Wath Sixth Form Subject Preparation Pack

A LEVEL IN COMPUTER SCIENCE

- What careers could the A Level in Computer Science IT lead to?
- What will I study?
- How will I be assessed?
- Meet the staff.
- Recommended resources.
- Transition tasks.

What is the A Level in Computer Science?

OCR summarise their course as *"a practical subject where learners 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 prism. It values computational thinking, helping learners to develop the skills to solve problems, design systems and understand the power and limits of human and machine intelligence. Learners will develop an ability to analyse, critically evaluate and make decisions"*

The course combines a programming element with two external examinations covering the theoretical elements of the subject.

Why should I study the A Level in Computer Science?

You may have an interest in technology.

You might want to find out more about how hardware works and how software is created, with them both combined effectively to create an end product.

You could have an interest in problem solving and wish to develop your own programming skills to help solve these problems.

You may wish to explore worldwide issues surrounding current technology.

You might be interested in a computer related course at University or IT related employment.

What careers could the A Level in Computer Science lead to?

There are a wide range of roles that could be pursued with Computer Science as an A Level, these include a software developer, database administrator, computer hardware engineer, computer systems analyst, web developer, information security analyst, computer and information research scientist, systems manager, IT project manager and many more.

What will I study?

The course content is split across **two exam** papers and **three coursework** units.

Examinations:

- **Paper 1 – Computer systems**
    - For the first exam you will be tested on:
        - 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.

- **Paper 2 – Algorithms and programming**
    - For the second exam you will be tested on:
        - Elements of computational thinking.
        - Problem solving and programming.
        - Algorithms to solve problems and standard algorithms.

Coursework:

- **Programming project**
    - The programming project is broken into four different sections:
        - Analysis of the problem.
        - Design of the solution.
        - Developing the solution.
        - Evaluation.

How will I be assessed?

There are two external examinations and one programming project. Both examinations are 2 hours and 30 minutes long and marked out of 140, each exam accounts for 40% of the course. The problem solving programming project is marked out of 70 and counts for the remaining 20% of the qualification.

Meet the staff

Head of ICT and Computer Science – Mr Wilby

"We live in a constantly changing world that heavily relies upon computers and ICT. Technology has undoubtedly enriched our lives pulling countries closer together and expanding our knowledge and understanding of what happens around us through the development of electronic devices and the global sharing of information. I have already seen many technological advancements in my lifetime and following these developments and predicting future technologies through analysis with students is something I greatly enjoy. I believe IT & Computer Science covers such a vast range of topics that there is something within its multiple possible pathways that will appeal to all. We offer creative, technical, 'hands on' and theoretical approaches, there is something for everyone and that's why I love teaching the subject."

Teacher of Computer Science/ICT/Business – Mr Roberts

"For several years I ran my own business but very much look forward to getting into the classroom and inspiring students! I think my real-world business experience will help me to help you learn and understand the work we will be covering. Like most of you, I like to keep up to date with all the latest technology and the workings of it. My lessons will be fun, interactive and incorporate technology as much as possible. In this ever changing and fast paced world

we live in, it's important to learn about the link between computing and business; hopefully my students will be just as interested as I am!"

Recommended resources

If you wish to explore some of the topics and further develop your programming skills prior to September then consider looking at the below.

Csnewbs is an excellent resource for learning about Python in case you wish to further explore this programming language prior to September:

https://www.csnewbs.com/python

Craig 'n' Dave YouTube videos cover a variety of topics from the course, watching some of these would give you an insight into areas to be covered over the two years.

https://www.youtube.com/channel/UC0HzEBLlJxlrwBAHJ5S9JQg/playlists?view=50&sort=dd&shelf_id=17

This is a text book endorsed by the exam board. There is no requirement to purchase this, although some students may wish to do so.

https://www.cambridge.org/gb/education/subject/computing/computer-science/level-computer-science/a-as-level-computer-science-ocr-student-book?isbn=9781108412711&format=PB#

Transition tasks

Prior to September I would like students to complete the below. Students will be picked at random in the first lesson to answer these as an 'ice breaker'.

1. What do these computer acronyms stand for and what do they do?
   a. CPU
   b. RAM
   c. ROM
   d. SSD
   e. BIOS
   f. HTTPS
   g. HTML
2. What is the difference between 'lossy' and 'lossless' compression?
3. Storage devices can be either magnetic, flash or optical. Give one real life example of each.
4. What does 'Base' mean in the context of 'Base 10'?
5. Where would you see 'entities' and what are they?
6. What are the three types of entity relationships? Draw them.
7. What is the difference between 'sequence', 'selection' and 'iteration' in terms of computer programming?
8. In programming terms, what do these mean?
   a. ==
   b. !=
   c. <
   d. <=
   e. >
   f. >=
9. Who created Python?
10. Code combat is an interactive game that helps learn some of the basics of Python. I would like all students to have some experience of this programming language so if you haven't please spend time working through the activities there https://codecombat.com/