KS4 Curriculum

Computer Science

CURRICULUM INTENT? What does Computer Science help young people achieve at KS4? Why have you made these curriculum choices?

The curriculum is designed so that students are introduced to every key topic in Year 10 and can then use year 11 to re-visit topics and develop their understanding through retrieval practice. There is also space for them to practice their programming skills, which is a key skill in industry.

In Key Stage 4 Computer Science students will:

- Understand and apply the fundamental principles and concepts of Computer Science, including abstraction, decomposition, logic, algorithms, and data representation.
- Analyse problems in computational terms through practical experience of solving such problems, including designing, writing and debugging programs.
- Think creatively, innovatively, analytically, logically and critically.
- Understand the components that make up digital systems, and how they communicate with one another and with other systems.
- Understand the impacts of digital technology to the individual and to wider society.
- Apply mathematical skills relevant to Computer Science.

TERM BY TERM BREAKDOWN – Knowledge acquired, and skills developed:

	Year 10 Course Outline	Year 11 Course Outline	Opportunities beyond the classroom

Autumn Term			
	Knowledge: ***Online Safety** - understand how changes in technology affect safety, including new ways to protect their online privacy and identity, and how to report a range of concerns* *Key Skills:* • Digital Footprint • Online Reputation • Fake News • Data Theft • Privacy • Revenge attacks *Knowledge:* **Systems Architecture, Memory and Storage** **Wired and wireless networks** **Systems software and security** **Ethical, Legal and Environmental Concerns** *Key Skills:* • *Computer system components* • *Memory, Data and Storage* • *Understanding the Internet* • *Networks and wireless networking* • *Client server and Peer-to-Peer networks* • *Protocols and Layers* • *Network threats and identifying vulnerabilities* • *Operating system software and Utility system software* • *Ethics in computing and computing in the modern world* • *Legislation and privacy*	*Knowledge:* ***Online Safety** - understand how changes in technology affect safety, including new ways to protect their online privacy and identity, and how to report a range of concerns* *Key Skills:* • Digital Footprint • Online Reputation • Fake News • Data Theft • Privacy • Revenge attacks *Knowledge:* **Revisiting of Systems Architecture, Memory and Storage** **Wired and wireless networks** **Systems software and security** **Ethical, Legal and Environmental Concerns** *Key Skills:* • *Computer system components* • *Memory, Data and Storage* • *Understanding the Internet* • *Networks and wireless networking* • *Client server and Peer-to-Peer networks* • *Protocols and Layers* • *Network threats and identifying vulnerabilities* • *Operating system software and Utility system software* • *Ethics in computing and computing in the modern world* • *Legislation and privacy*	Students can sign up for codeacademy: https://www.codecademy.com/learn/learn-python-3 Free revision resource: https://www.senecalearning.com/ Attempt gradually more difficult tasks to increase coding skills. https://snakify.org/teacher/ Students are encouraged to stay up to date in the subject by reading technology journals, magazines and websites.

Spring Term	*Knowledge:* **Algorithms** **Programming using Python** **Logic & Languages** **Data Representation** *Key Skills:* • *Computational thinking* • *Searching & Sorting Algorithms* • *Developing Algorithms using Flow Diagrams & Pseudocode* • *Interpreting, correcting and completing Algorithms* • *Programming concepts* • *Sequence and Selection* • *Iteration* • *Arrays* • *Procedures & Functions* • *Records & Files* • *Logic Diagrams and Truth Tables* • *Defensive Design* • *Errors and Testing* • *Translators and Facilities of Languages* • *Storage Units and Binary Numbers* • *Binary arithmetic and hexadecimal* • *ASCII & Unicode* • *Images, Sound & Compression*	*Knowledge:* **Revisiting of Algorithms** **Programming using Python** **Logic & Languages** **Data Representation** *Key Skills:* • *Computational thinking* • *Searching & Sorting Algorithms* • *Developing Algorithms using Flow Diagrams & Pseudocode* • *Interpreting, correcting and completing Algorithms* • *Programming concepts* • *Sequence and Selection* • *Iteration* • *Arrays* • *Procedures & Functions* • *Records & Files* • *Logic Diagrams and Truth Tables* • *Defensive Design* • *Errors and Testing* • *Translators and Facilities of Languages* • *Storage Units and Binary Numbers* • *Binary arithmetic and hexadecimal* • *ASCII & Unicode* • *Images, Sound & Compression*

	Knowledge: **Python Programming**	Knowledge: **Final revision sessions**	Code with python online with no need to install it locally:
Summer Term	Key Skills: *Students will start their programming project from one of the OCR programming tasks. There will be two progress checks to make sure that the students are making the required progress.*	Key Skills: *Students will revise the work already taught in year 10* *Subject knowledge audit* *Exam technique* *Mock Exam revision & formal analysis*	https://repl.it/languages/python3 Attempt gradually more difficult tasks to increase coding skills. https://snakify.org/teacher/

Key Independent Learning Resources	**GREAT READS**
New Grade 9-1 GCSE Computer Science OCR Revision Question Cards **Series: GCSE Computer Science for OCR** (Paperback: 250 pages) - Publisher: Cambridge University Press; Student edition (January 19, 2018) - Language: English - ISBN-10: 1316503992 - ISBN-13: 978-1316503997	

KS4 Curriculum

Creative IT

Creative IT is designed to assess the application of creative media skills through their practical use. It provides our learners with essential knowledge, transferable skills and tools to improve their learning in other subjects with the aims of enhancing their employability when they leave education, contributing to their personal development and future economic well-being.

