




YEAR 12 A LEVEL COMPUTER SCIENCE AUTUMN TERM 1 – PAPER 2

‘An ambitious curriculum that meets the needs of all’

Medium Term Planning – Python Programming Techniques

Curriculum Intent	Pupils will be taught the following National Curriculum guidelines this term:
Skills/Assessment Objective Links	<p>At the end of this Unit all students should be able to:</p> <ul style="list-style-type: none">▪ use an IDE to develop and debug a program▪ describe the use of an IDE to check for syntax errors▪ explain the difference between a variable and a constant▪ write a pseudocode solution for a simple problem involving iteration and selection (branching)▪ use nested selection and iteration statements▪ use arithmetic operations and Boolean operations NOT, AND and OR <p>Most students will be able to:</p> <ul style="list-style-type: none">▪ describe features of an IDE which are useful in developing and debugging a program▪ write a pseudocode solution for a problem involving iteration and selection (branching)▪ determine the output from a pseudocode program▪ construct algorithms using two-dimensional arrays <p>Some students will be able to:</p> <ul style="list-style-type: none">▪ write complex algorithms involving sequence, selection, iteration and arrays
Numeracy	Arithmetic, BIDMAS, Comparison operators
Literacy	<p>Vocabulary Tier 3: Integrated Development Environment (IDE), syntax errors, logic errors, debug, watch, breakpoint, trace algorithm, structured programming, data type, variables, constants, assignment, arithmetic operations, Boolean operators, sequence, selection, branching, definite and indefinite iteration, top down design, modular programming, subroutine, procedure, function, parameter, argument, pass by value, pass by reference, global and local variables, recursion, object oriented programming, class, object, method, attribute, inheritance, encapsulation, polymorphism</p> <p>Vocabulary Tier 2: code, program, arithmetic</p> <p>Reading: Worksheets, presentations, answer sheets, exam questions, mark scheme, further reading for homework, conduct research for NEA</p> <p>Writing: Answer on the worksheet via word, complete NEA</p> <p>Oracy: Listening and using tier 3 words</p>
Becoming future ready	<p>Careers/Employability:</p> <p>Understand the grade requirements at universities and the topics that can be applied for. Explore apprenticeship opportunities with a range of industries.</p> <ul style="list-style-type: none">▪ Software Architect.▪ Data Scientist.▪ Machine Learning Engineer.▪ Blockchain Developer▪ Cybersecurity Engineer.▪ Cloud Solutions Architect.▪ AI Research Scientist.▪ Full-Stack Developer.
Adaptation	Throughout this topic, quality first teaching will provide differentiation:

QFT/SEND Provision	<p>By product: Learners are asked to present outcomes writing different code, not all code will be equal in style and sophistication, all code will work with teachers input, top end programmers will be set challenges on how to extend code and be expected to conduct a level of independent research</p> <p>By resource: Worksheets are well presented and accessible. Instructions are clearly outlined and separate from the information so that pupils know where to begin and end. Handouts are differentiated by outcome. Resources used will appeal to the range of preferred learning styles of pupils e.g. visual, auditory or kinesthetic learners. Scaffolding of tasks – word frames.</p> <p>By Intervention: By providing different levels of supervision and support depending on coding ability</p> <p>By Progressive Questioning: Exploring pupils’ understanding of programming by setting adaptive challenges</p> <p>By Grouping: According to coding ability, prior attainment, gender, social preference, preferred learning style.</p> <p>By Task: Pupils identify targets which are meaningful via level of coding ability</p> <p>By Offering Optional Activities: In class or as homework, to extend learning.</p> <p>This QFT/SEND provision will be explicit within the lesson by lesson schemes of work.</p>
Implementation Curriculum Delivery	To be able to:
Learning Outcomes (Knowledge)	<p>Topic 1 Programming Basics Be familiar with the use of an IDE to develop and debug a program Define what is meant by an algorithm and pseudocode Learn how and when different data types are used Learn the basic arithmetic operations available in a typical programming language Write pseudocode solutions to simple problems</p> <p>Topic 2 Concurrent Processing Determine which parts of a program can be tackled at the same time Determine the benefits and trade offs of concurrent processing</p> <p>Topic 3 Selection Use relational operators Use Boolean operations AND, OR, NOT Use the switch/case statement for selection Use nested selection statements</p> <p>Topic 4 Iteration for and while Be able to use counter controlled (for) loops Write code using for loops Understand when and why to use for loops Be able to use condition controlled (while) loops Write code using while loops Understand when and why to use while loops</p> <p>Topic 5 Arrays and Sorting Arrays Understand why lists and arrays are useful Be able to read and edit data in a list Know how to declare and append to a list Understand why you might want to sort a list Know how to sort a list using Python Be able to use other functions with lists</p> <p>Topic 6 Two Dimensional Arrays Understand the nature of a 2D list Be able to use a 2D list to solve a problem Be able to read from a 2D list Be able to add to a 2D list</p>

	Programing end of unit assessment 
Current learning to be developed in the future within:	Functions, procedures, regular expressions
Assessment	See assessment maps for formative and summative assessment opportunities.
Impact	<p>Review assessment results and target pupils that require further support via:-</p> <ul style="list-style-type: none"> • Learning conversation • Changing seating plan • Plan lessons to address areas of concern in assessment • Targeted homework based on low performance areas identified in the assessment and marked pieces • Stretch and challenge high ability pupils by identifying ambitious next steps to expand knowledge <p>Create a feedback sheet for each student Each student identifies areas of Green, Amber and Red using Mark Assessment on their feedback sheet Complete NOW task on areas identified as Amber and Red</p>