2020/21
CURRICULUM MAP

Computer Science & IT

Preparing Students for the Digital World by developing skills in computer coding & digital technology applications enabling them to ultimately secure a career within a wide range of industries

	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Year 7	**Prior Knowledge & Skills from Primary school**	**Welcome to Computing @ JMS**	**Spreadsheets**	**3D Modelling**	**Data Representation**	**Computational Thinking**	**Vector Graphics**
	• use logical reasoning • work with variables and various forms of input and output • understand computer networks including the internet • use search technologies effectively • use technology safely, respectfully and responsibly	Students are introduced to the JMS IT system • Logging on & Passwords • Saving Work • SMHW/Google Classroom • Baseline / CAT Testing • Sending Emails • Intro to IDEA.ORG • Effective Internet Searching • Staying Safe Online	Students learn to create spreadsheets for a real world scenario. • Getting to know a spreadsheet • Difference between data & Information • Collecting Data • Using Formulas & Functions	Students develop knowledge and understanding of using a computer to produce 3D models. • 3D Modelling • Rotation and Position • Making holes • Plan & create 3D Model	Students develop an understanding of how data is stored and manipulated in a computer system. • Understanding Binary • Units • Converting between Binary & Denary.	Student develop an understanding of how instruct a computer to do a task. • What is an Algorithm? • Understand how a computer carries out instructions. • Input/Process/Output • Programming skills using sequence, selection & Iteration.	Students develop an understanding of how to design graphics using vector graphic editing software • Draw Basic Shapes • Create Vector Graphics
Year 8	**Prior Knowledge & Skills from Year 7**	**Data Representation**	**Spreadsheets**	**Computational Thinking**	**Cybersecurity**	**Mobile App Development**	**Computing Systems**
	• Computational Thinking • Digital Literacy	Students develop an understanding of how data is stored and manipulated in a computer system. • Understanding how computers represent data • Understanding binary and hexadecimal number systems. • Binary Addition • Representing Images • Representing Sounds	Students learn to create spreadsheets for a real world scenario. • Getting to know a spreadsheet • Difference between data & Information • Collecting Data • Using Formulas & Functions • Creating Charts & Graphs	Student develop an understanding of how instruct a computer to do a task. • What is an Algorithm? • Understand how humans and Computers understand and carry out instructions • Recognise that computers follow the control flow of Input/Process/Output	Students develop an understanding of techniques used by cybercriminals to steal data, disrupt systems, and infiltrate networks • Data Protection Act • Data leaks through human error • Hacking • Malware • Protecting Networks • Preventative Methods	Students work through the entire process of creating their own mobile app. • Decomposition • Programming Skills (Sequence, Selection, Iteration, Event based) • Code Testing • Evaluation	Students develop an understanding of the different layer of Computing Systems. • Functions of hardware components • Operating System • Boolean Logic & logic gates • AI & Machine Learning

Year 9 CS

Prior Knowledge & Skills from Year 8	**Programming Skills**		**Introduction to Data Representation**	**Introduction to Computer Systems**	**Introduction to Networks**	**Introduction to Cybersecurity**
• Algorithmic Thinking • Decomposition • Online Safety • Digital Literacy	Python Programming Developing practical programming skills to create programs which meet user requirements.	Flowcharts & Pseudocode Understanding how algorithms can be represented in different forms.	• Understanding how computers represent data • Understanding binary and hexadecimal number systems.	• Components of a Computer system • How the CPU works and interacts with memory and storage to input, process and output data.	• What is a network? • Network Protocols • Network Hardware • Wired Vs Wireless • Internet Vs WWW • Network Components	• Different types of threats to Data • How to prevent attacks

Year 10 CS

Prior Knowledge & Skills from Year 9	**Programming Skills**	**Computer Systems**	**Data Representation**	**Databases**	**Networks**	**Cybersecurity**
• Digital Literacy • Data Representation • Computer Systems • Database • Cybersecurity	• Using decomposition and problem solving to create algorithms. • Develop programs using practical programming skills. • Understand different types of programming languages.	• Memory & Storage • The role of RAM and ROM and virtual memory. • Types of storage device and how they work. • Factors impacting performance and selection of storage devices.	• Understanding how computers represent data such as images, sound and text using binary. • Understanding binary and hexadecimal number systems. • ASCII & Unicode • Data Compression	• Creating a database and identifying appropriate data types and validation techniques. • Understanding key database terminology. • Creating SQL Queries	• Understand what a computer network is • Types of networks • Compare Wired & wireless networks. • Network Topologies	• Cybersecurity Threats • Types of Testing • Social Engineering • Malware • Detect & Prevent methods

