

A Level

Computer Science

AQA



Computation is at the heart of the quest to unravel the secrets of life, to understand more about the human brain, the natural sciences and economic systems.

If you choose not to continue this subject onto year 2, you are able to sit an AS exam at the end of year 1.

Course Content

Computer Science is a broad-based course where you will gain a sound understanding of the internal structure of computers and how they operate. A large part of the course will be spent studying programming in Pascal and Delphi, developing skills in expressing solutions to problems using algorithms.



Advances in computing are transforming the way we work and our new Computer Science specifications are changing with the times. This course, with its emphasis on abstract thinking, general problem-solving, algorithmic and mathematical reasoning, scientific and engineering-based thinking, is an excellent foundation for understanding these future challenges.

Year 1

Topics covered at AS Level include:

- **Fundamentals of Programming**, including programming and their concepts, arithmetic, relational and Boolean operations, constants and variables (local and global), string handling operations, random number generation, exception handling, sub-routines and procedural-oriented programming.
- **Fundamentals of Data Structures**, including single and multi-dimensional arrays, fields, records and files.
- **Systematic Approach to Problem Solving**, including analysis, design, implementation, testing and evaluation.
- **Theory of Computation**, including abstraction and automation and finite state machines.
- **Fundamentals of Data Representation**, including number systems, number bases, units of information, binary number system, information coding systems and representing images, sound and other data.
- **Fundamentals of Computer Systems**, including hardware and software, classification of programming languages, types of program translator, logic gates and Boolean algebra.
- **Fundamentals of Computer Organisation and Architecture**, including internal hardware components of a computer, the stored program concept, structure and role of the processor and its components and external hardware devices.
- **Consequences of Uses of Computing**, including individual (moral), social (ethical), legal and cultural issues and opportunities.
- **Fundamentals of Communication and Networking**, including methods and wireless networking.

Computer Science

Year 2

The AS Level and A Level are co-teachable, therefore the A Level includes the same topics as the AS level, plus the following:

- **Fundamentals of Programming**, including the topic areas of the AS Level plus pointers/references, role of stack frames in sub-routine calls, recursive techniques and object-oriented programming.
- **Fundamentals of Data Structures**, including the topic areas of the AS Level plus queues, stacks, graphs, trees, hash tables, dictionaries and vectors.
- **Fundamentals of Algorithms**, including graph traversal, tree traversal, reverse Polish, searching, sorting and optimisation algorithms.
- **Theory of Computation**, including the topic areas from the AS Level plus regular languages, context free languages, classification of algorithms and a model of computation (Turing machine).
- **Fundamentals of Data Representation**, including the topic areas of the AS Level plus rounding, absolute and relative errors, range and precision, normalisation of floating point form, underflow/overflow and vector graphics.
- **Fundamentals of Communication and Networking**, including the topic areas of the AS Level plus The Internet and TCP/IP.
- **Fundamentals of Databases**, including database design and normalisation.
- **Big Data**, including knowing that 'Big Data' is a catch-all term for data that won't fit the usual containers.
- **Fundamentals of Functional Programming**, including functional programming paradigm, writing functional programs and lists in functional programming.
- **Systematic Approach to Problem Solving**, including aspects of software development.
- **Computing Practical Project**, including analysis, design, implementation, testing and evaluation.

Career Possibilities

The course provides an excellent foundation for any Computer Science related course. Many students have moved on to degree courses in, for example, Computer Science, Artificial Intelligence, Games Design and Software Engineering. Computing personnel are required in many industries, such as Botany and Biology, Space and Aeronautics, National Defence, Sports Equipment, Computer Games Design, Transport and Travel, Modern Media, Social Networking and Medicine and Medical Research.

Minimum Entry Requirements

5 GCSEs at grade A* - C, including English and either a grade 5 in Maths OR a grade 4 in Maths and a grade B in Computer Science.

As an alternative to A level Computer Science you may wish to explore the BTEC in Computing & IT.

Apply online: www.psc.ac.uk/apply t: 01962 857555 e: admissions@psc.ac.uk

Peter Symonds College, Owens Road, Winchester, Hampshire SO22 6RX