

Shoreham Academy ICT and Computing Department: 7 year curriculum map

Note: The structure of KS3/4/5 curriculum is designed to meet the practical knowledge/skills/content missed during the pandemic, therefore similar topics may be covered across year groups, with curriculum being reviewed, updated for 2022/23.

	Autumn		Spring		Summer	
Year 7 ICT and Computing	<p>Topic: E-Literacy and E-safety</p> <p>Knowledge/skills taught: How to use the school network. Electronic file and folder management. Searching the web using Boolean Operators. Cyberbullying - inappropriate content, contact and conduct.</p> <p>Has links to: Using the school network safely and respectfully. Online relationships covered in year 8 and 9. Databases in year 9. Boolean Algebra KS4/KS5 Computer Science.</p>	<p>Topic: Computing theory</p> <p>Knowledge/skills taught: Identifying/describing the functions of computer hardware components, storage devices, input, and output devices. Binary Conversion.</p> <p>Has links to: Computing theory studied in KS4/KS5 Computer Science and IT.</p>	<p>Topic: Data Manipulation and Processing - Spreadsheets</p> <p>Knowledge/skills taught Create, edit, and process data using appropriate software tools and techniques – Data entry/formatting, formulae, functions, Charts/Graphs, Modelling.</p> <p>Has links to: Spreadsheets studied in year 9 and KS4/KS5 IT.</p>	<p>Topic: Computer Crime and Legislation</p> <p>Knowledge/skills taught Identify and explain legislation relating to securing and protecting personal data – GDPR. Crimes linked to data theft - explain the need for data protection.</p> <p>Has links to: Legislation/Data studied in KS4/KS5 Computer Science and IT.</p>	<p>Topic: Designing algorithms using Flowcharts</p> <p>Knowledge/skills taught: Create flowcharts to solve and model of real-world problems. Use flowcharts symbols to construct flowcharts and show the step-by-step solution to the problem.</p> <p>Has links to: Algorithms studied in year 7/8/9 programming Topic and KS4/KS5 Computer Science.</p>	<p>Topic: Programming (Scratch)</p> <p>Knowledge/skills taught: Programming using block based visual programming. Use programming techniques – sequence, selection, and iteration. Plan and develop a digital game – based on client requirement.</p> <p>Has links to: Programming studied in year 8 (Small Basic), 9 (Python) and KS4/5 Programming - Computer Science.</p>
Year 8 ICT and Computing	<p>Topic: Data Manipulation and Processing - Spreadsheets</p> <p>Knowledge/skills taught Using techniques to create, edit and process data. Using formulae, conditional formatting, What If Scenarios (goal seek), advanced functions and cell referencing.</p> <p>Has links to: Spreadsheets/Data Manipulation studied in year 9 and KS4/KS5 IT.</p>	<p>Topic: Computer Crime and Legislation</p> <p>Knowledge/skills taught - legislation relating to intellectual property - Copyright, Designs and Patents Act. Legislation relating to Computer Crimes – Hacking and Malware – Computer Misuse Act.</p> <p>Has links to: Legislation - studied in KS4/KS5 Computer Science and IT.</p>	<p>Topic: Designing algorithms using Flowcharts</p> <p>Knowledge/skills taught: Create flowcharts to solve and model of real-world problems. Use flowcharts symbols to construct flowcharts and show the step-by-step solution to the problem.</p> <p>Has links to: Algorithms studied in year 7/8/9 programming Topic and KS4/KS5 Computer Science.</p>	<p>Topic: Programming Techniques (Small Basic)</p> <p>Knowledge/skills taught: Code instructions to a graphics and text window. Understand and use programming constructs - sequence, selection, and iteration.</p> <p>Has links to: Programming studied in 9 (Python) and KS4/5 Computer Science.</p>	<p>Topic: Networks and topologies</p> <p>Knowledge/skills taught. Types of networks (LAN/WAN), network hardware, factors affecting network performance. Network topologies -Star, Ring, Bus and Mesh.</p> <p>Has links to: Networks and topologies studied in KS4/KS5 Computer Science and IT.</p>	<p>Topic: E-safety and Cyber Security</p> <p>Knowledge/skills taught: Understand online risks and how to stay safe. Understand cyber-crime threats -social engineering and malware. Methods used to prevent cyber-attacks.</p> <p>Has links to: Cybercrime and Threats studied in KS4/KS5 Computer Science and IT.</p>
