



Key Stage 3 Computing

Computer Science is the study of processes that interact with data and that can be represented as data in the form of programs. It enables the use of algorithms to manipulate, store and communicate digital information. Information technology is the use of computers to store, retrieve, transmit and manipulate data or information.

This department strives to develop a passion in students for technology and information systems. Students have many opportunities to develop digital literacy whilst having the opportunity to learn concepts and principles from Computer Science and Information Technology. It provides opportunities to focus on the fundamental principles and concepts of computer science, including abstraction, logic, algorithms, programming and data representation. Students are encouraged to become independent learners, and work in teams to be able to analyse problems in computational terms, and have repeated practical experience of writing computer programs to solve such problems. Students are also encouraged to be articulate using appropriate subject vocabulary in a range of contexts. Technology advances constantly and people are always working on new and inventive ways to use it.

By studying Computer Science, our students will be able to evaluate and apply information technology, including new or unfamiliar technologies, analytically to solve problems. They will also become responsible, competent, confident and creative users of information and communication technology. We aim to foster curiosity and thinking skills in all our learners, preparing them to learn how to look at a problem and working out a way a computer might be able to help you solve it. We aim to prepare our students to become logical thinkers and problem solvers. Our overriding aim is to prepare students with the digital literacy skills in the event of them discontinuing their study in this field, that they are still supported in all areas of their education and work.

For more information about our ICT, Business Studies and Computer Science curriculum, please contact the Head of Department at izaak.ritchie@consilium-at.com



Year 7

Half Term 1 - Impact of Technology		
1	Digital Organisation	Students can use suitable file and folder names, locate and open their own documents and common applications, and manage their work effectively on the school network.
2	Online Safety and Respect	Students understand how to stay safe online, identify the characteristics of strong passwords, check who they are communicating with, and behave respectfully when using digital devices and online platforms.
3	Communication and Presentation	Students can construct respectful and effective emails, send them to the correct recipients, and plan, create, and deliver presentations for a specific audience.
Half Term 2 - Using Media		
1	Software Selection and Formatting	Students can choose appropriate software for a task, identify key features of different packages, and apply formatting techniques to make documents suitable for their audience and purpose.
2	Credible and Legal Use of Content	Students understand copyright, licensing, plagiarism, paraphrasing, citation, and referencing, and can credit original sources appropriately when using online content.
3	Creating Digital Artefacts	Students can evaluate online sources for credibility, select appropriate images and information, and organise content to construct a digital artefact using suitable software.
Half Term 3 - Introduction to Programming Part 1		
1	Instructions and Computational Thinking	Students understand how humans and computers process instructions differently, and can compare the types of tasks best suited to each.
2	Sequencing and Program Flow	Students can explain, predict, trace, modify, and create programs using sequence, variables, and the input-process-output model.
3	Selection and Conditions	Students can identify and create selection in programs using conditions, comparison operators, and Boolean logic operators such as and, or, and not.
Half Term 4 - Introduction to Programming Part 2		

1	Iteration and Loops	Students can identify different types of loops, explain why iteration is used, and choose and apply the most suitable form of iteration in a program.
2	Debugging and Program Development	Students can detect and correct errors in programs, trace algorithms, and independently design solutions using appropriate programming constructs.
3	Decomposition, Subroutines and Lists	Students can break problems down using decomposition, recognise opportunities for subroutines, and create and use lists to store and manage data in programs.
Half Term 5 - Computer Networks & Protocols		
1	Networks and Connections	Students understand what a computer network is, how devices connect using wired and wireless methods, and the hardware needed to create and access networks.
2	Data Transmission and Protocols	Students can explain how data travels across networks and the internet using protocols, packets, addressing, bandwidth, and appropriate data transmission units.
3	Internet, Services and Connectivity	Students understand the difference between the internet and the World Wide Web, can describe internet services and their uses, and can explain how connectivity affects everyday life and online safety.
Half Term 6 - Modelling Data - Spreadsheets		
1	Spreadsheet Structure and Formatting	Students understand rows, columns, cells, and cell references, and can use formatting, conditional formatting, and autofill to organise spreadsheet data clearly.
2	Data, Formulas and Functions	Students understand the difference between data and information, can collect and analyse data from primary and secondary sources, and can use formulas and functions such as SUM, AVERAGE, COUNTIF, and IF.
3	Analysis, Charts and Modelling	Students can sort, filter, analyse, and present data using appropriate charts, and can use spreadsheet models to solve given problems.





