Computing (CS) 5 Year Curriculum Learning Journey

UP HOLLAND HIGH SCHOOL

Computing Faculty Intent: To ensure all students are proficient in the use of Computers to allow them to access a variety of resources across the whole school curriculum. Students should be able to make informed choices for their future pathway having experienced a breadth of IT and Computer Science related topics and link these to real world situations and careers.

J277: OCR Computer Science (9-1)

COURSE OVERVIEW

J277/01: Computer Systems

Written paper: 1 hour and 30 minutes
50% of total GCSE
80 marks

J277/02: Computational thinking, algorithms and programming

Written paper: 1 hour and 30 minutes
50% of total GCSE
80 marks

GRADING: 9-1

KS4 NATIONAL CURRICULUM

NC1: Develop their capability, creativity and knowledge in computer science, digital media and information technology

NC2: Develop and apply their analytic, problem-solving, design, and computational thinking skills

NC3: Understand how changes in technology affect safety, including new ways to protect their online privacy and identity, and how to identify and report a range of concerns.

KS3 NATIONAL CURRICULUM

NC1: Design, use and evaluate computational abstractions that model the state and behaviour of real-world problems and physical systems

NC2: Understand several key algorithms that reflect computational thinking [for example, ones for sorting and searching]; use logical reasoning to compare the utility of alternative algorithms for the same problem

NC3: Use two or more programming languages, at least one of which is textual, to solve a variety of computational problems; make appropriate use of data structures [for example, lists, tables or arrays]; design and develop modular programs that use procedures or functions

NC4: Understand simple Boolean logic [for example, AND, OR and NOT] and some of its uses in circuits and programming; understand how numbers can be represented in binary, and be able to carry out simple operations on binary numbers [for example, binary addition, and conversion between binary and decimal]

NC5: Understand the hardware and software components that make up computer systems, and how they communicate with one another and with other systems

NC6: Understand how instructions are stored and executed within a computer system; understand how data of various types (including text, sounds and pictures) can be represented and manipulated digitally, in the form of binary digits

NC7: Undertake creative projects that involve selecting, using, and combining multiple applications, preferably across a range of devices, to achieve challenging goals, including collecting and analysing data and meeting the needs of known users

NC8: Create, re-use, revise and re-purpose digital artefacts for a given audience, with attention to trustworthiness, design and usability

NC9: Understand a range of ways to use technology safely, respectfully, responsibly and securely, including protecting their online identity and privacy; recognise inappropriate content, contact and conduct and know how to report concerns.

Year 11

Exam technique will be the focus with a mixture of group tasks & personalised exam questions. The aim is to ensure that algorithm questions are answered using the correct structure to maximise marks.	Exam technique will be the focus with a mixture of group tasks & personalised exam questions. The aim is to ensure that extended writing questions are answered using the correct structure to maximise marks.	Students will be given specific exam questions to focus on depending on areas identified during Mock Exams and Seneca Learning homeworks.
Paper 2 Exam Technique	**Paper 1 Exam Technique**	**Personalised Exam Preparation**
NC2: Develop and apply their analytic, problem-solving, design, and computational thinking skills	NC1: Develop their capability, creativity and knowledge in computer science, digital media and information technology	NC1 NC2 NC3
1.2a - Memory & Storage: NC1: Develop their capability, creativity and knowledge in computer science, digital media and information technology	1.3 - Networks - topologies, protocols and layers: NC3: Understand how changes in technology affect safety, including new ways to protect their online privacy and identity, and how to identify and report a range of concerns.	1.2b - Memory & Storage - Data Representation: NC1: Develop their capability, creativity and knowledge in computer science, digital media and information technology
1.2b - Memory & Storage - Data Representation & 2.5 - Translators and	**1.5 - System Software & 2.4 - Computational Thinking**	**2.2 - Programming Techniques & 2.3 - Robust Programs**
1.2a - Memory & Storage: NC1: Develop their capability, creativity and knowledge in computer science, digital media and information technology	1.3 - Networks - topologies, protocols and layers: NC3: Understand how changes in technology affect safety, including new ways to protect their online privacy and identity, and how to identify and report a range of concerns.	1.2b - Memory & Storage - Data Representation: NC1: Develop their capability, creativity and knowledge in computer science, digital media and information technology
2.1 - Algorithms: NC2: Develop and apply their analytic, problem-solving, design, and computational thinking skills	1.3 - Networks - topologies, protocols and layers: NC3: Understand how changes in technology affect safety, including new ways to protect their online privacy and identity, and how to identify and report a range of concerns.	1.3 - Networks - topologies, protocols and layers: NC3: Understand how changes in technology affect safety, including new ways to protect their online privacy and identity, and how to identify and report a range of concerns.

