CURRICULUM AND ASSESSMENT PLAN

ORMISTON FORGE ACADEMY

COMPUTER SCIENCE YEAR 10

CURRICULUM INTENT

The curriculum and assessment of students at this stage of education has been carefully designed to promote deep learning of computer science and develop students into computer scientists that hold sector specific knowledge and skills gained through a practical learning environment. In year 10, students build on skills and knowledge of text-based programming using the Python language. They will learn how to effectively write programs through using a range of advanced programming techniques that allow them to meet all the needs of various scenarios. The scenarios that students will experience will develop their creative, independent and cultural skills. Students will also develop their understanding of computational thinking and apply this knowledge when producing their own solutions to problems. Students will develop skills in breaking down problems and designing, developing testing and evaluating their solutions. Students will develop their programming skills further by learning about additional file handling techniques and how to test programs appropriately. By the end of the year, students will have been given the opportunity to design, develop, test and evaluate their own programs. They will have an excellent understanding of a range of programming techniques that will also enable them to produce algorithms in the way of a flowchart and pseudocode. Throughout the year, students will be provided with a range of different challenges and projects that vary in difficulty and allow them to showcase their programming ability. Students will also be given the opportunity to develop their knowledge of computer systems through a theory-based component where students will gain an understanding of key topics such as: systems architecture, memory and storage, computer networks, connections and protocols, network security, systems software and ethical, legal, cultural and environmental impacts of digital technology. Students will apply the knowledge they have gained when answering exam questions and use the subject terminology required at this level.
They year 10 course will prepare students for year 11 where they will continue to develop their understanding of computer systems and algorithms

PRIOR LEARNING	Students have studied the following topics previously: **programming using a high-level language, image representation, data representation, sorting and searching algorithms, flowcharts and pseudocode.** Students will build on this knowledge as they move into year 10 and enhance their understanding of the topic in more detail.
PERSONAL DEVELOPMENT & CURRICULUM LINKS	The computing curriculum has links to mathematics. Examples include studying and writing algorithms and using mathematical operators in programs. Additionally, students will learn formulas to calculate file sizes and be able to perform conversions between storage units. Students are required to learn and use various sorting and searching algorithms as well as performing calculations using different number systems.
EXTRA-CURRICULAR & CULTURAL CAPITAL	ENRICHMENT OPPORTUNITIES **Revision sessions are available to students throughout the year to develop their skills in the subject. Students can attend weekly clubs to develop their programming skills. This club will allow students to look at scenarios and produce fully working solutions. Students can also use this time to develop their skills in other programming languages.**

