



## Computing: The Future is Technology

The rationale for the Computing GCSE curriculum is designed to aid student progression through the course and to consistently build on prior learning. This helps students grow, develop and reinforce the skills and theory needed to pass the course.

The Computing course is split into two components with two separate exam papers, the SOW has been structured in the best possible way for students to help retain the skills and information required for these papers. Firstly, Programming is taught early in year 10. Just like riding a bike, once the programming foundation has been learned it sticks with students through the course, which then only needs to be refreshed periodically throughout later year 10 and in year 11. Approaching programming in this way means that there is no additional learning required in year 11, which generates more time for the theoretical revision.

## GCSE

Year 10	Enquiry Statement/Aim	Knowledge and Skills
<b>Term 1</b>	<b>Topic - Programming</b>  To develop an understanding of basic computer programming language and how to write simple programs.	By creating very simple programs students develop problem solving and computational thinking skills along with the fundamental programming language basics such as, IF Else statements , prints and loops.
<b>Term 2</b>	<b>Topic - Programming</b>  To consolidate and apply basic programming skills independently to more complex tasks.	Students learn how to program more independently and apply skills to problems. Advanced skills are also learned such as two dimensional lists and count-controlled loops, which are applied where needed.
<b>Term 3</b>	<b>Topic - Programming</b> <b>Non-Examined Assessment (NEA)</b>  Completion of compulsory NEA.	Students apply all prior knowledge in order to complete the compulsory 20-hour NEA. As well as programming skills students will also learn how to analyse problems, construct testing tables, create flowcharts and evaluate/reflect upon a programming project.
<b>Term 4</b>	<b>Topic - Binary, Denary, Hexadecimal</b>  To understand the fundamental backbone of all digital data.	In term 4 students start to prepare for the theory examination. They first learn about about the importance of binary which underpins every aspect of technology. They gain skills in converting between binary, decimal and hexadecimal, as well as adding binary values, performing binary shifts and understanding check digits

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	<p><b>Topic - The CPU and internal hardware</b></p> <p>To understand how hardware components function inside a computer system.</p>	<p>The second topic of focus is the CPU, RAM, ROM and Memory and how they all work together in a system. This focuses on the function of a CPU including the Von Neuman architecture. Students learn the difference between a variety of types of memory and how the CPU uses these to process data.</p>
Term 5	<p><b>Topic - Software</b></p> <p>To understand how software is run and processed by the hardware.</p> <p><b>Topic - Data Representation</b></p> <p>Students aim to understand how different types of data such as images and sound are processed and represented by a computer system.</p>	<p>Students understand the difference between system software and application software. They will then focus on how an operating system uses software to maintain the computer and perform background processes.</p> <p>Students learn about how computers process different data formats and the key properties of different types of data.</p> <p>They will also focus on the leading two character sets (ASCII and Unicode) and how they are used in different devices.</p>
Term 6	<p><b>Topic - Networks</b></p> <p>To understand the hardware, principles and protocols that govern the sending of information across a network</p>	<p>Students will first understand the basics of how networks are constructed, the different types of networks that can be made and the advantages and disadvantages of different network topologies. Students will then learn about the fundamental hardware needed to send data across a network and the universal protocols needed for data to travel across the hardware.</p>

Year 11	Enquiry Statement/Aim	Knowledge and Skills
Term 1	<p><b>Topic - Networks</b></p> <p>To recap on the network unit studied before summer.</p> <p><b>Topic - Programming skills and theory</b></p>	<p>Due to the complexity and content of the unit students will spend the first two weeks recapping network theory.</p>