Year 9 ICT and Computing	<p>Topic: Data Management</p> <p>Knowledge/skills taught: Database management – database design, entry, data types, creating queries and reports.</p> <p>Has links to: Database Management studied in KS4 IT and KS5 Computer Science and IT.</p>	<p>Topic: Programming (Python)</p> <p>Knowledge/skills taught: Write and run programs using Sequence (Input and output), Selection (Making decisions), Iteration (Repeating instructions). Write pseudocode algorithms for a given problem.</p> <p>Has links to: Programming studied in 9 (Python) and KS4/5 Computer Science.</p>	<p>Topic: Web design and development</p> <p>Knowledge/skills taught: Analysing and assessing websites, creating a website prototype to meet customer criteria. Use HTML to structure static web pages. Modify HTML tags using inline styling to improve the appearance of web pages.</p> <p>Has links to: KS4/5 IT coursework units.</p>	<p>Topic: App Development</p> <p>Knowledge/skills taught: Implement and customise GUI elements to meet the needs of the user. Use user input in an event-driven programming environment. Develop an app prototype to include some functionality. Act on user feedback and evaluate the solution.</p> <p>Has links to: KS4/5 IT coursework units. Programming Concepts studied in KS4/5 Computer Science.</p>	<p>Topic: Data Manipulation and Processing - Spreadsheets</p> <p>Knowledge/skills taught: Using techniques to create, edit and process data. Using formulae, functions, data validation, formatting, modelling tools, security measures</p> <p>Has links to: Spreadsheets/Data Manipulation studied in KS4/KS5 IT.</p>	<p>Topic: Project Management</p> <p>Knowledge/skills taught: Understanding project life cycle, using planning tools and software to plan a project and the meet requirements of client, presenting information using tools and techniques. Evaluating projects.</p> <p>Has links to: KS4/5 IT units – Project Lifecycle, app design and game design.</p>

<p>Year 10 IT (New course)</p>	<p>Topics: Design Tools, HCI (Human Computer Interaction), Data and testing</p> <p>Key Knowledge/skills taught: Understand how to apply and create design tools for applications</p> <ul style="list-style-type: none"> Flowcharts, mindmaps (library/tunnel timeware/presentation), visualisation diagrams and wireframes <p>Understand the importance and use of HCI in applications</p> <ul style="list-style-type: none"> Banking, embedded systems, entertainment, fitness, home appliances and retail Hardware and software considerations User interaction methods <p>Understand the use of data and testing in different contexts when testing solutions</p> <ul style="list-style-type: none"> Information and data, data use, data types, data validation and verifications, data collection and storage methods 	<p>Topic: Data and testing, Cyber Security and legislation Digital Communications</p> <p>Key Knowledge/skills taught: Understand the use of data and testing in different contexts when testing solutions</p> <ul style="list-style-type: none"> Purpose and importance of testing, test data, types of testing <p>Understand cyber security and legislation related to the use IT systems</p> <ul style="list-style-type: none"> Threats: Malware, social engineering, hacking, DDos, Pharming Vulnerabilities: environmental, physical, system Impacts/consequences of cyber security attacks Prevention measures: physical, logical, safe destruction of data IT Legislation <p>Understand the types of digital communication software devices and distribution channels</p> <ul style="list-style-type: none"> Digital communication types, Digital devices, distribution channels, connectivity, audience demographics 	<p>Topic: Data Manipulation using spreadsheets</p> <p>Key knowledge/skills taught: To be able to import and manipulate data to develop a solution to meet an identified need using Spreadsheets and Databases</p> <ul style="list-style-type: none"> Functionality: calculations, sorting, filtering, user aids (data entry/validation) Types of outputs: charts, lists, invoices, reports, worksheets HCI: Navigation, accessibility, colour, layout, learnability, user perceptions, messages Data handling and manipulation: Data validation, formatting, formulae, cell referencing, functions, pivot tables, importing file types, data types, security measures, modelling tools User interface: Buttons, Macros, Hyperlinks, Forms Testing: during and after development, test plan documentation, types of test data Evaluating the spreadsheet solution: client requirements, HCI design principles and conventions
