5 Day intensive GCSE (KS3 & KS4) Computer Science training for Teachers.

(NCC-GCSE-5Day)

2018-2019

(Dates to be confirmed)

Session	Topic Outline	Activities & Objectives
Session 1 **Day 1 am**	Introduction to the Python and the Turtle. First look at the Python environment. Coding concepts	* Introduction to the Python environment. * Using basic instructions in the shell. * Common tools and facilities in an integrated development environment * The Python IDE. Saving and loading your programs. * Introduction to programming constructs: sequencing, iteration and selection. * Introductions modules or function libraries. * Creating programs using the turtle. * Introductions to procedures and functions. * Passing parameters to a function. * Introduction to iteration (loops). * Nested loops
Session 2 **Day 1 pm**	Introducing Sequencing Identify and use standard programming techniques	* Difference between the 3 coding constructs sequence, selection and iteration. * Programming the turtle in Python. * Directional Instructions * Building your first module. * Using your module in a program. * Introduction to basic Python instructions. * Variables and assigning values. * Introduction to Flow Charts. * Variable Casting
Session 3 **Day 2 am**	Languages, Sequencing and an introductions to Variables	* Languages: Machine Code, Assembly language, High level languages * Translators * Error types * Variable Casting * Creating your first Python programs
Session 4 **Day 2 pm**	Variables and Algorithmic Operators Introduction to Selection	* How to declare and use variables and constants * Be able to use the data types. * Variable scope. * How to use basic mathematic operators to process values * Converting between types. * Design and represent simple algorithms using flowchart. * Operators
Session 5 **Day 3 am**	Selection and Operators.	* How selection can be used to allow a program to follow different paths. * How selection is shown in flowcharts. * Introduction to selection methods. * Boolean operators and truth tables. AND, OR, NOT.

		* Assignment Operators * Using the IF, ELIF, ELSE statements. * How to use logical operators when programming selection algorithms. * Applying computing-related mathematics:
Session 6 **Day 3 pm**	String functions	* Introduction to strings * Using strings in programs * Using the MID, LEFT, RIGHT string functions. * Applying the string functions to real world inspired programs.
Session 7 **Day 4 am**	Iteration and computational thinking.	* Computational thinking: Abstraction and Decomposition * Introduction to iteration and why it's used. * How to design and represent iteration using flowcharts and pseudo code. * How to use counters with repeated code * How to write code that will repeat instructions a predetermined number of times * How to write code that will repeat instructions based in user input. * Iteration based on a count. * Iteration based on a condition. * The advantages and disadvantages for the various methods. * Rogue values and how they are used
Session 8 **Day 4 pm**	Arrays and Lists	* What is an array? Why use arrays? * 2 and 3 dimensional arrays. * What is a list? Why do we use list and how? * Working with lists. * List functions. Loops and Lists
Session 9 **Day 5 am**	Binary Numbers	* How to convert positive denary whole numbers (0-255) into 8 bit binary numbers and vice versa * add two 8 bit binary integers and explain overflow errors which may occur * Binary shifts and How to convert positive denary whole numbers (0-255) into 2 digit hexadecimal numbers and vice versa * How to convert from binary to hexadecimal equivalents and vice versa * Check digits.
Session 10 **Day 5 pm**	File handling. Introduction to Sorting and Searching	* The use of basic file handling operations: open, read, write, close * Introduction to standard searching algorithms: binary search, linear search * Introductions to standard sorting algorithms: bubble sort, merge sort, insertion sort