Curriculum plan

Year 7 – Computer Science & ICT

Assessments:

Formative: Knowledge recalls at the start of each lesson. Low stake quizzes using online platforms.

Summative: Termly assessment of prior learning (mixture of project based or theory based to suit the subject)

Term 1	Term 2	Term 3
Communicating online: -Username & passwords -Folder structure -Online platforms -Sending emails -Cyber bullying -Social media -Presenting to an audience	**The computer system:** -Computer components -Input and output devices -Inside the computer -Memory -RAM & ROM	**Internet of everything:** -Development of computers -Key figures including Ada Lovelace & Alan Turing -How technology has changed our lives -Where will technology take us
Modelling data: -Getting to know a spreadsheet -Formulas -Sort and filter -Producing graphs Creating a spreadsheet for a given purpose and target audience	**Controlling devices:** -Introduction to 2 new software packages, Logo and Flowol - Introduction to flowcharts -Logo: Basic commands -Flowol: Controlling inputs and outputs	**Computer programming:** -Introduction to block-based programming using Scratch -Basic programming commands -Adding variables -Adapting code -Building a game within Scratch

Curriculum plan

Year 8 – Computer Science & ICT

Assessments:

Formative: Knowledge recalls at the start of each lesson. Low stake quizzes using online platforms.

Summative: Termly assessment of prior learning (mixture of project based or theory based to suit the subject)

Term 1	Term 2	Term 3
Multimedia website: -Understanding how to create an interactive model (website) -Microsoft Office PowerPoint skills including how to create a master slide and add navigation - Purpose and target audience of a client brief -Planning tools -How to search for appropriate content	**Modelling data – Using MS Excel:** -Complex spreadsheet skills building on last year's understanding -Functions -Conditional formatting -Creating graphs using appropriate formatting features -IF functions -Spreadsheet project to demonstrate understanding	**Controlling devices using Flowol:** -Building on skills taught in year 7 -Flowol complex features -Multiple outputs -Inputs and decisions -Sub routines -Creating instructions to control a number of mimics
Multimedia product: -Compare and contrast key features of a magazine cover -Identifying target audience -Planning tools -Collecting images: legal implications -Microsoft Publisher skills -Creating a magazine front cover using skills learnt from this term	**E-Safety:** -How to use social media safely -Age restrictions -Cyber bullying -Sexting -Body image and photo editing software -Creating an information document to inform year 6 about how to be safe online	**Computer system:** -Building on skills taught in year 7 -Understanding how the CPU works -Operating systems Network including local area networks (LAN) and wide area networks (WAN) -Network topologies including star, bus and ring networks

Curriculum plan

Year 9 – Computer Science & ICT

Assessments:

Formative: Knowledge recalls at the start of each lesson. Low stake quizzes using online platforms.

Summative: Termly assessment of prior learning (mixture of project based or theory based to suit the subject)

Term 1	Term 2	Term 3
Media animation: -Introduction to animation software called 'Blender' -Blender skills including how to move, rotate, scale and colour, animation, name and parenting -Creating 3D models and adding colour -Adding lights, camera and rendering to an animation -Blender project	**Cyber security:** -Understanding the difference between data and information -Keeping your data safe -Social engineering -Cryptography -Script kiddies -Rise of the bots	**Binary:** -Binary to denary number conversion -Denary to binary number conversion -Adding binary numbers -Logic gates including AND, OR, NOT
Business enterprise: -Types of businesses and business owners -Business plan and project planning -SMART targets -Intellectual property -Creating a business pitch to sell the business idea to a group of investors (similar to the Dragons Den concept)	**Computer programming:** -Introduction to text-based programming (Python) -Reading code and algorithms -Python inputs and outputs -Variables -Entering data: Numbers and text -IF statements	**Augmented Reality to present information:** -Purpose and main concept of AR -Designing an AR model prototype -Creating and AR model protype -Testing and reviewing the AR protype

Curriculum plan

KS4 Year 10 - Computer Science

Assessments:
Formative: Knowledge recalls at the start of each lesson, low stake quizzes using online platforms, SMART revise.
Summative: Termly assessment of prior learning (mixture of project based or theory based to suit the subject). Mock exams.

