ICT & Computer Science

Through their experiences of using ICT & Computer Science, our students here at St Thomas More Catholic school will not only find improvements in engagement and knowledge retention, but will also develop their ability to problem solve using the four foundation stones of Computational Thinking. We aim for all our students to be able to use the ever evolving world of computing in a safe and respectful manner; matching their products to their audience and purpose, so that they will be able to successfully contribute to the world in which we live and reach their potential.

Key Stage 3 and 4

The ICT & Computer Science Department curriculum has been built around the following key concepts that students need to grasp:

E-Safety	**Audience & Purpose**	**Computer Architecture and networks**	**Computational Thinking and Software development**	**The Ethical, legal, cultural and environmental impact**
E-Safety: how do we keep ourselves safe in today's digital world. What do we do if things go wrong and how do we report wrong doings?	Audience & Purpose: how do we ensure the product we make digitally is suitable for its intended audience & purpose?	Computer Architecture & networks: how does a computer work? What are the hardware and software elements and how do they combine to make a computer work? How are computer systems joined through the use of networks?	Computational Thinking: how do the 4 cornerstones of abstraction, algorithmic thinking, decomposition and pattern recognition enable us to problem solve? What are the key programming concepts?	The Ethical, legal, cultural and environmental impact: what do we need to do to ensure our carbon footprint is negative or neutral. What laws cover the date we collect and process and the assets we use online?

The table below shows you the topics pupils will study throughout Key Stage 3:

	Module 1	**Module 2**	**Module 3**
Year 7	Clear messaging in Digital Media. Networks from semaphores to the Internet.	Programming Essential 1. Modelling Data using spreadsheets.	Programming Essentials 2. Using media - Gaining support for a cause.
Year 8	Media - Vector graphics Layers of computing systems	Developing for the Web Representation - from clay to silicon	Mobile app development Introduction to Python programming

Year 9	Python programming with sequences of data Media - animation	Data science Representations - going audiovisual	Introduction to cybersecurity Python Programming with Sequences of data

Having developed their knowledge of the key concepts throughout Key Stage 3, the aim of Key Stage 4 is to ensure that students are able to apply their understanding of these concepts to allow them to successfully undertake either ICT or Computer Science courses.

The table below shows you the topics pupils will study throughout Key Stage 4:

ICT	**Module 1**	**Module 2**	**Module 3**
Year 10	Design tools, Planning and designing the spreadsheet solution, Designing an AR model prototype, Human Computer Interface in everyday life, Data & Testing, design conventions and principles.	Creating the spreadsheet solution, Testing the spreadsheet solution, Evaluating the spreadsheet solution. NEA Assessment, Augmented Reality,	NEA Assessment, Digital communications, Designing an AR model prototype, Internet of Everything, Creating and AR model prototype.
Year 11	Modern technologies Cyber security	The wider implications of digital systems Planning and communication in digital systems	Theory Revision

CSc	**Module 1**	**Module 2**	**Module 3**
Year 10	Boolean logic, Data storage, Designing, creating and refining algorithms, Data types and Programming fundamentals	Practical Programming Skills. Architecture of the CPU, CPU Performance	Embedded systems, Primary & Secondary storage, Networks and topologies, Wired and wireless networks, protocols and layers
Year 11	Threats to computer systems and networks, Identifying and preventing vulnerabilities, Defensive design, Operating systems, Utility software, The IDE	Ethical, legal, cultural and environmental impact, Searching and sorting algorithms, Languages	Theory Revision & Practical Programming Skills Revision

Key Stage 5

Computer Science

The GCE Computer Science curriculum builds upon all the knowledge and skills established during the GCSE Computer Science course. A more independent learning approach will encourage our students to be inspired, motivated and challenged. The course will provide insight into, and experience of how computer science works and how we engage with

Success at this Key Stage is led by a critical understanding of the **key concepts** below:

Computer Architecture and networks	**Computational Thinking** **Software and software Development**	**Legal, moral, cultural and ethical issues**

The table below shows you the topics pupils will study throughout Key Stage 5:

	Module 1	**Module 2**	**Module 3**
Year 12	Components and functions of a processor Computational Thinking	Software and types of methodologies Programming Techniques & Computational Methods Exchanging Data	Algorithms Legal, moral, cultural and ethical issues. Planning NEA project
Year 13	Creating, testing & evaluating NEA project	Data types, structures & Algorithms Structured Revision	Structured Revision

ICT- AAQ

The Cambridge Advanced Nationals in IT: Data Analytics will encourage you to develop key knowledge, understanding and skills, relevant to the subject. You will need to think creatively, innovatively, analytically, logically and critically as well as developing valuable communication skills that are important in all aspects of further study and life. You will need to develop transferable learning and skills, such as evaluation, planning, presentation and research skills, that are important for real-life contexts and work situations.

	Module 1	**Module 2**	**Module 3**
Year 12	Unit F200: Fundamentals of data analytics	Unit F201: Big data and machine learning	Unit F202: Spreadsheet data modelling
Year 13	Design of the solution (NEA) Developing the solution (NEA)	Evaluation (NEA) Computing related legislation Moral and ethical Issues	Structured Revision

ICT- Cambridge Technicals

Students studying this qualification will learn not just about how to use computers, but how businesses' systems or the systems for their customers, use IT as a tool to analyse data and develop applications. This qualification is designed to give our students a range of specialist knowledge and transferable skills in the context of applied IT. The various units are outlined below:

Unit 6	In this unit our students will explore potential ideas for a new application and develop the fundamental design for it. They will then develop the designs for an application and how users will interact with it.
Unit 9	In this unit our students will learn about different product design methodologies and the role of the product development life cycle. In addition, they will discover the factors that influence product developments.
Unit 21	In this unit you will research, design and produce an interactive, responsive website that is specific to a client's needs, culminating in presenting the concept of the website using the prototype to the client. You will learn about the security risks in website design and how to minimise these threats. This unit will also allow you to incorporate existing interactive elements, as well as prototyping your own website.

The table below shows you the topics pupils will study throughout Key Stage 5:

	Module 1	**Module 2**	**Module 3**
Year 13	Be able to plan the development of an interactive website for an identified client. Be able to create prototype websites for an identified client. Be able to investigate potential solutions for application developments. Be able to generate designs for application solutions. Be able to design products that meet identified client requirements. Be able to implement and test products.	Be able to present the interactive website concept to an identified client Be able to present application solutions to meet client and user requirements Be able to carry out acceptance testing with clients	Moderation of work.