<p>Year 10 Computer Science</p>	<p>Topic:</p> <ol style="list-style-type: none"> Programming fundamentals Algorithms Producing robust programs Practical Programming knowledge/skills <p>Key knowledge/skills taught: Programming fundamentals: The use of variables, constants, operators, inputs, outputs, and assignments, use programming constructs used to control the flow of a program, arithmetic operators, Boolean operators AND, OR and NOT. Data types: The use of data types.</p> <p>Algorithms: Computational thinking, designing, creating, and refining algorithms, searching, and sorting algorithms.</p> <p>Producing robust programs: Defensive design, testing, Refining algorithms.</p> <p>Practical programming Task: All students are given the opportunity to undertake programming tasks to allow students to develop knowledge/skills within the following areas when programming:</p> <ul style="list-style-type: none"> Design Write Test Refine <p>Python as a programming language, will be used to solve a problem (or problems).</p>	<p>Topic:</p> <ol style="list-style-type: none"> Boolean logic Memory and storage Systems architecture Computer networks, connections, and protocols <p>Key knowledge/skills taught: Boolean logic: Simple logic diagrams using the operators AND, OR and NOT, Truth tables, combining Boolean operators using AND, OR and NOT, applying logical operators in truth tables to solve problems.</p> <p>Memory and storage: Primary storage (RAM/ROM/VIRTUAL memory) Secondary storage. 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 (Numbers, Characters, Images, Sound) Compression)</p> <p>Systems architecture: Architecture of a CPU, CPU Performance, Embedded systems.</p> <p>Networks and topologies: Types of networks, wired and wireless networks, protocols and layers.</p> <p>Systems software: Operating systems, Utility software</p>	<p>Topic:</p> <ol style="list-style-type: none"> Practical Programming knowledge/skills Practical programming Task <p>Key knowledge/skills taught: Practical Programming knowledge/skills: Learn Programming fundamentals and techniques with Python.</p> <p>Additional programming techniques: basic string manipulation, file handling operations, SQL to search for data, arrays (or equivalent) when solving problem. Sub programs (functions and procedures) to produce structured code. Random number generation.</p>

<p>Year 11</p> <p>IT</p>	<p>Topic: L06 and L07 Processing and presenting data / Revision for external exam (Unit R012) during week 1 of Spring term.</p> <p>Key knowledge/skills taught: Understand the different methods of processing data and presenting information.</p> <ul style="list-style-type: none"> Using spreadsheets and databases to process information Software tools used to present information in each context, presentation methods. Consideration when presenting information: Target audience, content limitation, distribution channels, presentation methods. <p>To be able to select and present information in the development of the solution to meet an identified need.</p> <ul style="list-style-type: none"> Word Processing tools and techniques: text/tables, referencing tools, table of contents/indexes, mail merge, linking and embedding data, document reviewing, saving, and exporting into formats Presentation techniques: text and objects, slideshows, speaker notes, sound/video, master pages, integrating applications, security measures, saving/exporting Web/mobile technologies: HTML, CSS, web design. 	<p>Topic: L08 Evaluating a solution / Controlled Assessment Mock</p> <p>Key knowledge/skills taught: To be able to iteratively review and evaluate the development of the solution.