COMPUTER SCIENCE

Qualification: A-Level | Exam board: AQA

THE BEDFORD SIXTH FORM

SUBJECT OVERVIEW

Computer Science is relevant to the changing and progressive world of computing. It is a practical subject where you can apply the academic principles learned in the classroom to real world systems.

It is an intensely creative subject that combines invention and excitement, and can look at the natural world through a digital lens.

Several pathways would be open to a student with an appropriate grade in A-Level Computer Science.

The Bedford Sixth Form, Bromham Road, Bedford MK40 2BS
01234 291291 · www.bedfordsixthform.ac.uk

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YEAR ONE COURSE CONTENT

The following topic areas are covered in the first year:

Fundamentals of programming
Basic programming techniques are introduced including selection, iteration, arrays, subroutines and exception handling.

Problem solving and theory of computation
More advanced ideas are introduced including problems in logic and how to solve them, structured programming, writing and interpreting algorithms, testing, abstraction and automation, and finite state machines.

Data representation
Number systems are introduced and how they are represented in computer systems. Digital representation of sound and compression, and encryption are also studied.

Hardware and software
The fundamental architectural components of a computer system are explained including operating systems, programming languages, logic gates and Boolean algebra.

Computer organisation and architecture
Computers are studied in detail through an examination of internal computer hardware such as the processor, processor instruction set, input-output devices and secondary storage devices.

Communication: technology and consequences
Network concepts and architecture are introduced as well as wireless technology and an exploration of the issues and challenges presented by networked technology.

YEAR TWO COURSE CONTENT

The second year will build on the learning from year one in the following areas:

Databases
Current database theory and structure is introduced including relational databases and structured query language (SQL).

Big Data
Current issues related to, and techniques for handling, large amounts of structured and unstructured data are studied. Distributed processing and functional programming are applied to big data.

Functional programming
The functional programming paradigm is introduced and compared to other programming methods. Opportunities to write functional programs will be presented.

Systematic problem solving
The software development lifecycle is examined and a method for addressing problems in software is introduced.

Non-Assessed practical project
Sudents will have the opportunity to spend time on a large programming project of their choosing. This may involve a real end user and will be based on the skills they have developed throughout the course. A typical project might be, modelling a flu epidemic, a computer game or an app for a mobile or tablet.

WHAT DOES THIS COURSE PREPARE ME FOR?

Several pathways would be open to a student with an appropriate grade in A-Level Computer Science. A student would have the opportunity to study Computer Science at degree level or a combination of Science and Computer Science, perhaps in the area of Bioinformatics.

Alternatively a student may want to explore opportunities with a suitable employer to further their programming skills and experience.

ASSESSMENT

A-Level Computer Science is a linear course which means that the final A-Level qualification will depend on the examinations and project at the end of the second year of study only.

At the end of the second year, the A-Level examination will consist of two theory papers each covering 40% of the marks and a software project covering 20% of the marks.

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