Term 1	Term 2	Term 3
1.1.1 Architecture of the CPU: -The purpose of the CPU -The fetch-execute cycle -Common CPU components and their function: -ALU (Arithmetic Logic Unit) -CU (Control Unit) -Cache -Registers Von Neumann architecture: -MAR (Memory Address Register) -MDR (Memory Data Register) -Program Counter -Accumulator	**2.1.1 Computational thinking:** -Principles of computational thinking -Abstraction -Decomposition -Algorithmic Thinking.	**1.3.1 Networks and topologies:** -Types of networks: -LAN (Local Area Network) -WAN (Wide Area Network) -Factors that affect the performance of networks -The different roles of computers in a client-server and a peer-to-peer network -The hardware needed to connect stand-alone computers into a Local Area Network: Wireless access points, Routers, Switches, NIC (Network Interface Controller/Card) -Transmission media -The Internet as a worldwide collection of computer networks: DNS (Domain Name Server), Hosting, The Cloud, Webservers and Clients -Star and Mesh network topologies
1.1.2 CPU Performance: -How common characteristics of CPUs affect their performance: -Clock speed -Cache size -Number of Cores	**2.1.2 Designing, creating and refining algorithms:** -Identify the inputs, processes, and outputs for a problem -Structure diagrams -Create, interpret, correct, complete, and refine algorithms using: -Pseudocode -Flowcharts -Reference language/high-level programming language -Identify common errors -Trace tables	**1.3.2 Wired and wireless networks, protocols and layers:** -Modes of connection: Wired, Ethernet, Wireless, Wi-Fi, Bluetooth -Encryption -IP addressing and MAC addressing -Standards -Common protocols including: -TCP/IP (Transmission Control Protocol/Internet Protocol) -HTTP (Hyper Text Transfer Protocol) -HTTPS (Hyper Text Transfer Protocol Secure) -FTP (File Transfer Protocol) -POP (Post Office Protocol) -IMAP (Internet Message Access Protocol)

		-SMTP (Simple Mail Transfer Protocol) -The concept of layers
1.1.3 Embedded systems: -The purpose and characteristics of embedded systems -Examples of embedded systems	**2.2.1 Programming fundamentals:** -The use of variables, constants, operators, inputs, outputs and assignments -The use of the three basic programming constructs used to control the flow of a program: -Sequence -Selection -Iteration (count- and condition- controlled loops) -The common arithmetic operators -The common Boolean operators AND, OR, NOT	**2.2.3 Additional programming techniques:** -The use of basic string manipulation -The use of basic file handling operations: Open, Read, Write, Close -The use of records to store data -The use of SQL to search for data -The use of arrays (or equivalent) when solving problems, including both one-dimensional (1D) and two-dimensional (2D) arrays -How to use sub programs (functions and procedures) to produce structured code -Random number generation
1.2.1 Primary storage (Memory) -The need for primary storage -The difference between RAM and ROM -The purpose of ROM in a computer system -The purpose of RAM in a computer system -Virtual memory	**2.2.2 Data types:** -The use of data types: -Integer -Real -Boolean -Character and string -Casting	**Practical programming skills**
1.2.2 Secondary storage: -The need for secondary storage -Common types of storage: Optical, Magnetic, Solid state -Suitable storage devices and storage media for a given application -The advantages and disadvantages of different storage devices and storage media relating to these characteristics: Capacity, Speed, Portability, Durability, Reliability, Cost	**2.4.1 Boolean logic:** -Simple logic diagrams using the operations AND, OR and NOT -Truth tables -Combining Boolean operators using AND, OR and NOT -Applying logical operators in truth tables to solve problems	
	1.2.4 Data storage: -Numbers -Characters -Images -Sound **1.2.5 Compression:** -The need for compression -Types of compression: -Lossy -Lossless	

Curriculum plan

KS4 Year 11 - Computer Science

Assessments:

Formative: Knowledge recalls at the start of each lesson, low stake quizzes using online platforms, SMART revise.

Summative: Termly assessment of prior learning (mixture of project based or theory based to suit the subject). Mock exams.

Term 1	Term 2
1.4.1 Threats to computer systems and networks: -Forms of attack -Malware -Social engineering, e.g. phishing, people as the 'weak point' -Brute-force attacks -Denial of service attacks -Data interception and theft -The concept of SQL injection	**2.5.1 Languages:** -Characteristics and purpose of different levels of programming language: o High-level languages o Low-level languages -The purpose of translators -The characteristics of a compiler and an interpreter
1.4.2 Identifying and preventing vulnerabilities: -Common prevention methods: o Penetration Testing o Anti-malware software o Firewalls o User access levels o Passwords o Encryption o Physical Security	**2.5.2 The Integrated Development Environment (IDE):** -Common tools and facilities available in an integrated development environment (IDE): o Editors o Error diagnostics o Run-time environment o Translators
1.5.1 Operating systems: -The purpose and functionality of operating systems: o User interface o Memory management and multitasking o Peripheral management and drivers o User management o File management	**2.1.3 Searching and sorting algorithms:** -Standard searching algorithms: o Binary search o Linear search -Standard sorting algorithms: o Bubble sort o Merge sort o Insertion sort
2.3.1 Defensive design: -Defensive design considerations: o Anticipating misuse o Authentication -Input validation -Maintainability: o Use of sub programs o Naming conventions o Indentation o Commenting	**Searching and sorting practical programming skills**
2.3.2 Testing: -The purpose of testing -Types of testing:	**Practical programming skills**

o Iterative o Final/terminal -Identify syntax and logic errors -Selecting and using suitable test data: o Normal o Boundary o Invalid o Erroneous -Refining algorithms	
1.5.2 Utility software: -The purpose and functionality of utility software -Utility system software: o Encryption software o Defragmentation o Data Compression	**Theory revision**
1.6.1 Ethical, legal, cultural and environmental impact: -Impacts of digital technology on wider society including: o Ethical issues o Legal issues o Cultural issues o Environmental issues o Privacy issues -Legislation relevant to Computer Science: o The Data Protection Act 2018 o Computer Misuse Act 1990 o Copyright Designs and Patents Act 1988 o Software licences (i.e. open source and proprietary)	

