Year 11 – Computer Science

We live in a digital age and computers play a part in just about every aspect of life. Their use has transformed society and computer scientists are at the heart of that change. Studying Computer Science allows you to solve complex, challenging problems and is invaluable even if your chosen career path lies outside of Computing. For many companies and employers, it shows that you can think logically and creatively. It also develops your resistance to 'giving up' when things go wrong.

The course is studied over two years and is composed of five units. Specifically, the course is designed to encourage students to develop:

- an understanding of, and the ability to apply, the fundamental principles and concepts of computer science, including abstraction, decomposition, logic, algorithms and data representation
- the ability to analyse problems in computational terms through practical experience of solving such problems, including writing programs to do so
- the capacity for thinking creatively, innovatively, analytically, logically and
- critically
- the capacity to see relationships between different aspects of computer science
- mathematical skills (note that there is a lot of complex mathematical work)
- the ability to articulate the individual (moral), social (ethical), legal and cultural opportunities and risks of digital technology.

In Year 12 students will study;

Unit 1: Fundamentals of Computer Science. This is assessed by a written examination which is 25% of the overall qualification (62.5% of AS qualification)

Unit 2: Practical Programming to Solve Problems. This is assessed by an on-screen examination which accounts for 15% of qualification (37.5% of AS qualification)

For a detailed overview of the course and the assessment objectives see here

Should you decide to study Computer Science as a subject next year, these resources should help further develop your interests as well as preparing you for 'A' Level study and beyond.

Textbook : AS Level Computer Science for WJEC Student Book Paperback – 27 Jun. 2020 by Mark Thomas (Author), Alister Surrell (Author), Adrian Hamflett (Author)

Recommended textbook to help with the Maths content: Essential Maths Skills for AS/A Level Computer Science Paperback – 27 May 2016 by Gavin Craddock (Author), Victoria Ellis (Author)

The following resources should help further develop your interests as well as preparing you for 'A' Level study and beyond.

The resources include a selection of websites and videos that you may find useful in your preparation. During Key Stage 5 one of the best ways to stand out is through the amount of independent study you undertake outside of the classroom. Further study enables you to get an increased awareness of your area of interest irrespective of your future plans.

Why Computer Science matters
https://www.youtube.com/watch?v=FpMNs7H24X0

Suggested websites:

1. **Visual Studio Community Edition: https://visualstudio.microsoft.com/vs/community/**
During Year 12 for Unit 2 Practical Programming to Solve Problems students will utilise the Visual Basic language. This software is free to download from the link above if you wish to explore.

2. **Get started with Visual Basic console applications: https://docs.microsoft.com/en-us/visualstudio/get-started/visual-basic/tutorial-console?view=vs-2019**

3. **Isaac Computer Science: https://youtu.be/nW4J-NVDziw**
https://isaaccomputerscience.org/
Excellent resources for Computer Science recently launched. There are GCSE to AS level resources for you to check out whether this is the right course for you
https://isaaccomputerscience.org/concepts/gcse_prog_basics?topic=gcse_programming_concepts
– you will need to register, do so with a school email address.

4. **Learn Computer Science: https://www.learncomputerscienceonline.com/** A useful site that allows you to explore some of the key concepts in the world of Computer Science

These websites can be useful to further explore the subject of Computer Science

5. **CS4F – Computer Science For Fun** – **http://www.cs4fn.org/** A magazine that looks at some fun aspects of Computer Science

6. **BEBRAS Challenge https://challenge.bebras.uk/index.php?action=user_competitions**
Computational Thinking (Problem Solving) plays a major role in Computer Science. Have a go at some of the past challenges (choose senior) to see how good your problem solving skills are. Do you think computationally?

There are also a number of websites that will help you to keep abreast of emerging technologies and developments.

Suggested websites:

1. **BBC Click: https://www.bbc.co.uk/programmes/b006m9ry**
2. **Wired: https://support.office.com/en-gb/publisher**
3. **Computer Weekly: https://www.computerweekly.com/**
4. **Tech Radar: https://www.techradar.com/news/computing**
5. **Technology Review: https://www.technologyreview.com/**
6. **Computing: https://www.computing.co.uk/type/news**

**Some videos that might be of interest that relate to the theory content**

1.   Bettina Bair: Inside your computer

How does a computer work? The critical components of a computer are the peripherals (including the mouse), the input/output subsystem (which controls what and how much information comes in and out), and the central processing unit (the brains), as well as human-written programs and memory.
Bettina Bair walks us through the steps your computer takes…

https://www.ted.com/talks/bettina_bair_inside_your_computer
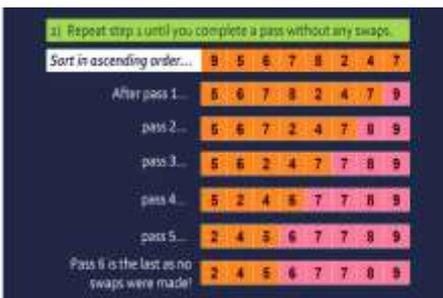
2.   Bubble, Merge and Insertion Sort Algorithms

A topic that will definitely come up within your examination and one that builds on GCSE studies.

https://www.youtube.com/watch?v=qfs9Kt5Rkj0

3.   Kanawat Senanan: How do hard drives work?

The modern hard drive is an object that can likely hold more information than your local library. But how does it store so much information in such a small space? Kanawat Senanan details the generations of engineers, material scientists, and quantum physicists who influenced the creation of this incredibly powerful and precise tool.
https://www.ted.com/talks/kanawat_senanan_how_do_hard_drives_work