	To recap programming skills.	Students will recap programming skills by completing 10 small coding tasks that build in complexity and are similar to GCSE style questions.
<b>Term 2</b>	<p><b>Topic - Sorting and Searching Algorithms</b></p> <p>To understand sorting and searching algorithms and how to program them in Python.</p> <p><b>Topic - Defensive design</b></p> <p>To use defensive design strategies to make computer programs more robust.</p>	<p>Students will first study three sorting algorithms: linear, binary and insertion sort. They need to understand how these algorithms function as well as program them to work with an unsorted single dimensional list.</p> <p>Students will learn key defensive design strategies and how they can be used to make programs robust and unbreakable. Students will then apply these knowledge and skills to the programs that they made in year 10. This will help to reinforce past learning as well as consolidate these new defensive skills.</p>
<b>Term 3</b>	<p><b>Topic - Legal, ethical and cultural</b></p> <p>To understand the legal, ethical and cultural aspects of computing.</p> <p>At this point the course has been completed so it is now time to recap past units and begin revision.</p> <p><b>Topic - To recap the CPU unit</b></p> <p><b>Topic - To recap the memory unit</b></p>	<p>Students need to learn key laws and legislation that affect technology in the UK. They also consider the ethical and cultural dimensions of technology and how this technology affects the world and the environment.</p> <p>Targeted in class revision of key topics based on the identification of students' strengths and areas for development.</p> <p>A variety of different learning techniques will be used such as: thinking hard resources, flashcards, keyword sheets, practice questions, exam questions and question cards.</p>
<b>Term 4</b>	<p><b>Topic - To recap the Data Representation unit</b></p> <p><b>Topic - To recap the Network Unit</b></p> <p><b>Topic - To recap the Programming unit</b></p>	<p>Targeted in class revision of key topics based on the identification of students' strengths and areas for development.</p> <p>A variety of different learning techniques will be used such as: thinking hard resources, flashcards, keyword sheets, practice questions, exam questions and question cards.</p>

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<b>Term 5</b>	<b>Topic - Revision</b>	Students will use their PLC sheets to work out a revision plan of weakest to strongest topics. Students can then tailor revision lessons to cater for their individual needs and use any resources that work for them. Students also have the option to complete practice and past papers to get comfortable with the structure of the papers
<b>Term 6</b>	<b>Topic - Revision</b>	To complete last minute exam preparation.

The Rationale for the BTEC IT course is very different from what is put in place at GCSE. Firstly when deciding to structure the course The exam elements needs to first be taken into account. The course consists of three exams which students are able to take a total of three times during the two years. To give students the option of taking these resits the tests must all be completed in year 12 otherwise there is not time to fit all the resits in if they are needed. I have therefor structured the course content so these exams are taught first so students can use the resit windows if needed.

Each unit is the IT BTEC is very different from the next and the course is designed that way to give students a broad range of IT skills so they can choose the correct career path that suits them. Because of this I have chosen the following logical order for the units.

1. **Unit 11 – Cyber security and Incident Management.** – I have chosen this unit first as the information needed for the exam is easier to retain than the others. Once students understand how to forensically analyse a cyber-security issue and understand how to use the exam templates effectively they only need a bit of revision before the exam to remind them of the processes.
2. **Unit 2 - Creating systems to manage information** – This unit is very skill based and technical, students have to remember a lot of processes and how to execute them effectively. Students also have the tendency to forget these skills very quickly if they go for an extended period of not making a database so it is crucial they work on this unit right up to the exam window to give them the best possible chances in the exam.
3. **Unit 1 – Computer systems** – This exam based unit is very different from the other two and is more like the GCSE papers the students are used to, rather than an extended practical exam, unit 1 is a two hour theoretical exam based on computing knowledge. There are many similarities and crossovers from the GCSE paper so any Students who took GCSE computing will already have covered most of the content for this exam. Teaching this unit through the spring is nice for the student's as they can work at a slower pace after the stress of the practical exams.

Following the exam based units the students also have five coursework-based units to complete. The first unit is completed in year 12 with the following four units completed throughout year 13



## BTEC IT

Year 12	Enquiry Statement/Aim	Knowledge and Skills
<b>Term 1</b>	<p><b>Topic - Cyber security and incident management</b></p> <p>Students will examine the many different types of cyber security attacks, the vulnerabilities that exist in networked systems and the techniques that can be used to defend an organisation's networked systems. Students will investigate the techniques used to assess risks and ways of planning to deal with the results of a cyber security incident and recover systems following an incident.</p>	<p>Students will pick up skills related to cyber security and learn how to prevent these issues. They will gain knowledge in; network hardware, security tools and software, risk assessment and forensic analysis.</p>
<b>Term 2</b>	<p><b>Topic - Using systems to organise data</b></p> <p>Students will examine the structure of data and its origins, and how an efficient data design follows through to an effective and useful database. Students will examine a given scenario and develop an effective design solution to produce a database system.</p>	<p>Students will gain knowledge in using systems to organise data. They will gain key skills in normalisation, creating ERD's relational database structure, primary and foreign keys, generating queries and reports and finally reflecting on the previous processes.</p>
<b>Term 3</b>	<p><b>Topic - Computer systems</b></p> <p>Students will explore the relationships between the hardware and software that form an IT system, and the way that systems work individually and together, as well as the relationship between the user and the system. You will examine issues related to the use of IT systems and the impact that they have on organisations and individuals.</p>	<p>Students will gain skills, knowledge and understanding in; Digital devices, their functions and use, Peripheral devices and media. Computer software in an IT system, Emerging technologies. Choosing IT systems for different purposes, Transmitting data, Operating online, Protecting data and information. The impact of IT systems and finally, Moral, ethical and legal issues.</p>
<b>Term 4</b>	<p><b>Topic - Computer systems</b></p> <p>The computer systems unit will run until the exam date.</p>	<p>As above</p>