Year 8

Half Term 1 - Computer Systems		
1	Computer Systems and Architecture	Students understand different types of computer systems, including general-purpose computers and embedded systems, and can explain the key hardware components that all computing systems share.
2	Hardware, Software and Operating Systems	Students can describe how hardware components, input and output devices, software, and the operating system work together to allow computers to run programs and perform tasks.
3	Computing in the Real World	Students understand how computers have developed over time, how algorithms are used to create programs, and how artificial intelligence is used in real-world contexts.
Half Term 2 - Mobile App Development		
1	Problem Solving and User Needs	Students can use decomposition and computational thinking to break down a problem, establish user needs, create success criteria, and design a solution that meets a specific purpose.
2	Event-Driven Programming and GUI Design	Students understand objects, events, triggers, and event-driven programming, and can create and customise GUI elements using variables, user input, sequence, selection, and iteration.
3	Testing, Debugging and Evaluation	Students can identify and fix coding errors, respond to user and functional testing, and evaluate the success of a programming project against user needs and success criteria.
Half Term 3 - Developing for the web		
1	HTML and Web Page Structure	Students understand the purpose of HTML and can use appropriate tags to structure static web pages, display images, add media, and create hyperlinks between pages.
2	CSS, Styling and Navigation	Students understand the purpose and benefits of CSS, and can use it to style web pages, improve appearance, and implement navigation to create a functioning website.
3	Search Engines and Web Technologies	Students understand how websites are stored and accessed, how search engines use crawlers and indexes to rank results, and how to use search technologies effectively.
Half Term 4 - Media - Bitmap & Vector Graphics		
1	Bitmap and Vector Graphics	Students understand the difference between bitmap and vector graphics, including how they are created, where they are used, and when each type is most appropriate.

2	Digital Graphics Tools and Techniques	Students can use digital graphics tools to draw, resize, manipulate, group, duplicate, layer, and edit objects using features such as fill, stroke, gradients, transparency, and opacity.
3	Creating Graphics for a Purpose	Students can combine multiple tools and techniques to create effective bitmap and vector graphic designs that are suitable for a specific purpose.
Half Term 5 – Representations & Logic		
1	Data Representation and Number Systems	Students understand how real-world data is represented digitally using binary, denary, bits, bytes, character sets, and units of data size, and can convert between binary, denary, bits, bytes, and text.
2	Files, Metadata and Digital Storage	Students understand how data is stored, transmitted, and organised using file types, metadata, character sets, and appropriate units of storage.
3	Logic Gates and Encryption	Students can describe, draw, and use NOT, AND, and OR logic gates, complete truth tables, construct simple logic circuits, and explain the need for basic encryption methods.
Half Term 6 - Intro to Text Based Programming		
1	Algorithms, Programs and Translation	Students understand the difference between algorithms and programs, how code is translated for computers, and how syntax is used to create simple Python programs.
2	Python Programming Fundamentals	Students can write Python programs using output, variables, keyboard input, casting, arithmetic expressions, random numbers, and relational operators.
3	Control Flow, Errors and Problem Solving	Students can use selection, multi-branch selection, iteration, counters, and logical expressions to control program flow, identify and correct errors, and solve algorithm challenges.





Year 9

Cyber Security		
1	Online Data and Legislation	Students understand what happens to data entered online, the main legislation relating to ICT security, and how data should be protected when using digital systems.
2	Cyber Threats and Human Error	Students can identify common cyber security risks, including human error, social engineering, hacking, DDoS attacks, malware, bots, and botnets, and explain their potential impact.
3	Protection and Prevention	Students can compare cyber threats by likelihood and impact, and can explain effective strategies to reduce cyber attacks, prevent data interception, and protect networks.
Data Science		
1	Data Visualisation and Insights	Students understand what data science is and can use visualisations to identify patterns, trends, correlations, outliers, and insights from data sets.
2	Data Cleansing and Investigation	Students can use software tools to sort, filter, format, cleanse, and investigate data sets as part of a structured data science process.
3	Conclusions and Decision Making	Students can analyse visualisations, draw conclusions, report findings, and use data science evidence to support recommendations and decision making.
Text Based Programming		
1	Digital Images and Representation	Students understand how digital images are made from pixels, how colour is represented using binary, and how resolution and colour depth affect quality and file size.
2	Digital Sound and Sampling	Students understand how sound is captured, sampled, digitised, and represented as bits, and can explain how sample rate and sample size affect quality and file size.
3	Media Quality, Editing and Compression	Students can calculate representation sizes, perform basic sound editing, explain compression, and evaluate the creative benefits and ethical issues of digital manipulation.
Representations Audio/Visual		
1	Programming Fundamentals	Students can write text-based programs that display messages, receive keyboard input, use variables, apply arithmetic expressions, and control program flow using selection.
2	Lists, Strings and Iteration	Students can create and use lists, access list items and strings, perform common operations, and use while and for loops to iterate through data.

3	Developing Programming Solutions	Students can combine selection, iteration, lists, strings, counters, and sums to develop solutions to meaningful programming problems.
Physical computing		
1	Physical Devices and Inputs/Outputs	Students understand physical computing and can describe how sensors, motors, input devices, and output devices are used to control real-world systems.
2	Programming Physical Devices	Students can write, execute, debug, and refine Python programs that use a physical device's input and output features and communicate with other devices.
3	Decomposition and Efficient Solutions	Students can decompose a physical computing system into simpler features, consider user needs and resources, and optimise programs to create effective solutions.
Future Technologies		
1	Emerging Technologies	Students can describe modern and emerging technologies, identify real-world examples, and explain how new digital tools are shaping society and the wider world.
2	Impacts of Technology	Students can discuss the positive and negative impacts of technology on the environment, automation, power and energy industries, and health-based technologies.
3	Ethics, Economy and the Future	Students understand the basics of the economy and stock market, and can evaluate ethical, moral, environmental, and economic implications of future technologies.

