

# Curriculum Design 2023-24

COMPUTING							
		Term1		Term2		Term3	
		Term 1.1	Term 1.2	Term 2.1	Term 2.2	Term 3.1	Term 3.2
7	Theme	The Basics	Algorithms	Computer Graphics	Spreadsheet Data	Computer Systems	Microbit Project
	Concept	<i>Communication Technologies</i>	<i>Algorithms &amp; Programming</i>	<i>Media</i>	<i>Data &amp; Information</i>	<i>Computer Systems</i>	<i>Projects</i>
	Skills Knowledge	<ul style="list-style-type: none"> <li>Expectations &amp; Passwords</li> <li>Baseline Assessment</li> <li>Reading Test</li> <li>Safety in a Computing Room</li> <li>Digital Footprint</li> <li>Respectful and Responsible Online Communication</li> </ul>	<ul style="list-style-type: none"> <li>Introduction to Algorithms and Flowcharts</li> <li>Algorithms in Flowol</li> <li>Algorithms in Scratch</li> <li>Searching &amp; Sorting Algorithms</li> </ul>	<ul style="list-style-type: none"> <li>Bitmap &amp; Vector Graphics</li> <li>Copyright</li> <li>Creating a Vector Image</li> <li>Creating an Advertising Document</li> </ul>	<ul style="list-style-type: none"> <li>Introduction to Spreadsheets</li> <li>Data &amp; Data Types</li> <li>Spreadsheet Skills</li> <li>Spreadsheet Project</li> </ul>	<ul style="list-style-type: none"> <li>Computer Systems</li> <li>Input Devices</li> <li>Output Devices</li> <li>Internal Components of a Computer System</li> <li>Computer Storage</li> </ul>	<ul style="list-style-type: none"> <li>Microbit Project - Getting to know the microbit</li> <li>Microbit Project - Temperature Activity</li> <li>Microbit Project - Virtual Rock Paper Scissors</li> <li>Microbit Project - Plan &amp; Develop your own Microbit game</li> </ul>
	Wider Curriculum						
8	Theme	The Internet & The WWW	Introduction to Programming	Multimedia	Data in Everyday Life	Systems Software	Ethics Project
	Concept	<i>Communication Technologies</i>	<i>Algorithms &amp; Programming</i>	<i>Media</i>	<i>Data &amp; Information</i>	<i>Computer Systems</i>	<i>Projects</i>
	Skills Knowledge	<ul style="list-style-type: none"> <li>The Internet and the WWW</li> <li>Search Engines and Web Browsers</li> <li>Safe Searching</li> <li>Search Engine Ranking</li> <li>Simple Searching Techniques</li> <li>Advanced Searching</li> </ul>	<ul style="list-style-type: none"> <li>Computational Thinking</li> <li>Introduction to Small Basic</li> <li>Reflection &amp; Assessment Feedback for 7.3 Assessment</li> <li>User Input</li> <li>Selection Statements</li> </ul>	<ul style="list-style-type: none"> <li>What is multimedia?</li> <li>Multimedia Features</li> <li>Reflection &amp; Assessment Feedback for 7.1 Assessment</li> <li>Understanding your client</li> <li>Creating your multimedia product</li> </ul>	<ul style="list-style-type: none"> <li>My Data</li> <li>Digital Marketing</li> <li>Reflection &amp; Assessment Feedback for 7.2 Assessment</li> <li>Healthcare</li> <li>Cyber Security</li> </ul>	<ul style="list-style-type: none"> <li>Computer &amp; Application Software</li> <li>User Interfaces</li> <li>Reflection &amp; Assessment Feedback for 7.4 Assessment</li> <li>Operating Systems</li> <li>Utility Software</li> <li>Proprietary &amp; Open-Source Software</li> </ul>	<ul style="list-style-type: none"> <li>Computers Changing Your Perceptions</li> <li>Driverless Cars</li> <li>Reflection &amp; Assessment Feedback for 7.5 Assessment</li> <li>Digital Divide</li> <li>Futuristic Technology</li> </ul>
	Wider Curriculum						
9	Theme	Computer Networks	Text-based Programming	Pre-Production	Data Representation	Systems Architecture	Cross-curricular Projects
	Concept	<i>Communication Technologies</i>	<i>Algorithms &amp; Programming</i>	<i>Media</i>	<i>Data &amp; Information</i>	<i>Computer Systems</i>	<i>Projects</i>
	Skills Knowledge	<ul style="list-style-type: none"> <li>What are networks?</li> <li>Wired and Wireless Networks</li> <li>Types of Networks</li> <li>Network topologies and Packet Switching</li> <li>Network performance and security</li> <li>The Cloud &amp; Virtual Networks</li> </ul>	<ul style="list-style-type: none"> <li>Introduction to Python &amp; Print</li> <li>Variables &amp; User Input</li> <li>Selection Statements</li> <li>Iteration</li> </ul>	<ul style="list-style-type: none"> <li>Client requirements &amp; Target Audience</li> <li>Intro Pre-production &amp; Moodboards</li> <li>Mindmaps</li> <li>Visualisation Diagrams &amp; Storyboards</li> </ul>	<ul style="list-style-type: none"> <li>Binary &amp; Denary</li> <li>CBEM Options Carousel</li> <li>Binary Addition</li> <li>Storing Images &amp; Sound</li> </ul>	<ul style="list-style-type: none"> <li>CPU &amp; CPU Components</li> <li>CPU &amp; FDE Cycle</li> <li>CPU Performance</li> <li>Computer Memory</li> <li>Logic Gates &amp; Circuits</li> </ul>	<ul style="list-style-type: none"> <li>Extra-curricular Projects</li> <li>Extra-curricular Projects</li> <li>Extra-curricular Projects</li> <li>Extra-curricular Projects</li> </ul>
	Wider Curriculum						

# COMPUTING

		Term1		Term2		Term3	
		Term 1.1	Term 1.2	Term 2.1	Term 2.2	Term 3.1	Term 3.2
10 CS	Theme	Systems Architecture <u>Algorithms</u>	Memory & Storage <u>Algorithms</u>	Memory & Storage <u>Programming</u>	Systems Software <u>Programming</u>	Ethics <u>Programming</u>	Ethics <u>Programming</u>