The Cambridge Nationals qualification in Creative iMedia we have chosen will equip learners with a range of creative media skills and provide opportunities to develop, in context, desirable, transferable skills such as research, planning, and review, working with others and communicating creative concepts effectively. Using these skills, learners will ultimately be creating fit-for-purpose creative media products such as digital graphics, comic strips and interactive multimedia products.

Our Creative IT curriculum encourages independence, creativity, and awareness of the digital media sector by being able to:

- Equip students with the wide range of knowledge and skills needed to work in the creative digital media sector.
- Learn industry standard pre-production techniques and workflow such as visualisation diagrams.
- Become familiar with some of the most popular software used in this field.
- Create their own comic strip from planning phase through to using software.
- Create a multimedia product using Microsoft PowerPoint.
- Use digital graphics to create logo's, text and image graphics that pertain to customer specifications.
- Learn how to gather and process information into a suitable multimedia product.
- Learn how to optimise using compression and use the most suitable file types for a given scenario.

TERM BY TERM BREAKDOWN – Knowledge acquired, and skills developed:

	Year 10 Course Outline	Year 11 Course Outline	Opportunities beyond the classroom

Autumn Term	*Knowledge:* ***Online Safety*** - **understand how changes in technology affect safety, including new ways to protect their online privacy and identity, and how to report a range of concerns** *Key Skills:* • Digital Footprint • Online Reputation • Fake News • Data Theft • Privacy • Revenge attacks *Knowledge:* **R081 - Pre-production skills (R093 New course 2022)** *Key Skills:* • Learn the purpose and content of Mood boards • Visualisation diagrams • Storyboards • Scripts • How to interpret client requirements • Produce a work plan and production schedule • Identifying a target audience • Applicable legislation • How to create a mood board • How to review documentation and design and identify areas for improvement	*Knowledge:* ***Online Safety*** - **understand how changes in technology affect safety, including new ways to protect their online privacy and identity, and how to report a range of concerns** *Key Skills:* • Digital Footprint • Online Reputation • Fake News • Data Theft • Privacy • Revenge attacks *Knowledge:* **R087 - Creating interactive multimedia products (R097 New Course, Interactive Digital Media 2022)** *Key Skills:* • Where different interactive multimedia products are used and their purpose • Key elements to consider when designing interactive multimedia products, i.e.: The colour scheme and house style, layout and GUI (graphical user interface) • The required hardware, software and peripherals to create and view interactive multimedia products • The type of limitations caused by connections, bandwidth and data transfer when accessing interactive multimedia products • File formats supported by different platforms (e.g. computer, smartphone).	

		Knowledge: **R082 - Creating digital graphics (R094 New Course, Visual Identity and Digital Graphics)** *Key Skills:* ***Theory:*** • why digital graphics are used (e.g. to entertain, to inform, to advertise, to promote, to educate) • how digital graphics are used (e.g. magazine covers, CD/DVD covers, adverts, web images and graphics, multimedia products, games) • types of digital graphics, i.e.:o bitmap/raster or vector • file formats, quality and compression settings • how different purposes and audiences influence the design and layout of digital graphics (e.g. the use of colour, composition, white space and styles). • Be able to plan the creation of a Digital Graphic • Be able to create a digital graphic using suitable software.	Knowledge: **R082 - Creating digital graphics re-visited (Assessed Task) (R094 New Course, Visual Identity and Digital Graphics)** *Key Skills:* • ***Theory:*** • Why digital graphics are used (e.g. to entertain, to inform, to advertise, to promote, to educate) • How digital graphics are used (e.g. magazine covers, CD/DVD covers, adverts, web images and graphics, multimedia products, games) • Types of digital graphics, i.e.:o bitmap/raster or vector • File formats, quality and compression settings • How different purposes and audiences influence the design and layout of digital graphics (e.g. the use of colour, composition, white space and styles). • Be able to plan the creation of a Digital Graphic • Be able to create a digital graphic using suitable software.	
Spring Term			

	Knowledge:	Knowledge:	
Summer Term	**R084 - Storytelling with a comic strip (New Course 2022 starters R095 Characters and Comics)** *Key Skills:* • Understand the use of genre • Appreciate target audience • A brief history of the comic strip • How panel placement creates the flow of a story • How physical and non-physical characteristics complement each other in effective storytelling • Interpret client requirements • Construct a script and storyline • Identify assets required for successful production • Learn how legislation might affect the assets used • Be able to effectively review a comic strip and identify areas of development.	***Consolidation of knowledge and exam preparation and look at past papers – R081*** *Most of the lesson time will be used for revision and going over individual students' weaker subject knowledge from the mock exam.* *Key Skills:* • Learn the purpose and content of Mood boards. • Visualisation diagrams • Storyboards • Scripts • How to interpret client requirements • Produce a work plan and production schedule. • Identifying a target audience • Applicable legislation • How to create a mood board • How to review documentation and design and identify areas for improvement.	
Key Independent Learning Resources			**GREAT READS**
My Revision Notes: OCR Cambridge Nationals in Creative iMedia L 1 / 2: Pre-production skills and Creating digital graphics Paperback: 88 pages Publisher: Hodder Education (31 Mar. 2017) Language: English ISBN-10: 1471886689 ISBN-13: 978-1471886683			