

# A LEVEL COMPUTER SCIENCE

**According to the Forbes Rich List, all but one self-made billionaire under 35 years of age are computer scientists! The invention of the computer in the twentieth century is a 'once in a millennium' event, comparable in importance to the development of writing or the printing press. Computers are fundamentally different from other technological inventions in the past in that they directly augment human thought, rather than, say, the functions of our muscles or our senses.**

You will find that computer science is an intensely creative subject, combining invention and excitement and looking at the natural world through a digital prism. This course offers the chance for you to develop a broad range of programming skills along with computer science theory such as hardware, networks and program construction techniques. Computer science will develop computational thinking and problem solving skills, as well as programming skills including object-orientated, assembly language, logical reasoning, algorithmic thinking, system design and structured problem solving. These skills are applicable in many contexts, from science and engineering to the humanities and business, and have already led to deeper understanding in many areas.

## COURSE OUTLINE

During year 1, you will discover the inner-workings of a CPU, use of algorithms, types of OS, procedural programming (Python), advanced binary, Assembly language, data structures, databases and normalisation, compression and encryption, network protocols, and web development (HTML, CSS, JavaScript) including Google's first algorithm.

During year 2, you will learn about the laws that govern the use of computers, Object-Orientated programming, types of processors, memory management, abstraction and concurrency, interrupts, scheduling, virtual machines, development methodologies, and the programs used in programming.



## ASSESSMENT STRUCTURE

YEAR	TITLE	CONTENT	WEIGHTING
End of Year 13	Paper 1	Computer Systems	40%
End of Year 13	Paper 2	Algorithms and Programming	40%
End of Year 13	Paper 3	Controlled Assessment Programming Project	20%

## ENTRY REQUIREMENTS

A Level computer science is a detailed and intensive course, building upon your existing knowledge and skills. A background in computing and/or a strong background in mathematics and science will be useful in this course, which requires logical thinking skills.

Competition for places will be high as computing and related sciences are a popular choice at university. As a result to ensure we strive for the highest success students will ideally have Grade Point 7-9 (Grade A\*/A) at Computer Science GCSE or related subject. The minimum GCSE grade required is Grade point 6 (Grade B). Studying mathematics alongside this course would be advantageous. Evidence of programming experience will also be taken into consideration, especially if you have not taken this subject at GCSE.



Computers are the most remarkable tool that we've ever come up with, the equivalent of a bicycle for our minds  
- Steve Jobs, Apple Inc.



## PROGRESSION ROUTES

It is important to note that computer science is a new A Level subject and many universities are currently only specifying mathematics A Level for degree level entry, however this is expected to change over the next 2 years. Mathematics A Level in addition to Computer Science is therefore essential to study a degree in computing. Other useful A Levels include physics or art.

Computer Scientists work in a huge range of fields, including software, game, and web development and engineering, as well as computer forensics and computer graphics. database management, data analysis and consultancy.

## RECOMMENDED EXTRA CURRICULAR ACTIVITIES

Computer science and programming requires purposeful practise. For that reason it is recommended you purchase a Raspberry Pi and peruse the projects freely available through the online community.

In addition to numerous clubs and societies taking place every week in computing, we also offer a programming club, including Raspberry Pi and other programming projects. In Warrington there is a Coder-Dojo that meet monthly, which is a great place to meet other Computer Scientists and programmers.

## RECOMMENDED READING LIST

Understanding Java by Barry Cornelius

Computer Science: An Overview by J. Glenn Brookshear

Another lively, informative (and short!) book by David Harel

## TOP 5 UNIVERSITIES CURRENTLY FOR THIS SUBJECT

It is important to note that computer science is a new subject in schools, therefore universities are currently only requiring mathematics, however this is expected to change.

1. Oxford University
2. University of Cambridge
3. University of Edinburgh
4. Imperial College London
5. University College London

## COURSE/QUALIFICATION DETAILS

Qualification: A level Computer Science

Specification: OCR

Code: H446

Lead Teacher: Mr R Birchall, Lead Practitioner for Computer Science

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