	Concept	<i>Computer Systems Algorithms &amp; Programming</i>	<i>Computer Systems Algorithms &amp; Programming</i>	<i>Computer Systems Algorithms &amp; Programming</i>	<i>Computer Systems Algorithms &amp; Programming</i>	<i>Computer Systems Algorithms &amp; Programming</i>	<i>Computer Systems Algorithms &amp; Programming</i>
	Skills Knowledge	<p><b>Architecture of the CPU</b></p> <ul style="list-style-type: none"> <li>The purpose of the CPU:               <ul style="list-style-type: none"> <li>The fetch-execute cycle</li> </ul> </li> <li>Common CPU components and their function:               <ul style="list-style-type: none"> <li>ALU (Arithmetic Logic Unit)</li> <li>CU (Control Unit)</li> <li>Cache</li> <li>Registers</li> </ul> </li> <li>Von Neumann architecture:               <ul style="list-style-type: none"> <li>MAR (Memory Address Register)</li> <li>MDR (Memory Data Register)</li> <li>Program Counter</li> <li>Accumulator</li> </ul> </li> </ul> <p><b>CPU Performance</b></p> <ul style="list-style-type: none"> <li>How common characteristics of CPUs affect their performance:               <ul style="list-style-type: none"> <li>Clock speed</li> <li>Cache size</li> <li>Number of cores</li> </ul> </li> </ul> <p><b>Embedded Systems</b></p> <ul style="list-style-type: none"> <li>The purpose and characteristics of embedded systems</li> <li>Examples of embedded systems</li> </ul> <p><b>Computational Thinking</b></p> <ul style="list-style-type: none"> <li>Principles of computational thinking:               <ul style="list-style-type: none"> <li>Abstraction</li> <li>Decomposition</li> <li>Algorithmic thinking</li> </ul> </li> </ul> <p><b>Designing, creating and refining algorithms</b></p>	<p><b>Primary storage (Memory)</b></p> <ul style="list-style-type: none"> <li>The need for primary storage               <ul style="list-style-type: none"> <li>The difference between RAM and ROM</li> <li>The purpose of ROM in a computer system</li> <li>The purpose of RAM in a computer system</li> <li>Virtual memory</li> </ul> </li> </ul> <p><b>Secondary Storage</b></p> <ul style="list-style-type: none"> <li>The need for secondary storage</li> <li>Common types of storage:               <ul style="list-style-type: none"> <li>Optical</li> <li>Magnetic</li> <li>Solid state</li> </ul> </li> <li>Suitable storage devices and storage media for a given application</li> <li>The advantages and disadvantages of different storage devices and storage media relating to these characteristics:               <ul style="list-style-type: none"> <li>Capacity</li> <li>Speed</li> <li>Portability</li> <li>Durability</li> <li>Reliability</li> <li>Cost</li> </ul> </li> </ul> <p><b>Data Units</b></p> <ul style="list-style-type: none"> <li>The units of data storage:               <ul style="list-style-type: none"> <li>Bit</li> <li>Nibble (4 bits)</li> <li>Byte (8 bits)</li> <li>Kilobyte (1,000 bytes or 1 KB)</li> <li>Megabyte (1,000 KB)</li> <li>Gigabyte (1,000 MB)</li> <li>Terabyte (1,000 GB)</li> <li>Petabyte (1,000 TB)</li> </ul> </li> <li>How data needs to be converted into a binary format to be processed by a computer</li> <li>Data capacity and calculation of data capacity requirements</li> </ul> <p><b>Searching &amp; Sorting Algorithms</b></p> <ul style="list-style-type: none"> <li>Standard sorting algorithms:               <ul style="list-style-type: none"> <li>Bubble sort</li> <li>Merge sort</li> <li>Insertion sort</li> </ul> </li> </ul> <p><b>Languages</b></p> <ul style="list-style-type: none"> <li>Characteristics and purpose of different levels of programming language:</li> </ul>	<p><b>Data Storage - Numbers</b></p> <ul style="list-style-type: none"> <li>How to convert positive denary whole numbers to binary numbers (up to and including 8 bits) and vice versa</li> <li>How to add two binary integers together (up to and including 8 bits) and explain overflow errors which may occur</li> <li>How to convert positive denary whole numbers into 2-digit hexadecimal numbers and vice versa</li> <li>How to convert binary integers to their hexadecimal equivalents and vice versa</li> <li>Binary shifts</li> </ul> <p><b>Data Storage - Characters</b></p> <ul style="list-style-type: none"> <li>The use of binary codes to represent characters</li> <li>The term 'character set'</li> <li>The relationship between the number of bits per character in a character set, and the number of characters which can be represented, e.g.:               <ul style="list-style-type: none"> <li>ASCII</li> <li>Unicode</li> </ul> </li> </ul> <p><b>Data Storage - Images</b></p> <ul style="list-style-type: none"> <li>How an image is represented as a series of pixels, represented in               <ul style="list-style-type: none"> <li>binary</li> <li>Metadata</li> </ul> </li> <li>The effect of colour depth and resolution on:               <ul style="list-style-type: none"> <li>The quality of the image</li> <li>The size of an image file</li> </ul> </li> </ul> <p><b>Data Storage - Sound</b></p> <ul style="list-style-type: none"> <li>How sound can be sampled and stored in digital form</li> <li>The effect of sample rate, duration and bit depth on:               <ul style="list-style-type: none"> <li>The playback quality</li> <li>The size of a sound