The Emmbrook Sixth

Computer Science

Qualification Level: GCE Advanced Level

Qualification Duration: 2 years

Exam Board: OCR

Intro: Computer Science is the study of computers and computational systems. Knowing how to program is essential to the study of computer science but it is only one element of the field. Computer scientists design and analyse algorithms to solve programs and study the performance of computer hardware and software. The problems that computer scientists encounter range from the abstract-- determining what problems can be solved with computers and the complexity of the algorithms that solve them – to the tangible – designing applications that perform well on handheld devices, that are easy to use, and that uphold security measures. This is why computer science is a key skill that spans across many subjects such as Mathematics, Science and Economics to name a few.

Subject Content:

1. The characteristics of contemporary processors, input, output and storage devices
2. Software and software development
3. Exchanging data
4. Data types, data structures and algorithms
5. Legal, moral, cultural and ethical issues
6. Elements of computational thinking
7. Problem solving and programming
8. Algorithms to solve problems and standard algorithms

Assessment for these units will be carried out at the end of the two year course.

Non Exam Assessment:

This is an opportunity for you to choose a project and a programming language. You will be tasked with using the knowledge and skills that you have gained throughout year 1 of the course to solve or investigate a practical problem. Some of the problems that students have investigated are

- Machine Learning Algorithms
- Computerised Chess
- The equilibrium problem (Chemistry)
- Modelling a business problem

Programming Language

The programming element of the course is taught using C# and Python however the project can be done in any language and so far we have had students complete their projects in VB.Net, Java, C, C++ and C#. If a student comes with strong knowledge of an A-level appropriate programming language this can always be accommodated.

Assessment comprises two exams with a range of short and long answer questions as well as project which is referred to as the Non Exam Assessment (NEA). The examinations make up 80% of the final grade and the NEA, 20%. An awareness of the application of computer science in the real world will be required as is the desire to solve problems and create programs.

Trips and other costs:

- Text books for each year are £32 and are available from Amazon. Visual Studio can be downloaded to a windows or apple computer to aid study at home for free.

Career and further study:

A Computer Science A level helps to prepare you for many courses at University and can also be the qualification that you need to secure a level 3 apprenticeship. It is a highly academic subject that will help you to develop the problem solving and algorithmic skills needed in areas such as Mathematics, Science, Economics as well as standard Computer Science. If you do wish to study computer science at University many courses will require Mathematics A-Level. Studying Computer Science will provide you with an excellent foundation for a wide range of careers.

Why Study Computer Science at Emmbrook?

It can be difficult to choose a 6th form provider and understand the differences between all of the schools and colleges when they are offering the same course. We think you should study here for the following reasons:

Consistency of Staff: Mrs Panesar has been teaching computer science A-Level at Emmbrook for over 15 years. Mr Kalatzis has also been teaching this subject for over 9 years. The Emmbrook is a secure choice given the staff that will be taking the course.

Experience: Mrs Panesar has worked in industry as has Mr Kalatzis. Both were programmers and worked alongside hardware teams and having real examples of projects and programs that they have worked on in a real environment is key. Mrs Panesar was one of the first teachers to adopt the computer science GCSE course, way before it was fashionable to teach Computing. She has worked directly on Object Orientated programming.

Programming Language and flexibility: the experience in the department means we are not going to restrict you to one programming language. You can, if you wish, learn C, C++, C#, Java …..the list is endless. We will support you in this and encourage and work with you to ensure you get the best outcome. When it comes to the year 13 project we will not be asking all students to complete a project in one particular area. We will look at what you want to study at University, we will try and work the project into this and we will support any project you wish to undertake. We have had projects which students have worked on that have become commercial products, we have looked into graphics rendering, data processing, work for BP on the estimation of oil flow through a pump, we have planned air travel routes, created robotic simulators and worked on chemistry models. Whatever you choose, if it is a realistic project we will support you 100% on this.

Results: If you come to us with a grade 6 or above, a will to learn, a keen interest in programming and computer hardware then we will get you the result you need. We have a proven track record of getting good results with students who come with this criteria.