	AUTUMN 1	AUTUMN 2	SPRING 1	SPRING 2	SUMMER 1	SUMMER 2
TOPIC/KNOWLEDGE	**Computer Systems / Programming** **All students will know:** Component 1: - CPU - Primary & Secondary Storage - Data Representation - Cloud Computing Component 2: - Sorting & Searching Algorithms - Logic Gates & Truth Tables - Algorithms - Pseudocode - Flowcharts - Programming (Sequence, Selection, Iteration) - Programming Challenges	**Threats to Networks / Computational Thinking** **All students will know:** Component 1: - Threats - Prevention Methods Component 2: - Flowcharts - Pseudocode - Programming - Trace Tables - Computational Thinking	Networks / Programming **All students will know:** Component 1: - Security Risks - Networks - Topologies - Client Server Networks - Peer-to-peer Networks - Protocols - Transmission Media Component 2: - Programming Challenges (Real-life scenarios) - Algorithms (Pseudocode & Flowcharts)	**Testing / Advanced Programming Skills** **All students will know:** - Trace Tables - Testing - Lists - File Handling - Sub-programs (Procedures & Functions) - Defensive Design - Maintainability **All students will be assessed:** Students will all be assessed and receive feedback on the work they have completed in lessons in the following ways: - Do Now activities - Live Marking - Whole class feedback - Their ability to design, develop and test programs.	**Image and Sound Representation / Operating Systems** **All students will know:** Component 1: - Image Representation Component 2: - Structured Query Language (SQL) - Algorithms (Flowcharts & Pseudocode) - Computational Thinking - Programming	Advanced Programming / NEA **All students will know:** Component 2: - Revision - Functions - Procedures - 1d Arrays - 2d Arrays - File Handling - Students will be given a large programming task and will need to design, develop, test and evaluate their solution. They will be using abstraction and decomposition to support when working with the problem.
SKILLS	Students will develop their programming skills and be able to use basic programming constructs: ***sequence, selection & iteration.***	Students will develop the skill of being able to read/write and refine algorithms for different scenarios. They will be able to use both flowcharts and pseudocode.	Students will develop the skill of writing algorithms and will work on their programming skills using the Python language.	Students will develop their knowledge of programming and should be able to use the following by the end of the term: ***lists, files and sub-programs.*** Students will also develop the skill of reading programs and will be able to complete trace tables which show the changes that happen to different variables.	Students will now know how to work out the resolution of an image and the total number of colours that can be represented when given the bit depth. They will also learn how to calculate the file size of an image.	Students will develop their understanding of programming and will focus on developing their skills for the advanced programming techniques. Students will have the opportunity to design, develop, test and evaluate a program for a given scenario.
ASSESSMENT	Students will all be assessed and receive feedback on the work they have completed in lessons in the following ways: - Do Now activities - Live Marking - Their ability to design, develop and test programs. A summative assessment at the end of the term on data representation, storage, logic gates and algorithms. ***Key Assessment Point 1 (13.10.25 – 24.10.25)***	Students will all be assessed and receive feedback on the work they have completed in lessons in the following ways: - Programming Challenges - Do Now activities - Whole class feedback - Verbal feedback - Live Marking	- Do Now activities - Live Marking - Their ability to design, develop and test programs. - A summative assessment at the end of the term will be used, this will be the midpoint assessment on topics covered throughout the course with an emphasis on networking. ***Key Assessment Point 2 (26.01.26 – 06.02.26)***	Students will all be assessed and receive feedback on the work they have completed in lessons in the following ways: - Do Now activities - Live Marking - Whole class feedback - Their ability to design, develop and test programs. A summative assessment at the end of the term on programming where students will showcase their programming skills and will show that they can produce algorithms for a range of scenarios. Students will be required to produce the algorithms and programs on paper and will then be able to transfer this to a high-level language.	Students will all be assessed and receive feedback on the work they have completed in lessons in the following ways: - Do Now activities - Live Marking - Their ability to design, develop and test programs. A summative assessment will be completed on image and sound representation - other topics will be included in this assessment. Students will also complete an assessment of operating systems and utility software.	Students will all be assessed and receive feedback on the work they have completed in lessons in the following ways: - Do Now activities - Live Marking - Whole class feedback - Peer-assessment / Self-assessment Students will be assessed on the 8-mark questions they complete during lessons. They will all have the opportunity to complete an NEA in which they will receive feedback on their programming skills. ***Key Assessment Point 3 (20.04.26 – 01.05.25)*** Students will be completing a mock exam for C01 – Computer Systems and C02 – Computational Thinking, Algorithms and Programming. Past exam papers will be used for this mock exam to give students the chance to view real exam papers and to see how questions are presented.
VOCAB	High-level languages, Pseudocode, computer system, embedded system, PC, ALU, Control Unit.	Trace tables, count-controlled loops, condition-controlled loops, iteration, sequence, selection, testing.	Topologies, client-server, peer-to-peer, hardware, switch, router, threats, brute force, trojan horse, ransomware.	Integrated Development Environment (IDEs), Functions, Procedures, Arrays, Comments, Sub-programs, Normal, Boundary, Erroneous, Testing, Variables.	Amplitude, bit depth, sample rate, resolution, pixels, SQL, Flowchart, Pseudocode, Algorithm, Sequence, Selection, Iteration, Encryption, Compression, Defragmentation	Arrays, Functions, Procedures, Sub-programs, file handling, abstraction, decomposition, algorithms, computational thinking.

READING SKILLS

Students need to recognise key vocabulary within a piece of text and pick out key information. Students need to show they can use decomposition to break complex problems down.