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<b>Term 5</b>	<p><b>Topic - Website production</b></p> <p>The unit aim is to review existing websites, commenting on their overall design and effectiveness. Then to use scripting languages such as Hypertext Markup Language (HTML), Cascading Style Sheets (CSS) and JavaScript® and a simple text editor, or rapid application development tools to build a functional website</p>	<p>Students will gain knowledge in the purpose and principles of website products and Factors affecting website performance</p> <p>Following this students will gain practical website development skills. they will focus on; Common tools and techniques used to produce websites Client-side scripting languages Testing and Website optimisation</p>
<b>Term 6</b>	<p><b>Topic - Website production</b></p> <p>The unit aim is to review existing websites, commenting on their overall design and effectiveness. Then to use scripting languages such as Hypertext Markup Language (HTML), Cascading Style Sheets (CSS) and JavaScript® and a simple text editor, or rapid application development tools to build a functional website.</p>	<p>Students will gain knowledge in the purpose and principles of website products and Factors affecting website performance. Following this students will gain practical website development skills. they will focus on; Common tools and techniques used to produce websites Client-side scripting languages Testing and Website optimisation</p>

<b>Year 13</b>	<b>Enquiry Statement/Aim</b>	<b>Knowledge and Skills</b>
<b>Term 1</b>	<p><b>Topic - Digital 2D and 3D graphics</b></p> <p>The aim of this unit is to explore the technical characteristics or digital graphics, including how graphics are created and represented in digital form. The impact of the technologies used on the usability and accuracy of the digital graphics. Students will then design and develop 2D and 3D digital graphics for an audience and purpose.</p>	<p>Students will first gain knowledge in the purpose of and legal requirements for digital graphics. they will then demonstrate that they understand how graphics are represented and the applications that create them. after gaining knowledge of the unit students will gain skills in creating 2D and 3D images using a software package of their choice. Students will also gain skills in Designing documentation for digital graphics, Digital graphics processing and techniques and finally Tools and techniques used for developing digital graphics</p>
<b>Term 2</b>	<p><b>Topic - Digital 2D and 3D graphics</b></p> <p>The Unit will continue into term to until the final submission date</p>	As above
<b>Term 3</b>	<p><b>Topic - Social Networks</b></p>	



	<p>The aim of this unit is to explore different social media websites, the ways in which they can be used and the potential pitfalls when using them for business purposes. Students will develop a plan to use social media strategies for business purposes to achieve specific aims and objectives. Students will then implement the plan, developing and posting content and interacting with others.</p> <p><b>Topic - Programming</b></p> <p>The aim of this unit is to learn about computational thinking skills and the principles of designing and developing computer programs. Students will apply computational thinking skills to design, develop, test, refine and review computer programs for a given range of purposes.</p>	<p>Students will learn the skills needed to work in the social business industry. This includes understanding and reviewing Social media websites and apps, the business uses of social media, risks and issues and the social media planning processes.</p> <p>Students will then gain skills in understanding and unpicking Business requirements, Content planning and publishing, Developing an online community, Implement the use of social media in a business and finally Data gathering and analysis.</p> <p>Students will gain skills in coding using the Python programming language. By creating very simple programs students develop Problem solving and computational thinking skills along with the fundamental programming language basics such as, IF Else statements , prints and loops.</p> <p>Through programming students will also gain skills in the following; Computational thinking skills, Constructs and techniques and their implementation in different languages, Quality of software applications, the software development life cycle, testing software solutions and improvement, refinement and optimisation of software applications</p>
<p><b>Term 4</b></p>	<p><b>Topic - Project Management</b></p> <p>In this unit, Students will investigate the principles of project management and different project management methodologies, as used in the IT industry. Students will deliver an IT project using at least one project management methodology and complete the five main stages of a project. Students will undertake the planning, execution, and monitoring and control stages of the project.</p> <p><b>Topic - Programming</b></p> <p>The aim of this unit is to learn about computational thinking</p>	<p>Students will gain skills and knowledge in understanding three main product management methodologies, RAD, Agile and Waterfall. Students will then take the programming project they are about to undertake and apply project management strategies to it. Students will gain knowledge, skills and understanding in how to generate a feasibility study, project phasing , monitoring project-management processes, Risk and issues and finally execution and management processes for a project</p> <p>Students will use the skills obtained in Term three to complete the programming project</p>

