

<b>Computing Science (AQA 7517)</b>	<b>Subject Leader:</b> Mr J Adey
<b>Minimum Grade Requirement</b>	Grade 5 in English Language, Grade 6 in Maths and Grade 6 in one science or 6:6 in Double Science
<b>Assessment</b>	Paper 1 – 2:30hr practical examination, 40% Paper 2 – 2:30hr written examination, 40% Non-Exam Assessment, 20%

**Course overview:** Advances in computing are transforming the way we work. On this course students will learn and develop their programming skills and gain theoretical knowledge of computer science.

The course consists of thirteen modules over two years and a non-exam project based assessment:

**Module 1 Fundamentals of programming:** In this module students understand the concept of a data type, use meaningful identifier names and understand the importance of using them. They also become familiar with arithmetic and relational operations in programming language.

**Module 2 Fundamentals of data structures:** This module focusses on data structures, abstract data types, queues, stacks, graphs, trees, hash tables, dictionaries and vectors.

**Module 3 Fundamentals of algorithms:** In this module students become familiar with graph-traversal, Reverse Polish, searching algorithms, sorting algorithms and optimisation algorithms.

**Module 4 Theory of computation:** This module covers abstraction and automation, regular languages, context free languages, classification of algorithms and a model of computation where students become familiar with the structure and use of Turing machines.

**Module 5 Fundamentals of data representation:** In this module students become familiar with number systems, number bases, units of information, binary number system, information coding systems and representing images, sound and other data.

**Module 6 Fundamentals of computer systems:** This module considers hardware and software, classification of programming languages, types of program translator and Boolean algebra.

**Module 7 Fundamentals of computer organisation and architecture:** This module covers internal hardware components of a computer, the stored program concept, structure and role of the processor and its components and external hardware devices.

**Module 8 Consequences of uses of computing:** In this module students consider individual (moral), social (ethical), legal and cultural issues and opportunities

**Module 9 Fundamentals of communication and networking:** This module covers communication, networking, the internet and the Transmission Control Protocol/Internet Protocol (TCP/IP).

**Module 10 Fundamentals of databases:** In this module students understand conceptual data models and entity relationship modelling.

**Module 11 Big Data:** In this module students learn how to handle big data.

**Module 12 Fundamentals of functional programming:** This module focusses on the functional programming paradigm and writing functional programs.

**Module 13 Systematic approach to problem solving:** This module covers aspects of software development

**Future opportunities:** Careers in Software Development; Robotics; Web Development; Project Management. Students have gone on to study Computer Science; Games Development; Computer Networks and Security at university.

**Complementary subjects:** Business, Design and Technology, Economics, Engineering, Further Maths and Maths.