file</li> </ul> </li> </ul> <p><b>Compression</b></p> <ul style="list-style-type: none"> <li>The need for compression</li> <li>Types of compression:               <ul style="list-style-type: none"> <li>Lossy</li> <li>Lossless</li> </ul> </li> </ul> <p><b>Data Types</b></p> <ul style="list-style-type: none"> <li>The use of data types:               <ul style="list-style-type: none"> <li>Integer</li> <li>Real</li> <li>Boolean</li> <li>Character and string</li> <li>Casting</li> </ul> </li> </ul>	<p><b>Operating Systems</b></p> <ul style="list-style-type: none"> <li>The purpose and functionality of operating systems:               <ul style="list-style-type: none"> <li>User interface</li> <li>Memory management and multitasking</li> <li>Peripheral management and drivers</li> <li>User management</li> <li>File management</li> </ul> </li> </ul> <p><b>Utility Software</b></p> <ul style="list-style-type: none"> <li>The purpose and functionality of utility software</li> <li>Utility system software:               <ul style="list-style-type: none"> <li>Encryption software</li> <li>Defragmentation</li> <li>Data compression</li> </ul> </li> </ul>	<p><b>Ethical, legal, cultural, and environmental impact</b></p> <ul style="list-style-type: none"> <li>Impacts of digital technology on wider society including:               <ul style="list-style-type: none"> <li>Ethical issues</li> <li>Legal issues</li> <li>Cultural issues</li> <li>Environmental issues</li> <li>Privacy issues</li> </ul> </li> </ul> <p style="text-align: center;">Programming Project</p>	<p><b>Ethical, legal, cultural, and environmental impact</b></p> <ul style="list-style-type: none"> <li>Legislation relevant to Computer Science:               <ul style="list-style-type: none"> <li>The Data Protection Act 2018</li> <li>Computer Misuse Act 1990</li> <li>Copyright Designs and Patents Act 1988</li> <li>Software licences (i.e. open source and proprietary)</li> </ul> </li> </ul> <p style="text-align: center;">Programming Project Preparation &amp; revision for end of year 10 progress exams</p>

		<ul style="list-style-type: none"> <li>Identify the inputs, processes, and outputs for a problem</li> <li>Structure diagrams</li> <li>Create, interpret, correct, complete, and refine algorithms using: <ul style="list-style-type: none"> <li>Flowcharts</li> <li>Reference language/high-level programming language</li> </ul> </li> <li>Identify common errors</li> <li>Trace tables</li> </ul> <p><u>Searching &amp; Sorting Algorithms</u></p> <ul style="list-style-type: none"> <li>Standard searching algorithms: <ul style="list-style-type: none"> <li>Binary search</li> <li>Linear search</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>High-level languages</li> <li>Low-level languages</li> <li>The purpose of translators</li> <li>The characteristics of a compiler and an interpreter</li> </ul> <p><u>The Integrated Development Environment (IDE)</u></p> <ul style="list-style-type: none"> <li>Common tools and facilities available in an Integrated Development Environment (IDE): <ul style="list-style-type: none"> <li>Editors</li> <li>Error diagnostics</li> <li>Run-time environment</li> <li>Translators</li> </ul> </li> </ul> <p><i>Pupils will spend 1 hour of the paper 2 allocation, to build on their knowledge and skills in Python programming</i></p>	<p><u>Programming fundamentals</u></p> <ul style="list-style-type: none"> <li>The common arithmetic operators</li> <li>The common Boolean operators AND, OR and NOT</li> <li>The use of variables, constants, operators, inputs, outputs and assignments</li> <li>The use of the three basic programming constructs used to control the flow of a program: <ul style="list-style-type: none"> <li>Sequence</li> <li>Selection</li> </ul> </li> </ul> <p><i>Pupils will spend 1 hour of the paper 2 allocation, to build on their knowledge and skills in Python programming</i></p>	<p><u>Programming fundamentals</u></p> <ul style="list-style-type: none"> <li>The common arithmetic operators</li> <li>The common Boolean operators AND, OR and NOT</li> <li>The use of variables, constants, operators, inputs, outputs and assignments</li> <li>The use of the three basic programming constructs used to control the flow of a program: <ul style="list-style-type: none"> <li>Sequence</li> <li>Selection</li> </ul> </li> <li>The use of the three basic programming constructs used to control the flow of a program: <ul style="list-style-type: none"> <li>Iteration (count- and condition-controlled loops)</li> </ul> </li> </ul> <p><i>Pupils will spend 1 hour of the paper 2 allocation, to build on their knowledge and skills in Python programming</i></p>	<p><i>Pupils will spend 1 hour of the paper 2 allocation, to build on their knowledge and skills in Python programming</i></p>		
	Wider Curriculum							
	Theme	Data Representation Boolean Logic	Data Representation Producing Robust Programs	Computers Networks, Connections & Protocols Programming Languages	Computers Networks, Connections & Protocols Algorithms/Programming	Revision	Revision	
	Concept	<i>Computer Systems Algorithms &amp; Programming</i>	<i>Computer Systems Algorithms &amp; Programming</i>	<i>Computer Systems Algorithms &amp; Programming</i>	<i>Computer Systems Algorithms &amp; Programming</i>	<i>Computer Systems Algorithms &amp; Programming</i>	<i>Computer Systems Algorithms &amp; Programming</i>	