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<b>Term 5</b>	<p><b>Topic - Project Management</b></p> <p>In this unit, Students will investigate the principles of project management and different project management methodologies, as used in the IT industry. Students will deliver an IT project using at least one project management methodology and complete the five main stages of a project. Students will undertake the</p>	Students will close off the programming project by finishing the project management processes applied to it

## Year 7

At Dane Court we understand the importance of computing to all students. We also know that there are some areas of ICT and Computer Science that are essential for all students, such as remaining safe online, learning how to search for information on the internet, how to determine reliability or bias within online articles and how to format and write professional documentation and emails. In year 7 we have embedded a curriculum that caters to all of these skills, we feel not only does this help students learn essential computer skills but also helps them through their school life and across all subjects.

Year 10	Enquiry Statement/Aim	Knowledge and Skills
<b>Term 1 and 2</b>	<p><b>Topic - Computer systems</b></p> <p>To develop an understanding of the school computer systems and software we use collectively at the school</p>	<p>Students will begin year 7 learning how all areas of the school systems work for both in school and at home use. During the two terms they will learn the following knowledge and skills;</p> <ul style="list-style-type: none"> <li>● Log in successfully to the school computers.</li> <li>● Log into gmail, drive and classroom.</li> <li>● To learn where files are stored locally.</li> <li>● To learn where files are stored on Google Drive.</li> <li>● To Create folders and organise Google Drive.</li> <li>● To understand what makes a good password.</li> <li>● To change passwords.</li> <li>● To understand how school printing works.</li> <li>● To log into google classroom</li> <li>● To check current classes</li> <li>● To learn how to view tasks and submit work.</li> <li>● To understand how to write professional emails.</li> </ul>





		<ul style="list-style-type: none"> <li>● To learn how to add attachments, forward messages, CC, BCC and other email skills</li> <li>● To learn the three different Google Document packages that will help them through school life.</li> <li>● To understand the tools and skills needed for each graphical software package.</li> </ul>
<p><b>Term 3 and 4</b></p>	<p><b>Topic - 2D Graphics and Presentation software</b></p> <p>To develop interdisciplinary skills in presentation making and 2D graphics that will help them create and deliver effective presentations.</p>	<p>Students will learn what makes an effective presentation. How to create their own presentations and how to use advanced 2D graphics skills to add images to their presentations.</p> <p>They will learn the following skills during this topic;</p> <ul style="list-style-type: none"> <li>● To learn the basics of the fireworks package. Tools, layers, importing, saving, canvas size, colour. Cut/paste</li> <li>● To practice using 2D graphic tools such as; Colour replace, lasso, magic wand, rubber stamp, burn, smudge, hue, saturation, contrast etc..</li> <li>● Presentation skills such as; font size, text amount, spacing, image handling, transitions, house style, animations.</li> </ul>
<p><b>Term 5 and 6</b></p>	<p><b>Topic - Scratch Programming</b></p> <p>To begin learning Computer Science skills such as through the Scratch programming language.</p>	<p>While using the Scratch programming language students will learn the following skills;</p> <ul style="list-style-type: none"> <li>● Computational thinking</li> <li>● Problem solving</li> <li>● Abstraction</li> <li>● Decomposition</li> <li>● Algorithmic thinking</li> <li>● Pattern recognition</li> <li>● Scratch syntax</li> <li>● Errors and handling them</li> <li>● Troubleshooting</li> <li>● Testing</li> <li>● Programming theory</li> </ul>