</p> <ul style="list-style-type: none"> How to carry out and document an iterative review: phase reviews – reviewing each phase, identifying issues, using questionnaires/surveys to gather feedback, resolving issues, making adaptations to original plan. How to carry out and document an iterative review: final evaluation – measure success against criteria, review deviations to plans, effect of processes on delivering solution, maintainability – further development of the system. <p>Students will complete a programming project assignment to recap on knowledge/skills, review learning, fill learning gaps and prepare students for the programming task NEA.</p>	<p>Topic: Controlled Assessment (Unit R013)</p> <p>Key knowledge/skills taught: Students will initiate, plan, execute and evaluate a solution to a problem based on Controlled Assessment Scenario provided by the exam board. Students demonstrate and utilise all knowledge/skills learned throughout year 10 and 11 to successfully complete the assignment.</p> <p>Past assignment examples - Students have been asked to use the Project Lifecycle to create integrated IT systems for the following businesses:</p> <ul style="list-style-type: none"> Car manufacturer Hotels Bakery Beauty Salon Electricity Company
<p>Year 11</p> <p>Computer Science</p>	<p>Topic:</p> <ol style="list-style-type: none"> Systems software Computer networks, connections, and protocols Network security <p>Knowledge / Knowledge/skills: Systems software: Operating systems, Utility software.</p> <p>Networks and topologies: Types of networks, Wired and wireless networks, protocols and layers.</p> <p>Network security Threats to computer systems and networks. Identifying and preventing vulnerabilities</p>	<p>Topic:</p> <ol style="list-style-type: none"> Programming fundamentals Producing robust programs Programming languages and Integrated Development Environments <p>Key knowledge/skills taught: Programming fundamentals: The use of variables, constants, operators, inputs, outputs, and assignments, use programming constructs used to control the flow of a program, arithmetic operators, Boolean operators AND, OR and NOT. Data types: The use of data types.</p> <p>Producing robust programs: Defensive design, testing, refining algorithms.</p> <p>Programming languages and Integrated Development Environments Languages: Characteristics and purpose of different levels of programming language The Integrated Development Environment (IDE): Common tools and facilities available in an Integrated Development Environment (IDE).</p>	<p>Topic:</p> <ol style="list-style-type: none"> Ethical, legal, cultural, and environmental impacts of digital technology Algorithms Additional programming techniques Revision and mocks <p>Key knowledge/skills taught: Ethical, legal, cultural, and environmental impacts of digital technology: Impacts of digital technology on wider society including legislation relevant to Computer Science.</p> <p>Algorithms: Computational thinking, Designing, creating, and refining algorithms, Searching, and sorting algorithms.</p> <p>Additional programming techniques: basic string manipulation. file handling operations. SQL to search for data. Arrays (or equivalent) when solving problem. Sub programs (functions and procedures) to produce structured code. Random number generation.</p>
<p>Year 12</p> <p>IT</p>	<p>Topic: Fundamentals of IT (Unit 1)</p> <p>Key knowledge/skills taught: Computer hardware and software, business IT systems, employability and communication knowledge/skills, ethical and operational issues.</p>	<p>Topic: Application Design (Unit 6)</p> <p>Key knowledge/skills taught: Coursework based unit. Understand how applications are designed, be able to investigate potential solutions, be able to generate and prototype a solution to meet client and user requirements, presenting them to a client.</p>	<p>Topic: Internet of Everything (Unit 17)</p> <p>Key knowledge/skills taught: Coursework based unit. Understand what is meant by Internet of Everything (IoE), be able to repurpose technologies to extend scope of IoE, present concept of ideas for repurposed developments.</p>