11 CS	Skills Knowledge	<p><u>Data Units</u></p> <ul style="list-style-type: none"> <li>The units of data storage: <ul style="list-style-type: none"> <li>Bit</li> <li>Nibble (4 bits)</li> <li>Byte (8 bits)</li> <li>Kilobyte (1,000 bytes or 1 KB)</li> <li>Megabyte (1,000 KB)</li> <li>Gigabyte (1,000 MB)</li> <li>Terabyte (1,000 GB)</li> <li>Petabyte (1,000 TB)</li> </ul> </li> <li>How data needs to be converted into a binary format to be processed by a computer</li> <li>Data capacity and calculation of data capacity requirements</li> </ul> <p><u>Data Storage - Numbers</u></p> <ul style="list-style-type: none"> <li>How to convert positive denary whole numbers to binary numbers (up to and including 8 bits) and vice versa</li> <li>How to add two binary integers together (up to and including 8 bits) and explain overflow errors which may occur</li> <li>How to convert positive denary whole numbers into 2-digit hexadecimal numbers and vice versa</li> <li>How to convert binary integers to their hexadecimal equivalents and vice versa</li> <li>Binary shifts</li> </ul> <p><u>Boolean Logic</u></p> <ul style="list-style-type: none"> <li>Simple logic diagrams using the operators AND, OR and NOT</li> <li>Truth tables</li> <li>Combining Boolean operators using AND, OR and NOT</li> </ul> <p>Applying logical operators in truth tables to solve problems</p>	<p><u>Data Storage - Characters</u></p> <ul style="list-style-type: none"> <li>The use of binary codes to represent characters</li> <li>The term 'character set'</li> <li>The relationship between the number of bits per character in a character set, and the number of characters which can be represented, e.g.: <ul style="list-style-type: none"> <li>ASCII</li> <li>Unicode</li> </ul> </li> </ul> <p><u>Data Storage - Images</u></p> <ul style="list-style-type: none"> <li>How an image is represented as a series of pixels, represented in binary</li> <li>Metadata</li> <li>The effect of colour depth and resolution on: <ul style="list-style-type: none"> <li>The quality of the image</li> <li>The size of an image file</li> </ul> </li> </ul> <p><u>Data Storage - Sound</u></p> <ul style="list-style-type: none"> <li>How sound can be sampled and stored in digital form</li> <li>The effect of sample rate, duration and bit depth on: <ul style="list-style-type: none"> <li>The playback quality</li> <li>The size of a sound file</li> </ul> </li> </ul> <p><u>Compression</u></p> <ul style="list-style-type: none"> <li>The need for compression</li> <li>Types of compression: <ul style="list-style-type: none"> <li>Lossy</li> <li>Lossless</li> </ul> </li> </ul>	<p><u>Networks and topologies</u></p> <ul style="list-style-type: none"> <li>Types of networks: <ul style="list-style-type: none"> <li>LAN (Local Area Network)</li> <li>WAN (Wide Area Network)</li> </ul> </li> <li>Star and Mesh network topologies</li> <li>The different roles of computers in a client-server and a peer-peer network</li> <li>The hardware needed to connect stand-alone computers into a Local Area Network: <ul style="list-style-type: none"> <li>Wireless access points</li> <li>Routers</li> <li>Switches</li> <li>NIC (Network Interface Controller/Card)</li> <li>Transmission media</li> </ul> </li> <li>Factors that affect the performance of networks</li> </ul>	<p><u>Wired and wireless networks, protocols and layers</u></p> <ul style="list-style-type: none"> <li>Modes of connection: <ul style="list-style-type: none"> <li>Wired <ul style="list-style-type: none"> <li>Ethernet</li> </ul> </li> <li>Wireless <ul style="list-style-type: none"> <li>Wi-Fi</li> <li>Bluetooth</li> </ul> </li> </ul> </li> <li>The Internet as a worldwide collection of computer networks: <ul style="list-style-type: none"> <li>DNS (Domain Name Server)</li> <li>Hosting</li> <li>The Cloud</li> <li>Web servers and clients</li> </ul> </li> <li>Encryption</li> <li>IP addressing and MAC addressing</li> <li>Standards</li> <li>Common protocols including: <ul style="list-style-type: none"> <li>TCP/IP (Transmission Control Protocol/Internet Protocol)</li> <li>HTTP (Hyper Text Transfer Protocol)</li> <li>HTTPS (Hyper Text Transfer Protocol Secure)</li> <li>FTP (File Transfer Protocol)</li> <li>POP (Post Office Protocol)</li> <li>IMAP (Internet Message Access Protocol)</li> <li>SMTP (Simple Mail Transfer Protocol)</li> </ul> </li> <li>The concept of layers</li> </ul>	<p><u>Revision – Paper 1</u></p> <p>Revision topics to be directed by pupil performance/suggestions.</p> <p><u>Revision – Paper 2</u></p> <p>Revision topics to be directed by pupil performance/suggestions</p>	COMPLETION OF COURSE	
				<p><u>Additional programming techniques</u></p> <ul style="list-style-type: none"> <li>The use of basic file handling operations: <ul style="list-style-type: none"> <li>Open</li> <li>Read</li> <li>Write</li> <li>Close</li> </ul> </li> </ul> <p><u>Functions and procedures</u></p> <ul style="list-style-type: none"> <li>The use of procedures</li> </ul>	<p><u>Revision</u></p> <p>Recap - Sorting Algorithms Recap - Searching Algorithms Recap – Computational thinking Recap – Flowchart algorithms Recap – Pseudocode algorithms Recap – Loops</p>			