CAREERS LINKS

Data Analyst / Cyber Security Expert / Teacher
Programmer / Software Development
Web Development / IT Consultant
Video Game Developer / App Developer
Network Engineer / Network Architect / IT Support
Links to other careers which require problem solving and mathematical skills

SUPPORTING STUDENTS AT HOME

The following website has videos available for each of the topics included in the GCSE computerscience qualification - www.youtube.co.uk/ craigndave.

Students are provided with a CGP OCR computerscience revision guide which should be used to support the course. The department wouldstrongly recommend the purchase of the OCRpractice paper workbook which has sample questions and solutions from past papers - https://www.amazon.co.uk/GCSE-Computer- Science-Practice-Workbook/dp/1782946039.

The OCR text book is also a useful aid to the course content - https://www.amazon.co.uk/OCR-GCSE-9-1-Computer-Science/dp/1910523089.

The Khan Academy is a useful website thatstudents can use to support their studies -https://www.khanacademy.org.

CURRICULUM AND ASSESSMENT PLAN

COMPUTER SCIENCE YEAR 11

CURRICULUM INTENT

The curriculum and assessment of students at this stage of education has been carefully designed to promote deep learning of computer science and develop students into computer scientists that hold sector specific knowledge and skills gained through apractical learning environment: In year 11, students will continue to build on the skillsand knowledge developed at KS3 and in the previous year of study. They will continue to develop their understanding of computer systems, computational thinking, algorithms and programming. Students will be given the opportunity to develop their knowledge of networks by looking deeper into how devices communicate. They will encounter physical devices aswell as theoretical understanding involving the use of protocols, addresses, cloud computing and client serverapproaches. We wish to instill a balanced approach to learning with students being able to elevate different approaches to networking. During this year students will explore the wider issues that surround and use of technology. They will develop their understanding of legislation including the data protection act, computer misuse act and copyright. They will explorethe environmental aspects and the impact on both individuals and society. They will develop their cultural awareness and how they can play a responsible rolein society. Students will continue to work on their programming skills by being given the opportunity to produce solutions to a range of complex problems related to real-life scenarios. They will be expected to produce solutions in the form of algorithms and programs which will allow them to develop their logical thinking and problem-solving skills. This will also aid with the development of answers when working with thepractical based topics on: algorithms, programming, robust programs, Boolean logic, programming languageand integrated development environments. Students will also develop their understanding of the CPU and thecomponents that form it. They will be able to identify theregisters and their purpose as well as the purpose of the ALU, clock and control units. We will further developstudents' understanding of exam techniques by utilizing past exam questions and mark schemes. Students will be heavily exposed to the technical language used in theexam papers to ensure that they are ready and able to access paper one and two. The full course can prepare students with the knowledge, skills and understanding necessary for further study at BTEC level3 or A level andbuilds a strong foundation for students considering a career in computer science.

PRIOR LEARNING	Students will have studies the majority of the topics that needs to be taught in year 10 and will now be working on developing this knowledge further and using this knowledge to answer exam style questions.
PERSONAL DEVELOPMENT & CURRICULUM LINKS	The computing curriculum has links to mathematics. Examples include studying and writing algorithms and using mathematical operators in programs. Students are required to learn and use various sorting and searching algorithms as well as performing calculations using different number systems. Additionally, students will be required to calculate the file size taken up by a sound file. This will take into consideration factors that can impact the sound such as bit rate.
EXTRA-CURRICULAR & CULTURAL CAPITAL	Regular sessions of computing revision are offered throughout the year where students can complete practical tasks to support their understanding or work on theory based topics to extend their knowledge and ability to answer exam questions. Students will be expanding their knowledge of moral, ethical and legal issues that can arise from the use of technology. Everyone is welcome to join a cybercrime extracurricular program provided by the government. Students can use this to improve their understanding of crime whilst developing their problem-solving skills. A programming club is offered where students can attend and practice writing programs for real life scenarios.