Year 11 CS

Prior Knowledge & Skills from Year 10	**Programming Skills**	**Ethical, Legal & Environmental Issues**	**Networks**	**Revision & Exam Question Techniques**		
• Problem Solving • Programming • Data Representation • Databases • Computer Systems • Digital Literacy	**Algorithmic problem solving** • Understanding common algorithms (Search & Sort) • Creating algorithms for a range of real world scenarios. Programming techniques Understanding how to create well designed Code (defensive design/testing)	• The impact of computers on the environment. • Using computers in a legal and ethical way. • Legislation relating to technology in society.	• Network protocols and how they are used for communication. • How the internet works and how packets of data are transported across networks. • Network Security	Exam Techniques Paper 1 Focus on Computational thinking, code tracing, problem-solving, programming concepts including the design of effective algorithms and the designing, writing, testing and refining of code	Exam Techniques Paper 2 Focus on being able to explain the components of a computer and their role, and ability to explain how computers represent a range of data using binary. Databases, Cybersecurity & Ethical Impacts of technology	**Pathways** Afterwards • **A' Level** in Computer Science • **BTEC courses** which focus on industry practices. • **Apprenticeship** courses based in Computing Industry.

Year 9 DIT

Prior Knowledge & Skills from Year 8	Component 1: Exploring User Interface Design Principles and Project Planning Techniques	Component 2 : Collecting, Presenting and Interpreting Data	Component 3: Effective Digital Working Practices
• Spreadsheet Skills • Cybersecurity	Students will investigate different types of user interface used by individuals and organisations. They will investigate how they vary across different uses, devices and purposes. They will complete a mock assignment for this section of the component which will be used to assist them in year 10 when they complete the real assignment.	Students will investigate the characteristics of data and information and how they help organisations in decision making. Students will be taught spreadsheet skills needed to create a dashboard to present and draw conclusions from information.	Students will explore how organisations use digital systems and the wider implications associated with their use. The areas that the students will cover, in year 9, are: • **Modern Technologies** – Cloud Storage & Technology • **Cybersecurity** – Threats to Data, Malware • **The Wider Implications of Digital Systems** – Legal Aspects of using Technology

Year 10 DIT

Prior Knowledge & Skills from Year 9	Component 1 : Exploring User Interface Design Principles and Project Planning Techniques Internally assessed by the teacher.			Component 3 : Effective Digital Working Practices Exam Support & Preparation
• Understanding of User Interfaces (User Needs & Design Principles) • Understanding of Spreadsheets.	The students will complete the first internally assessed component towards their qualification. It is broken into three sections. The students are given an assignment for each section which they complete to demonstrate their understanding.			Students will explore how organisations use digital systems and the wider implications associated with their use. • **Modern Technologies** – Students will understand how and why modern technologies are used by organisations and stakeholders to access and manipulate data, and to provide access to systems and tools in order to complete tasks • **Impact of Modern Technologies** – Students will understand how modern technologies impact on the way organisations perform tasks. • **Cybersecurity** – Students will understand why systems are attacked, types of attack, how to prevent attacks & policies organisations hold. • **The wider implications of digital systems** – Students will understand the wider implication of digital systems and their use.
	LAA: Investigation Using the work completed in Year 9, the students will complete their real assignment for this section of the component	**LAB: The Project Plan** Students will investigate and use different project planning & design techniques/tools to plan & design a user interface project.	**LAC: Creating & Reviewing** Students will use their designs/plans from LAB to create their UI. They will refine and review their work.	

Year 11 DIT

Prior Knowledge & Skills from Year 10	Component 2 : Collecting, Presenting and Interpreting Data Internally assessed by the teacher.			Component 3: Effective Digital Working Practices Revision & Exam Question Techniques Externally assessed through controlled exam.	
Students will have completed one official component of study. They will have covered the theory for the Component 3 exam taken in Feb of year 11.	The students will complete the second internally assessed component towards their qualification. It is broken into three sections. The students are given an assignment for each section which they complete to demonstrate their understanding.			Focus on being able to answer exam questions, using appropriate techniques, on the following topics: • **Modern Technologies** • **Impact of Modern Technologies** • **Cybersecurity** • **The wider implications of digital systems**	**Pathways Afterwards** • **BTEC courses** which focus on industry practices. • **Apprenticeship** courses based in professional companies.
	LAA: Investigation Students will investigate the characteristics of data and information and how they help organisations in decision making.	**LAB: Dashboard Creation** Students will create a dashboard using data manipulation tools for a real life scenario.	**LAC: Drawing Conclusions** Students will draw conclusions on the data set, using their dashboard in order to make recommendations		