<p>Year 12</p> <p>Computer Science</p>	<p>Topic: <u>Fundamental of programming</u> Key Knowledge/skills taught: Programming concepts, Programming paradigms.</p> <p>Topic: <u>Fundamentals of data representation</u> Key knowledge/skills taught: Number systems, Number bases, Units of information, Binary number system, Information coding systems, Representing images, sound, and other data.</p> <p>Topic: <u>Fundamentals of data structures</u> Key knowledge/skills taught:</p> <ul style="list-style-type: none"> • Data structures and abstract data types • Queues • Stacks • Graphs • Trees • Hash tables • Dictionaries • Vectors 	<p>Topic: <u>Fundamentals of algorithms</u> Key knowledge/skills taught: Graph-traversal, Tree-traversal, Reverse Polish, searching algorithms, Sorting algorithms, Optimisation algorithms.</p> <p>Topic: <u>Theory of computation</u> Key knowledge/skills taught: Abstraction and automation, Regular languages, Context-free languages, Classification of algorithms, A model of computation.</p> <p>Topic: <u>Fundamentals of computer systems</u> Key knowledge/skills taught: Hardware and software, Classification of programming languages, Types of program translator, Logic gates, Boolean algebra.</p>	<p>Topic: <u>Fundamentals of computer organisation and architecture</u> Key knowledge/skills taught:</p> <ul style="list-style-type: none"> • Internal hardware components of a computer • The stored program concept • Structure and role of the processor and its components • External hardware devices <p>Topic: <u>Consequences of uses of computing</u> Key knowledge/skills taught:</p> <ul style="list-style-type: none"> • Individual (moral), social (ethical), legal and cultural issues and opportunities <p>Topic <u>Fundamentals of communication and networking</u> Key knowledge/skills taught:</p> <ul style="list-style-type: none"> • Communication • Networking • The Internet • The Transmission Control Protocol/Internet Protocol (TCP/IP) protocol
<p>Year 13</p> <p>IT</p>	<p>Topic: Global Information (Unit 2)</p> <p>Key knowledge/skills/knowledge taught: Understand where/how information is held globally, its uses by individuals and organisations. Understand legal framework governing storage, the process flow of information and principles of information security – for all types and classification of information.</p>		<p>Topic: <u>Game design (Unit 15)</u></p> <p>Key knowledge/skills/knowledge taught: Coursework based unit. Understand how games are designed, be able to investigate potential solutions, be able to generate and prototype a solution to meet client and user requirements, presenting them to a client. Blender to be used.</p>
<p>Year 13</p> <p>Computer Science</p>	<p>Topic: <u>Fundamentals of data representation</u> Key knowledge/skills taught: Number systems, Number bases, Units of information, Binary number system, Information coding systems, Representing images, sound, and other data.</p> <p>Topic: <u>Fundamentals of computer systems</u> Key knowledge/skills taught: Hardware and software, Classification of programming languages, Types of program translator, Logic gates, Boolean algebra.</p> <p>Topic: <u>Fundamentals of communication and networking</u> Key knowledge/skills taught:</p> <ul style="list-style-type: none"> • Communication • Networking • The Internet • The Transmission Control Protocol/Internet Protocol (TCP/IP) protocol 	<p>Topic: <u>Consequences of uses of computing</u> Key knowledge/skills taught: Individual (moral), social (ethical), legal and cultural issues and opportunities.</p> <p>Topic: <u>Fundamentals of databases</u> Key knowledge/skills taught:</p> <ul style="list-style-type: none"> • Conceptual data models and entity relationship modelling • Relational databases • Database design and normalisation techniques • Structured Query Language (SQL) • Client server databases <p>Topic: <u>Fundamentals of computer organisation and architecture</u> Key knowledge/skills taught:</p> <ul style="list-style-type: none"> • Functional programming paradigm • Writing functional programs • Lists in functional programming <p>Topic: <u>Big Data</u></p>	<p>Topic: <u>Fundamentals of functional programming</u> Key knowledge/skills taught:</p> <ul style="list-style-type: none"> • Functional programming paradigm • Writing functional programs • Lists in functional programming <p>Topic: <u>Systematic approach to problem solving</u> Key knowledge/skills taught: Aspects of software development.</p> <p>Non-exam assessment - Computing practical project</p>