			<p><u>Testing</u></p> <ul style="list-style-type: none"> <li>• The purpose of testing</li> <li>• Types of testing:             <ul style="list-style-type: none"> <li>○ Iterative</li> <li>○ Final/terminal</li> </ul> </li> <li>• Identify syntax and logic errors</li> <li>• Selecting and using suitable test data:             <ul style="list-style-type: none"> <li>○ Normal</li> <li>○ Boundary</li> <li>○ Invalid/Erroneous</li> <li>○ Refining algorithms</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>○ The use of functions</li> <li>○ The use of the following within functions and procedures:             <ul style="list-style-type: none"> <li>○ local variables/constants</li> <li>○ global variables/constants</li> </ul> </li> <li>○ The use of records to store data</li> <li>○ The use of SQL to search for data</li> <li>○ The use of arrays (or equivalent) when solving problems, including             <ul style="list-style-type: none"> <li>○ both one-dimensional (1D) and two-dimensional arrays (2D)</li> </ul> </li> <li>○ How to use sub programs (functions and procedures) to produce structured code</li> <li>○ Random number generation</li> </ul>			
	Wider Curriculum						

# COMPUTING

COMPUTING							
		Term1		Term2		Term3	
		Term 1.1	Term 1.2	Term 2.1	Term 2.2	Term 3.1	Term 3.2
10 IT	Theme	Planning and designing the spreadsheet solution	Creating the spreadsheet solution	Creating the spreadsheet solution	Testing the spreadsheet solution Evaluating the spreadsheet solution	Augmented Reality (AR)	Designing an Augmented Reality (AR) model prototype
	Concept	<i>Data manipulation using spreadsheets</i>	<i>Data manipulation using spreadsheets</i>	<i>Data manipulation using spreadsheets</i>	<i>Data manipulation using spreadsheets</i>	<i>Using Augmented Reality to present information</i>	<i>Using Augmented Reality to present information</i>
	Skills Knowledge	<p><u>Design Tools</u></p> <ul style="list-style-type: none"> <li>Flow charts</li> <li>Mind maps</li> <li>Story board</li> <li>Visualisation diagram</li> <li>Wireframe</li> </ul> <p><u>Functionality</u></p> <ul style="list-style-type: none"> <li>Calculations</li> <li>Sorting</li> <li>Filtering</li> <li>User aids                             <ul style="list-style-type: none"> <li>Data entry messages</li> <li>Data validation</li> </ul> </li> </ul> <p><u>Types of outputs that clearly present information for an organisation</u></p> <ul style="list-style-type: none"> <li>Charts</li> <li>Lists</li> <li>Invoices</li> <li>Reports</li> <li>Worksheets</li> </ul> <p><u>Human Computer Interface (HCI)</u></p> <ul style="list-style-type: none"> <li>Navigation</li> <li>Accessibility</li> <li>Colour</li> <li>Layout</li> <li>Learnability</li> <li>Memorability</li> <li>Messages</li> <li>Purpose</li> <li>User perceptions</li> </ul>	<p><u>Data handling and manipulation</u></p> <ul style="list-style-type: none"> <li>Data validation</li> <li>Lookup</li> <li>Range check</li> <li>Text length</li> <li>Limited choice                             <ul style="list-style-type: none"> <li>Drop down lists</li> <li>Radio Buttons</li> <li>Tick List</li> </ul> </li> <li>Cell formatting</li> <li>Conditional formatting</li> <li>Sorting</li> <li>Filters</li> <li>Formulae                             <ul style="list-style-type: none"> <li>Operators</li> <li>Parenthesis</li> </ul> </li> <li>Relational operators</li> <li>Naming cells</li> <li>Cell references                             <ul style="list-style-type: none"> <li>Relative/ Absolute/Named/Multi-sheet referencing</li> </ul> </li> <li>Functions</li> <li>Pivot tables</li> <li>Importing different file types</li> <li>Entering different data types</li> <li>Data types                             <ul style="list-style-type: none"> <li>Boolean</li> <li>Date</li> <li>Time</li> <li>Text</li> <li>Numeric                                     <ul style="list-style-type: none"> <li>Integer</li> <li>Number/Real</li> <li>Currency</li> <li>Percentage</li> <li>Decimal</li> </ul> </li> </ul> </li> <li>Security measures</li> <li>Modelling tools</li> </ul> <p><u>Techniques to generate the outputs</u></p> <ul style="list-style-type: none"> <li>Charts/graphs</li> <li>Page layout properties</li> <li>Adjusting row and column settings</li> </ul> <p><u>User interface</u></p> <ul style="list-style-type: none"> <li>Buttons/Macros</li> <li>Hyperlinks</li> <li>Forms</li> </ul> <p><b>R060 Task 1 – Planning a Spreadsheet</b> <b>R060 Task 1 – Designing a Spreadsheet</b></p>	<p><b>R060 Task 1 – Designing the Spreadsheet</b> <b>R060 Task 2 – Creating &amp; testing the Spreadsheet</b></p> <p><u>Test the user interface and the technical aspects of the spreadsheet solution</u></p> <ul style="list-style-type: none"> <li>Testing during development                             <ul style="list-style-type: none"> <li>Technical testing</li> <li>Usability testing</li> </ul> </li> <li>Testing after development</li> <li>Technical testing</li> <li>Usability testing</li> <li>Test plan documentation</li> <li>Types of test data                             <ul style="list-style-type: none"> <li>Extreme</li> <li>Invalid (Erroneous)</li> <li>Valid</li> </ul> </li> </ul>	<p><b>R060 Task 2 – Creating &amp; testing the Spreadsheet</b> <b>R060 Task 3 – Evaluating the Spreadsheet</b></p> <p><u>Methods used to evaluate the success of the spreadsheet solution</u></p> <ul style="list-style-type: none"> <li>Client requirements</li> <li>HCI design principles and conventions</li> </ul>	<p><u>Purpose and uses of Augmented Reality (AR)</u></p> <ul style="list-style-type: none"> <li>What AR is</li> <li>The purpose of AR</li> <li>The sectors where AR can be used in                             <ul style="list-style-type: none"> <li>Architecture</li> <li>Education</li> <li>Entertainment</li> <li>Retail</li> <li>Lifestyle</li> </ul> </li> <li>Uses of AR Training                             <ul style="list-style-type: none"> <li>Virtual tours</li> <li>Visualisation of designs, interiors, and concepts</li> <li>Marketing</li> </ul> </li> </ul> <p><u>Types of Augmented Reality (AR) and user interaction</u></p> <ul style="list-style-type: none"> <li>Types of AR                             <ul style="list-style-type: none"> <li>Object recognition / Marker-based</li> <li>Location based / Markerless</li> <li>Superimposed</li> </ul> </li> <li>User interaction / layers                             <ul style="list-style-type: none"> <li>Static</li> <li>Interactive</li> </ul> </li> </ul> <p><u>Devices used with Augmented Reality (AR)</u></p> <ul style="list-style-type: none"> <li>Types of devices AR can be used on                             <ul style="list-style-type: none"> <li>Mobile devices</li> <li>Smart devices</li> <li>Laptop / PC</li> </ul> </li> </ul>	<p><u>Planning and design considerations</u></p> <ul style="list-style-type: none"> <li>Purpose and user requirements</li> <li>Target audience</li> <li>Content</li> <li>Assets                             <ul style="list-style-type: none"> <li>Audio</li> <li>Charts and graphs</li> <li>Hyperlink/Weblink</li> <li>Photograph(s) /Image(s)</li> <li>Text</li> <li>Video</li> </ul> </li> <li>Triggers                             <ul style="list-style-type: none"> <li>Object recognition / Marker-based</li> <li>Location (GPS) based / Markerless</li> <li>Superimposition</li> </ul> </li> <li>Layers / User Interaction                             <ul style="list-style-type: none"> <li>Action flow</li> <li>Static</li> <li>Interactive</li> </ul> </li> </ul> <p><u>Design Tools</u></p> <p>Tools used to design the content and action flow for an AR product</p> <ul style="list-style-type: none"> <li>Flowcharts</li> <li>Mind Maps</li> <li>Mood boards</li> <li>Storyboards</li> <li>Visualisation diagrams</li> <li>Wireframes</li> </ul> <p><b>R070 Task 1 –Designing the Augmented Reality (AR) model prototype</b></p>
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11 IT	Theme	<p>Designing an Augmented Reality (AR) model prototype</p> <p>Creating an Augmented Reality (AR) model prototype</p> <p style="text-align: center;">Design tools</p> <p style="text-align: center;">Human Computer Interface (HCI) in everyday life</p>	<p>Creating an Augmented Reality (AR) model prototype</p> <p>Testing and reviewing</p> <p style="text-align: center;">Data and testing</p>	<p>Cyber-security and legislation</p>	<p>Digital communications</p> <p>Internet of Everything (IoE)</p>		
	Concept	<p><i>Using Augmented Reality to present information</i></p> <p style="text-align: center;"><i>IT in the Digital World</i></p>	<p><i>Using Augmented Reality to present information</i></p> <p style="text-align: center;"><i>IT in the Digital World</i></p>	<p><i>Using Augmented Reality to present information</i></p> <p style="text-align: center;"><i>IT in the Digital World</i></p>	<p><i>Using Augmented Reality to present information</i></p> <p style="text-align: center;"><i>IT in the Digital World</i></p>		
	Skills Knowledge	<p><u>Planning and design considerations</u></p> <ul style="list-style-type: none"> <li>• Purpose and user requirements</li> <li>• Target audience</li> <li>• Content</li> <li>• Assets               <ul style="list-style-type: none"> <li>○ Audio</li> <li>○ Charts and graphs</li> <li>○ Hyperlink/Weblink</li> <li>○ Photograph(s) /Image(s)</li> <li>○ Text</li> <li>○ Video</li> </ul> </li> <li>• Triggers               <ul style="list-style-type: none"> <li>○ Object recognition / Marker-based</li> <li>○ Location (GPS) based / Markerless</li> <li>○ Superimposition</li> </ul> </li> <li>• Layers / User Interaction               <ul style="list-style-type: none"> <li>○ Action flow</li> <li>○ Static</li> <li>○ Interactive</li> </ul> </li> </ul> <p><u>Design Tools</u></p> <ul style="list-style-type: none"> <li>• Tools used to design the content and action flow for an               <ul style="list-style-type: none"> <li>○ AR product</li> <li>○ Flowcharts</li> <li>○ Mind Maps</li> <li>○ Mood boards</li> <li>○ Storyboards</li> <li>○ Visualisation diagrams</li> <li>○ Wireframes</li> </ul> </li> </ul> <p><u>Augmented Reality (AR) model prototype</u></p> <ul style="list-style-type: none"> <li>• Characteristics               <ul style="list-style-type: none"> <li>○ Not full product</li> <li>○ Confirms functionality</li> <li>○ Confirms aesthetics</li> <li>○ Has access to real data</li> </ul> </li> </ul> <p><u>Triggers</u></p> <ul style="list-style-type: none"> <li>• Trigger characteristics               <ul style="list-style-type: none"> <li>○ Must be unique                   <ul style="list-style-type: none"> <li>➢ blurred images</li> <li>➢ too much text</li> <li>➢ too much blank space</li> </ul> </li> <li>○ Object recognition / Marker-based</li> <li>○ Location based / Markerless</li> <li>○ Superimposition</li> </ul> </li> </ul> <p><b>R070 Task 2 – Creating the Augmented Reality (AR) model prototype</b></p> <p><u>Types of design tools</u></p> <ul style="list-style-type: none"> <li>• Flow charts</li> <li>• Mind maps               <ul style="list-style-type: none"> <li>○ Library</li> <li>○ Tunnel timeline</li> <li>○ Presentation</li> </ul> </li> <li>• Visualisation diagrams</li> <li>• Wireframes</li> </ul> <p><u>The purpose, importance and use of HCI in application areas</u></p> <ul style="list-style-type: none"> <li>• Banking</li> </ul>	<p><u>Layers / user interaction</u></p> <ul style="list-style-type: none"> <li>• Single and multiple layers</li> <li>• Access to layers               <ul style="list-style-type: none"> <li>○ Static</li> <li>○ Interactive                   <ul style="list-style-type: none"> <li>➢ Swipe</li> <li>➢ Click/select</li> <li>➢ Voice</li> </ul> </li> </ul> </li> </ul> <p><u>Information output</u></p> <ul style="list-style-type: none"> <li>• Audio</li> <li>• Chart(s) and graph(s)</li> <li>• Hyperlink(s)/Weblink(s)</li> <li>• Photograph(s) /Image(s)</li> <li>• Text</li> <li>• Video(s)</li> </ul> <p><u>Testing</u></p> <ul style="list-style-type: none"> <li>• How to carry out testing of an AR model prototype               <ul style="list-style-type: none"> <li>○ Technical testing</li> <li>○ User testing</li> </ul> </li> <li>• Using a test plan               <ul style="list-style-type: none"> <li>○ Test number</li> <li>○ What is being tested</li> <li>○ Expected result</li> <li>○ Actual result</li> <li>○ Remedial action</li> </ul> </li> </ul> <p><u>Reviewing the process of creating the Augmented Reality (AR) model prototype</u></p> <ul style="list-style-type: none"> <li>• Ways to review               <ul style="list-style-type: none"> <li>○ The effectiveness of the processes followed</li> <li>○ The effectiveness of the tools and techniques used</li> <li>○ Does the AR model prototype meet the defined purpose</li> <li>○ Lessons learnt</li> </ul> </li> </ul> <p><b>R070 Task 2 – Creating the Augmented Reality (AR) model prototype</b></p> <p><b>R070 Task 3 – Test and review the Augmented Reality (AR) model prototype</b></p> <p><u>Information and data</u></p> <ul style="list-style-type: none"> <li>• What data is</li> <li>• What information is</li> <li>• The relationship between data and information</li> </ul> <p><u>Data use - Use of data types in different contexts</u></p> <ul style="list-style-type: none"> <li>• Alphanumeric</li> <li>• Boolean</li> <li>• Date</li> <li>• Numeric</li> </ul>	<p><u>Application of testing to a range of contexts - Importance and purpose of testing</u></p> <p><u>Application of testing to a range of contexts - Test data</u></p> <ul style="list-style-type: none"> <li>• Extreme</li> <li>• Invalid (Erroneous)</li> <li>• Valid</li> </ul> <p><u>Application of testing to a range of contexts - Types of testing</u></p> <ul style="list-style-type: none"> <li>• Technical</li> <li>• User</li> </ul> <p><u>Threats</u></p> <ul style="list-style-type: none"> <li>• Denial of service (DoS)</li> <li>• Hacking including               <ul style="list-style-type: none"> <li>○ Black Hat</li> <li>○ Grey Hat</li> <li>○ White Hat</li> </ul> </li> <li>• Malware including               <ul style="list-style-type: none"> <li>○ Adware</li> <li>○ Botnet</li> <li>○ Ransomware</li> <li>○ Spyware</li> <li>○ Trojan Horse</li> <li>○ Virus</li> <li>○ Worm</li> </ul> </li> <li>• Social Engineering including               <ul style="list-style-type: none"> <li>○ Baiting</li> <li>○ Phishing</li> <li>○ Pretexting</li> <li>○ Quid Pro Quo</li> <li>○ Scareware</li> <li>○ Shoulder Surfing</li> </ul> </li> </ul> <p><u>The impacts of a cyber-security attack on individuals and/or organisations</u></p> <ul style="list-style-type: none"> <li>• Data destruction</li> <li>• Data manipulation</li> <li>• Data modification</li> <li>• Data theft – in transit and at rest</li> <li>• Denial of service (DoS) to authorised others</li> <li>• Identify theft</li> </ul> <p><u>Prevention Measures</u></p> <ul style="list-style-type: none"> <li>• Physical               <ul style="list-style-type: none"> <li>○ Biometric devices</li> <li>○ Firewalls</li> <li>○ Keypads</li> <li>○ Radio-frequency identification (RFID)</li> <li>○ Secure backups</li> </ul> </li> <li>• Logical               <ul style="list-style-type: none"> <li>○ Access rights and permissions</li> <li>○ Anti-virus / malware software</li> <li>○ Two-Factor Authentication (2FA)</li> <li>○ Encryption</li> <li>○ Firewalls</li> <li>○ Secure backups</li> <li>○ Usernames &amp; passwords</li> </ul> </li> <li>• Secure Destruction of data               <ul style="list-style-type: none"> <li>○ Data erasure</li> </ul> </li> </ul>	<p><u>Digital communications – Types</u></p> <ul style="list-style-type: none"> <li>• Audio</li> <li>• Collaboration tools</li> <li>• Leaflet</li> <li>• Infographics</li> <li>• Newsletters</li> <li>• Presentations</li> <li>• Reports</li> <li>• Social