Year 10

2.2 - Programming Techniques & 1.4 - Networks Security	**2.1 - Algorithms & 2.1 - Algorithms**	**2.1 - Algorithms & 2.1 - Algorithms**
2.1 - Algorithms: NC2: Develop and apply their analytic, problem-solving, design, and computational thinking skills	1.3 - Networks - topologies, protocols and layers: NC3: Understand how changes in technology affect safety, including new ways to protect their online privacy and identity, and how to identify and report a range of concerns.	1.3 - Networks - topologies, protocols and layers: NC3: Understand how changes in technology affect safety, including new ways to protect their online privacy and identity, and how to identify and report a range of concerns.
1.3 - Networks - topologies, protocols and layers: NC3: Understand how changes in technology affect safety, including new ways to protect their online privacy and identity, and how to identify and report a range of concerns.	1.2a - Memory & Storage: NC1: Develop their capability, creativity and knowledge in computer science, digital media and information technology	1.1 - System Architecture - CPU: NC1: Develop their capability, creativity and knowledge in computer science, digital media and information technology
1.3 - Networks - topologies, protocols and layers & 1.3 - Networks - topologies	**1.2a - Memory & Storage & 2.2 - Programming Techniques**	**1.1 - System Architecture - CPU & 2.2 - Programming Techniques**
1.3 - Networks - topologies, protocols and layers: NC3: Understand how changes in technology affect safety, including new ways to protect their online privacy and identity, and how to identify and report a range of concerns.	1.2a - Memory & Storage: NC1: Develop their capability, creativity and knowledge in computer science, digital media and information technology	1.1 - System Architecture - CPU: NC1: Develop their capability, creativity and knowledge in computer science, digital media and information technology
Introduction to Computer Networks and how these are structured to enable data to be shared effectively. Network connections & topologies will be investigated with the aim of addressing key components of the CS specification.	Students tie together what they have learned during the year and link the topics to famous people from the History of Computing. The aim is to use spaced retrieval and provide a clear link to the real world and potential career pathways.	Year 9 Project: Students will revisit each of the topics from this year and link these to famous people from history. Students prepare a 5 minute presentation. Peer assessment completed on a shared document as students present.

Year 9

Computer Networks	**History of Computing**	**HWK - Helical Revision**
Skills: Interconnecting Data NC: 5 & 9	Skills: Research, Presenting, Careers NC: 5 & 9	Skills: Combining Applications NC: 7, 8 & 9
Introduction to Digital Graphics with a focus on use of shapes, layers & formatting effects. Exporting to different formats examined. Learning evidenced through the creation of a presentation that includes created images & videos.	Command line programming revisited with a focus on solving specific scenario based tasks to promote computational thinking. Libraries & Lists are included to extend learning and evidenced through code snippets in Repl.it.	Introduction to Cyber Security with links to both IT & CS KS4 courses. Revisiting e-Safety with a focus on malware & social engineering threats that exist online and prevention methods.
Digital Imaging	**Advanced Programming**	**Cyber Security**
Skills: Presenting Information NC: 8	Skills: Critical Thinking, Problem Solving NC: 2 & 3	Skills: eSafety, Problem Solving NC: 5 & 9
Introduction to Computer Networks and how these are structured to enable data to be shared effectively. Network connections & topologies will be investigated with the aim of addressing key components of the CS specification.	Introduction to ciphers which focuses on how digital content can be protected and displayed in many ways. Learning evidence through creation of different ciphers and creation of encrypted messages.	Year 8 Project: Students will revisit each of the topics from this year and link these to famous people from history. Students prepare a 5 minute presentation. Peer assessment completed on a shared document as students present.

Year 8

Computer Networks	**Ciphers & Cryptography**	**HWK - Helical Revision**
Skills: Interconnecting Data NC: 5 & 9	Skills: Critical Thinking, Problem Solving NC: 4 & 6	Skills: Combining Applications NC: 7, 8 & 9
Spreadsheets revisited with a focus on advanced functions and formatting tools to solve specific problems. Learning evidence through completion of spreadsheet models to perform various tasks.	Command line programming revisited to include the use of loops and decisions. Learning evidenced through code snippets in Repl.it.	Introduction to the basics of binary and why this is needed. Converting Numbers, Images & Sounds all examined. Binary Logic & Logic Gates examined. Learning evidenced through completing tasks in templates.
Spreadsheet Development	**Programming Development**	**Binary & Logic**
Skills: Modelling, Presenting Information NC: 1 & 7	Skills: Critical Thinking, Problem Solving NC: 2 & 3	Skills: Critical Thinking, Maths NC: 4 & 6
Introduction to spreadsheets with a focus on data, formatting, formulas & functions. Learning evidence through completion of spreadsheet models to perform various tasks.	Introduction to Digital Graphics with a focus on use of shapes, layers & formatting effects. Exporting to different formats examined. Learning evidenced through the creation of a presentation that includes created images & videos.	Year 7 Project: Students will revisit each of the topics from this year and link these to famous people from history. Students prepare a 5 minute presentation. Peer assessment completed on a shared document as students present.

Year 7

Spreadsheet Basics	**Digital Imaging**	**HWK - Helical Revision**
Skills: Modelling, Presenting Information NC: 1 & 7	Skills: Presenting Information NC: 8	Skills: Combining Applications NC: 7, 8 & 9
Introduction to the basics of command line programming looking at syntax and how to control a screen turtle. Learning evidenced through code snippets in Repl.it.	Introduction to the basics of programming and computational thinking skills using 'Blockly'. Learning evidenced through 'Accelerated course' on 'Code.org'.	Introduction to the basics of File Management before looking into the different aspects of eSafety. Learning evidenced through the creation of a presentation.
Programming Basics	**Block Programming**	**e-Safety**
Skills: Critical Thinking, Problem Solving NC: 2 & 3	Skills: Critical Thinking, Problem Solving NC: 2 & 3	Skills: eSafety, Presentations NC: 8 & 9

KEY

Description of Topic

Name of Topic/Specification Per Half-Term

Overview of Skills & Links to National Curriculum