Computing/Computer Science

Computing

Computing is a compulsory subject from Years 7-9. The curriculum is revised year on year to reflect the changes in ICT and therefore equip students with skills appropriate to work and life.

The main aim of the department is to ensure that students are given the opportunity to learn skills which are pertinent to life today and as a result, topics covered are revised each year in line with developments in technology. Students are encouraged from the outset to be independent learners and to be confident in their use of ICT.

We offer after school clubs whereby students can learn more aspects of Computing related to Programming. Activities include animation, gaming and programming.

Key Stage 3

In Year 7, pupils have the opportunity to develop their skills in the following areas:
- Online Safety
- Web Design
- Python Programming

In Year 8 pupils build on the knowledge and skills acquired in Year 7 alongside working with new software. Students also learn about e-safety, hardware, software and legislation.
- Cyber Security
- Python Programming
- Animation

In Year 9 pupils follow a programme of study designed to develop the skills and knowledge required by the courses at GCSE which further prepare them for studying this subject at GCSE:
- Understanding Computer, including the CPU, storage and binary
- Sound Manipulation using Audacity
- Further programming using Python

Pupils are assessed at the end of each unit of study and then three times during the year students will be given a report grade to reflect their Computing capability.

Aims - Key Stage 4 GCSE Computer Science
- Develop knowledge and understanding of the fundamental principles and concepts of computer science
- Develop and apply computational thinking skills to analyse problems and design solutions across a range of contexts
- Gain practical experience of designing, writing, and testing computer programs that accomplish specific goals
- Develop the ability to reason, explain and evaluate computing solutions
- Develop awareness of current and emerging trends in computing technologies
- Develop awareness of the impact of computing on individuals, society and the environment, including ethical, legal and ownership issues
- Communicate computer science concepts and explain computational solutions clearly and concisely using appropriate terminology.

Component 1: Principles of Computer Science - Written Paper (2 hours – 50%)
During the course pupils will complete the following components:

- Understanding of binary representation, data representation, data storage and compression, encryption and databases; ability to use SQL to insert, amend and extract data stored in a structured database.
- Understanding of components of computer systems; ability to construct truth tables, produce logic statements and read and interpret fragments of assembly code.
- Understanding of computer networks, the internet and the world wide web; ability to use HTML and CSS to construct web pages.
- Awareness of emerging trends in computing technologies, the impact of computing on individuals, society and the environment, including ethical, legal and ownership issues.

Component 2: Application of Computational Thinking - Written Paper (2 hours – 50%)

- Overview of content
- What algorithms are, what they are used for and how they work
- How to develop program code,
- Using programming constructs,
- Data types and structures, input/output, operators and subprograms and their ability to: interpret, amend and create algorithms.

Year 12 Computer Science A Level – OCR
The OCR AS Level in Computer Science will encourage learners to be inspired, motivated and challenged by following a broad, coherent, practical, satisfying and worthwhile course of study. It will provide insight into, and experience of how computer science works, stimulating learners' curiosity and encouraging them to engage with computer science in their everyday lives and to make informed choices about further study or career choices. The key features of this course encourage:

- Emphasis on problem solving using computers
- Emphasis on computer programming and algorithms
- Emphasis on the mathematical skills used to express computational laws and processes, e.g. Boolean algebra/logic and algorithm comparison
- Less emphasis on ICT

Assessment and Content Overview
Computing principles

- The characteristics of contemporary processors, input, output and storage devices
- Software and software development
- Programming
- Exchanging data
- Data types, data structures and algorithms
- Legal, moral, ethical and cultural issues

Algorithms and problem solving
- Elements of computational thinking
- Problem solving and programming
- Algorithms

Year 12 Computer Science A Level – OCR
Computer Science is a practical subject where students can apply the academic principles learned in the classroom to real-world systems. It's an intensely creative subject that combines invention and excitement, and can look at the natural world through a digital prism. The aims of this qualification are to enable learners to develop:

- An understanding and ability to apply the fundamental principles and concepts of computer science, including: abstraction, decomposition, logic, algorithms and data representation.
- The ability to analyse problems in computational terms through practical experience of solving such problems, including writing programs to do so.

- The capacity to think creatively, innovatively, analytically, logically and critically
- The capacity to see relationships between different aspects of computer science
- Mathematical skills.

Assessment and Content Overview

Computer systems - 40% of total A Level

- The characteristics of contemporary processors, input, output and storage devices
- Software and software development
- Exchanging data
- Data types, data structures and algorithms
- Legal, moral, cultural and ethical issues

Algorithms and programming - 40% of total A Level

- Elements of computational thinking
- Problem solving and programming
- Algorithms to solve problems and standard algorithms

Programming project - 20% of total A Level

The learner will choose a computing problem to work through according to the guidance in the specification.

- Analysis of the problem
- Design of the solution
- Developing the solution
- Evaluation