	AUTUMN 1	AUTUMN 2	SPRING 1	SPRING 2	SUMMER 1
TOPIC/KNOWLEDGE	**ETHICAL, LEGAL, CULTURAL AND ENVIRONMENTAL ISSUES / DATA REPRESENTATION / PRODUCING ROBUST PROGRAMS / OPERATING SYSTEMS** **All students will know:** »Ethic, legal, cultural and environmental issues affecting technology. »The purpose of operating systems »Types of utility software »Open source and proprietary software. »Defensive design. »High- and low-level languages. »Compilers and interpreters. »Images, sound and compression.	**NETWORKING / PROGRAMMING PRACTICAL** **All students will know:** »Network hardware »Network Topologies »Protocols / Layers » Transmission media »Wired and wireless networks. »Threats to systems and devices »Prevention methods »Algorithms »Computational Thinking »Programming concepts	**INTERLEAVING REVISION / PROGRAMMING SKILLS / SYSTEMS ARCHITECTURE** **All students will know:** »Von Neumann Architecture. »CPU components, functions and performance. »1.2 Memory & Storage »1.4 Network Security »1.5 System Software »2.1 Algorithms »2.2 Programming Fundamentals »2.3 Robust Programs »2.4 Boolean Logic »2.5 Programming languages and IDEs	**INTERLEAVING REVISION / PROGRAMMING SKILLS / ALGORITHMS** **All students will know:** »1.1 System Architecture »1.3 Computer networks, connections & protocols »1.6 Ethical, legal, cultural & environmental impacts of digital technology »2.1 Algorithms »2.2 Programming Fundamentals »2.3 Robust Programs »2.4 Boolean Logic »2.5 Programming languages and IDEs	**REVISION AND EXAM** **All students will know:** »How to respond to exam questions appropriately. »Computer systems. »Computational thinking and problem solving.
SKILLS	Students will develop the skill of answering questions and will know how to enter the top mark band for these questions.	Students will enhance their programming skills further by learning about more of the complex techniques needed at this level. They will also apply this knowledge to real world problems.	Students will learn how to answer exam questions for both exam papers – J277/01 and J277/02. They will develop the skill of writing programs on paper.	Students will learn how to answer exam questions for both exam papers – J277/01 and J277/02. They will develop the skill of writing programs on paper.	Students will learn how to answer exam questions and how to include key terminology in answers.
ASSESSMENT	» 'Do now' tasks and live marking in lesson. » Completion of sample exam questions »***Key Assessment Point 1 (03.11.25 – 14.11.25)*** Students will be given the opportunity to complete a mock exam paper. This will consist of content from C01 and C02. Students need to recognise key vocabulary in text and pick out key information.	»Summative at the end of the term by completing an assessment to cover current and prior learning. Do Now activities will be used in each lesson to assess prior learning. Live marking will be used to allow students to gain instant feedback. Students will be given the opportunity to complete previous exam questions based on the topics they are studying. Previous exam questions will be used during Do Now activities to give students the opportunity to see how questions are worded.	»Do now tasks and live marking in lesson. »Sample exam questions will be used to allow students to see what real exam questions are like and for them to have the opportunity to self-assess using the appropriate mark scheme. »***Key Assessment Point 2 (09.02.26 – 27.02.26)*** Students will be completing mock exams during this period and will have the opportunity to complete a C01 – Computer Systems and C02 – Computational Thinking, Algorithms and Programming exam paper.	» Do now tasks Live marking during lessons to give students instant feedback and to allow them to improve their knowledge and understanding. »Completion of sample exam questions. »Summative at the end of the term by completing an assessment to cover current and prior learning.	**Students will be externally assessed by completing two exam papers:** »**J277/01** - Computer systems. »**J277/02** - Computational thinking, logic and programming
VOCAB	PC, REGISTERS, ALU, MAR, MDR, ACC, PC, LAN, WAN, RAM, ROM.	Stakeholders, legislation, data protection, copyright, creative commons, freedom of information, privacy, maintainability	Compression, Bit Depth, Sample Rate, Character Set, Metadata, Malware, Prevention.	CPU, Registers, Topologies, Client server, Authentication, Maintainability, Defensive Design, Validation, Verification.	

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Programmer / Software Development
Web Development / IT Consultant
Video Game Developer / App Developer
Network Engineer / Network Architect / IT Support
Links to other careers which require problem solving and mathematical skills

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