Curriculum plan

KS4 Information Technology

Assessments:

Formative: Knowledge recalls, low stake quizzes, skills tests and Q&A

Summative: Termly assessments of prior learning – mixture of project based/ theory to suit the subject base. Controlled Assessment: RO60: Data Manipulation using Spreadsheets.

Term 1	Term 2	Term 3
RO50: It in the Digital World 1.1 Types of design tools: □ Flow charts □ Mind Maps □ Visualisation Diagram □ Wire Frames To include: ✓ To know the components of each ✓ To know the types of Software to use ✓ Advantages and Disadvantages ✓ Creating design tools ✓ Assessing the suitability to a given context.	RO60 Spreadsheets 1.2.2 – Types of outputs. □ Charts □ Lists □ Invoices □ Reports □ Worksheets To include: ✓ To be familiar with the creation of different types of outputs ✓To design different types of outputs to meet user/ client needs. ✓Consideration of layout and house style. ✓Reports to present information to the client and the end user, considering where the information is coming from.	Controlled Assessment: RO60 – Data manipulation using Spreadsheets: Planning and Designing the solution/ creating the spreadsheet solution.
RO50: It in the Digital World 2.1 The purpose, importance and use of HCI in application areas: □ Banking □ Embedded systems □ Entertainment □ Fitness □ Home appliances □ Retail To include: ✓ To know the purpose ✓ Know why HCI is used for each application area. ✓ Know the importance of HCI applied to each application. ✓ Advantages and Disadvantages of each HIC application.	RO60 Spreadsheets 1.2.3 – HIC □ Navigation □ Accessibility □ Colour □ Layout □ Learnability □ Memorability □ Messages □ Purpose □ User perceptions. To Include: ✓ Design a clear navigation system that meets the need of the user/ client ✓The start-up and flow through the navigation system and being able to navigate back to the main menu. ✓Show consideration of learnability and memorability in the design	Controlled Assessment: RO60 – Data manipulation using Spreadsheets: Planning and Designing the solution/ creating the spreadsheet solution.

	✓Accessibility considerations of sufficient contrast of text and colour. ✓Layout considerations of the use of white space, alignment. Location etc.	
<u>RO50: It in the Digital World 3.1 Information and Data:</u> □ What data is □What information is □ The relationship between data and information To include: ✓ To know the difference between data and information ✓ How data is converted to information <u>3.2.1 Use of data types in different contexts:</u> □ Alphanumeric □ Date □ Numeric □ Text To Include: ✓ Know the characteristics of each data type ✓ How each data type can be used ✓ Assess the suitability and justify the use of data types applied to a given context ✓ Alphanumeric is a combination of letters and numbers RO6O Spreadsheets– 1.2.1 Functionality: □ Calculations □ Sorting □ Filtering □ User Aids To Include: ✓ Design the functionalities for the solution. ✓ Design the calculations ✓ Design meaningful messages to be displayed to the end user when errors occur.	<u>RO6O Spreadsheets 2.1.1 – Data handling and manipulation:</u> □ Data Validation □Cell Formatting □Conditional Formatting □Sorting □Filtering □Formulae □Function □Pivot Tables □Importing Data file types □Importing different data types □Data types □Security Measures □Modelling tools. To Include: ✓Creating a Spreadsheet solution that is fit for purpose ✓Manipulating data using formulae and functions ✓Built in functions ✓Relational operators ✓Solving formulae errors ✓Effective validation checks within the spreadsheet solution ✓Naming of cells or group of cells ✓Use appropriate security measures such as lock cells, password protection and work book editing. ✓Use of different cell formatting options. ✓Modelling tools such as what-if and goal seek to predict different outcomes.	<u>RO50: It in the Digital World 4.4 – Legislation</u> □ Computer Misuse Act □Copyright, Design and Patent Act □Data Protection Act □Freedom of information Act □Health &Safety at work Act To Include: ✓ Know the purpose of the legislation ✓ Know how/ what is required of individuals business to comply with each area of the legislation. ✓ The implications of the legislation for: data and information, individuals and organisations ✓ Know how the legislation can be used when dealing with cyber-security issues. Students must keep up to date with any changes in the Acts or additional Act(s) that are relevant to the IT sector.