systems. They will learn about the basic building blocks of digital logic, such as AND, OR, and NOT gates, and how they are used to perform logical operations. Students will also learn about decimal to binary and hexadecimal conversions, which are important for understanding how computers store and process data. Additionally, students will learn about computational thinking, which involves breaking down complex problems into smaller, more manageable steps and using algorithms and logic to find solutions.	**Assessment 1**	When learning about data representation with images and sound, and compression, students will learn about the different methods and technologies used to store, process, and transmit multimedia data such as images, audio, and video. They will learn about different image and audio file formats, such as JPEG, PNG, and MP3, and how they are used to represent images and sound in a digital format.	**Assessment 2**	Python programming and ethical, legal, cultural, and environmental impacts, students will gain a foundation in programming concepts and practices. They will learn how to write code in Python, a widely-used programming language, and understand the basic syntax and structure of a program. They will also learn about variables, data types, control structures, functions, and more.	Defensive design and the architecture of the CPU, students will gain a deeper understanding of computer systems and how they are designed to operate securely. They will learn about defensive design techniques and strategies, including input validation, error handling, and security testing, to create software that is resilient against security threats.	**Assessment 3**	When learning about secondary storage and utility software, students will gain an understanding of the different types of storage used in computing systems. They will learn about secondary storage devices, including hard disk drives, solid-state drives, and cloud storage, and how they are used to store and retrieve data. Additionally, students will learn about utility software, including tools and applications used to manage, maintain, and optimize computer systems. This includes understanding the different types of utility software, such as disk defragmenters, backup software, and anti-virus software, and how they can be used to increase efficiency, ensure data security, and improve overall system performance. By the end of the unit, students will have a solid understanding of secondary storage and utility software, and how they are used to manage and maintain computer systems.	
Year 11	Students will gain an in-depth understanding of the central processing unit (CPU) and how it functions within a computer system. They will learn about the different components of the CPU, including the control unit, arithmetic logic unit, and cache, and how they work together to execute instructions and perform tasks. Additionally, students will learn about CPU performance and how it can be measured and optimized. This includes understanding the different factors that influence CPU performance, such as clock speed, number of cores, and memory, and how they can be used to improve the overall performance of a computer system. By the end of the unit, students will have a solid understanding of the architecture of the CPU and CPU performance, and how they impact the performance and efficiency of a computer system.			**Mock Exam 2**	Students will understand of the different types of network configurations and how they are used to connect devices. They will learn about different network topologies, including bus, star, and mesh networks, and the advantages and disadvantages of each. Additionally, students will learn about the various security threats that can impact computer systems, including viruses, malware, and hacking, and how to protect against these threats. This includes understanding the different types of security measures, such as firewalls, antivirus software, and encryption, and how they can be used to secure computer systems and networks. By the end of the unit, students will have a solid understanding of networking topology and the various security threats to computer systems, and how to protect against them.		**Mock Exam 3**	When learning about different searching and sorting algorithms, students will gain an understanding of various methods used to search and sort data. They will learn about different types of searching algorithms, such as linear search, binary search, and hash table, and how they can be used to find specific data within a large dataset. Additionally, students will learn about different sorting algorithms, including bubble sort, insertion sort, and quick sort, and how they can be used to efficiently sort data. This includes understanding the different trade-offs, such as time and space complexity, of each algorithm and when to use each one based on the specific requirements of a given problem.	***Revision in preparation for end of year exams.***