Media</li> <li>• Video</li> <li>• Voice over Internet Protocol (VoIP)</li> <li>• Websites</li> </ul> <p><u>Digital communications – Software</u></p> <ul style="list-style-type: none"> <li>• Desktop Publishing (DTP)</li> <li>• Standard office applications</li> </ul> <p><u>Digital communications – Digital Devices</u></p> <ul style="list-style-type: none"> <li>• Smartphone</li> <li>• Smart TV</li> <li>• PC/Laptop</li> <li>• Tablet</li> <li>• Smartboard</li> </ul> <p><u>Digital communications – Distribution Channels</u></p> <ul style="list-style-type: none"> <li>• Types of distribution channel               <ul style="list-style-type: none"> <li>○ Cloud</li> <li>○ Email</li> <li>○ Messaging</li> <li>○ Mobile Apps</li> <li>○ Multimedia</li> <li>○ VoIP</li> <li>○ Websites</li> </ul> </li> <li>• Distribution channel connectivity               <ul style="list-style-type: none"> <li>○ 4G / 5G</li> <li>○ Bluetooth</li> <li>○ Mobile Wi-Fi hotspots</li> <li>○ Wi-Fi</li> <li>○ Wired</li> </ul> </li> <li>• Audience demographics               <ul style="list-style-type: none"> <li>○ Accessibility</li> <li>○ Age</li> <li>○ Gender</li> <li>○ Location</li> </ul> </li> </ul> <p><u>Use of IoE</u></p> <ul style="list-style-type: none"> <li>• What is the IoE</li> <li>• The four pillars of the IoE</li> <li>• The interactivity between the four pillars</li> <li>• IoE digital interactivity               <ul style="list-style-type: none"> <li>○ Device to device</li> <li>○ Human to device</li> <li>○ How digital devices can be tailored to meet the needs of the user</li> </ul> </li> </ul> <p><u>Application areas in everyday life</u></p> <ul style="list-style-type: none"> <li>• Energy Management</li> <li>• Health</li> <li>• Manufacturing</li> </ul>	<p><u>Revision</u></p> <p>Revision topics to be directed by pupil performance/suggestions</p>	COMPLETION OF COURSE

		<ul style="list-style-type: none"> <li>• Embedded systems</li> <li>• Entertainment</li> <li>• Fitness</li> <li>• Home appliances</li> <li>• Retail</li> </ul> <p><u>Hardware considerations</u></p> <ul style="list-style-type: none"> <li>• Display <ul style="list-style-type: none"> <li>○ Type</li> <li>○ Size</li> </ul> </li> <li>• Resources <ul style="list-style-type: none"> <li>○ Memory</li> <li>○ Processing power</li> </ul> </li> </ul> <p><u>Software considerations</u></p> <ul style="list-style-type: none"> <li>• Operating system</li> <li>• Digital platform <ul style="list-style-type: none"> <li>○ Database</li> <li>○ Mobile App</li> <li>○ Spreadsheet</li> <li>○ Website</li> </ul> </li> </ul> <p><u>User interaction methods</u></p> <ul style="list-style-type: none"> <li>• Gesture</li> <li>• Keyboard</li> <li>• Mouse</li> <li>• Touch</li> <li>• Voice</li> </ul>	<ul style="list-style-type: none"> <li>○ Currency</li> <li>○ Decimal</li> <li>○ Integer</li> <li>○ Percentages</li> <li>○ Real</li> <li>• Text</li> </ul> <p><u>The difference between validation and verification - Data validation tools</u></p> <ul style="list-style-type: none"> <li>• Data type check</li> <li>• Format check</li> <li>• Input mask</li> <li>• Length check</li> <li>• Limited choice <ul style="list-style-type: none"> <li>○ Drop down list</li> <li>○ Radio buttons</li> <li>○ Tick list</li> </ul> </li> <li>• Lookup</li> <li>• Presence check</li> <li>• Range check</li> </ul> <p><u>The difference between validation and verification - Data verification tools</u></p> <ul style="list-style-type: none"> <li>• Double entry</li> <li>• Manual checking</li> </ul> <p><u>Data collection methods</u></p> <ul style="list-style-type: none"> <li>• Primary <ul style="list-style-type: none"> <li>○ Email</li> <li>○ Interview</li> <li>○ Online Questionnaire and survey</li> </ul> </li> <li>• Secondary <ul style="list-style-type: none"> <li>○ Book</li> <li>○ Government Statistics</li> <li>○ Magazine</li> <li>○ Website</li> </ul> </li> </ul> <p><u>Storage of collected data</u></p> <ul style="list-style-type: none"> <li>• Logical location <ul style="list-style-type: none"> <li>○ Cloud</li> </ul> </li> <li>• Physical location <ul style="list-style-type: none"> <li>○ Internal storage device <ul style="list-style-type: none"> <li>➢ Primary Hard Drive</li> <li>➢ Network Drive</li> </ul> </li> <li>○ External storage device <ul style="list-style-type: none"> <li>➢ Portable external Hard Drive Disc (HDD)</li> <li>➢ Portable Solid-State Drive (SSD)</li> <li>➢ Network-attached storage (NAS) device</li> <li>➢ Portable USB Flash Drives</li> <li>➢ Portable Wireless Drives</li> </ul> </li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>○ Data sanitation</li> <li>○ Magnetic wipe</li> <li>○ Physical destruction</li> </ul> <p><u>Legislation related to the use of IT systems</u></p> <ul style="list-style-type: none"> <li>• Computer Misuse Act</li> <li>• Copyright, Designs and Patents Act</li> <li>• Data Protection Act</li> <li>• Freedom of Information Act</li> <li>• Health &amp; Safety at Work Act</li> </ul>	<ul style="list-style-type: none"> <li>• Military / Emergency Services</li> <li>• Smart devices <ul style="list-style-type: none"> <li>○ Business</li> <li>○ Home</li> <li>○ Personal</li> <li>○ Transport</li> </ul> </li> </ul>		
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