

Computer Science

Introduction

So you have chosen to undertake the A-Level study of Computer Science, congratulations, you have begun a journey and here is what you can expect;

- A course that will be relevant to the modern and changing world of computing.
- Focus on programming, building on your GCSE Computing and emphasis on the importance of computational thinking as a discipline helping you to develop the skills to solve problems, design systems and understand human and machine intelligence.
- We will help you apply the academic principles learned in the classroom to real world systems in an exciting and engaging manner.
- The culmination of this will be a clear progression into higher education.

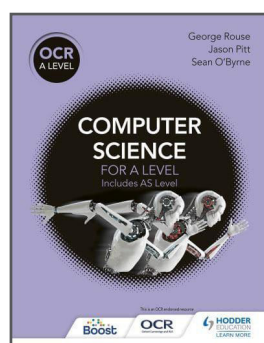
Preparation

You have a long period of time between now and beginning your studies here at St Christopher's so it is wise to get started on prepping for the courses you will undertake.

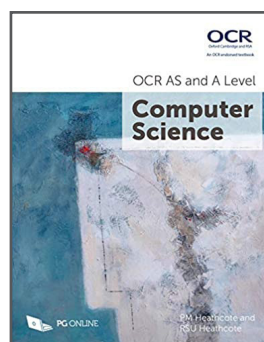
I would begin by investigating the OCR website for the new course at the following address:
www.ocr.org.uk/qualifications/as-and-a-level/computer-science-h046-h446-from-2015

Here you will find the scheme of work for the A-Level course and you should use it as a tool for both monitoring your learning and getting ahead.

Although we do not strictly follow any particular text, you will find the below accredited textbooks by OCR most useful. Now is the best time to buy, but first check out second hand sites such as ebay and Amazon Market Place before purchasing a brand-new book.



Title: Computer Science For A-Level
Publication date: April 2015
Author: Sean O'Byrne, George Rouse, Jason Pitt
ISBN: 9781471839764
Publisher: Hodder Education



Title: OCR AS and A-Level Computer Science
Publication date:
Author: P. M. Heathcote , R. S. U. Heathcote
ISBN: 9781910523056
Publisher: PG Online Limited

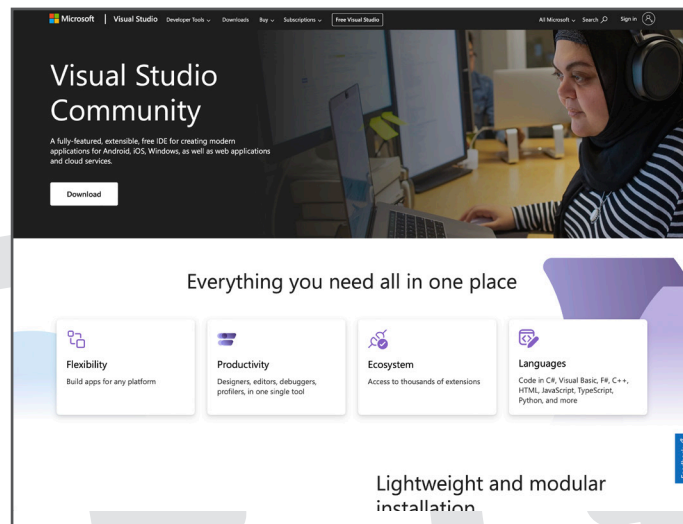
As always I would ask all my students to be mindful of any potential resources they may come across on-line (websites, social networks, YouTube) and pay attention to the news as this can be a valuable resource especially when we look at the moral and ethical issues associated with computers and legislation surrounding them. The following websites are invaluable;

- www.mrfraser.org (this site will give you a lot of revision material and examples)
- www.codecademy.com (please sign up for this site and begin to learn html, CSS & Java Script)
- www.w3schools.com/sql (Great site to learn SQL and brush up on html, CSS basics)
- www.programmr.com (Try your hand at various programming languages)
- [Craigndave YouTube Channel](#) (Watch videos on every specification point in the OCR A-Level)

What to do before you start in September!

To help get you into the mood and hit the ground running I would like you to get an understanding of the programming language Visual Basic.NET.

You will be using Visual Basic.NET language (both console and later forms) and it is expected that you familiarise yourself with the code by downloading the free visual studio software from;



<https://visualstudio.microsoft.com/vs/community>

You should choose the community download as this is the most appropriate (if using a Windows based PC).

Please use the following pdf tutorial to get yourself ready for the course. This tutorial covers the 'console application' side of VB.Net which is critical for being able to understand and answer exam questions.

Enter the following into Google search: '**VB.Net Console Student Booklet**'. The first link is to a PDF download written by 'Doug Semple'. This is a great resource and will allow you to move quickly into the VB.NET syntax.

PLEASE NOTE: The above guide is for use with the VB.NET Console IDE developer, this may not be the default IDE when using Visual Studio. Please make sure to select the correct IDE!

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Course Outline

There are four themes to the A-Level Computer Science (Cambridge OCR):

- Component 1 – Computer Systems (40%, external written paper)
- Component 2 – Algorithms and Programming (40%, external written paper)
- Component 3 – Programming project (20%, non-examined assessment completed in class)

Components 1 & 2 are examined during the course.

Course Breakdown

Lower Sixth

- Programming concepts using VB.NET, OOP, LMC paradigm's. This will allow you to understand the different structures and searches.
- Structure and function of the CPU. Different types of CPU and how they meet the demands of modern society.
- System and application software and how these interact with the user and hardware.
- Data types, specifically conversion from binary, denary, hexadecimal in unsigned and signed notation. Calculations of binary signed values and conversion of floating point Binary. Manipulation of binary values through bitwise and masks.
- Boolean algebra encompassing logic gates, expressions and Karnaugh maps for simplification. D-type flip flops, half adders and full adders.
- Structures, including records, lists, tuples, linked-list, graphs, stack, queue, tree, binary tree and hash table.
- You will also begin you project and have completed you main analysis ready for the start of Upper Sixth.

Upper Sixth

- Complete your project
- Study algorithms of sorts and searches and use Big-O theory to analyse efficiency.
- Compression, encryption and hashing.
- Databases, networks and web technologies.
- Examination preparation.

The external examinations consist of two papers: Paper 1 (Component 1) and Paper 2 (Component 2).

There is an option to take the AS-Level Computer Science externally, which consists of two papers: Paper 1 (Component 1, 50%) and Paper 2 (Component 2, 50%); no programming project is required.

The specification can be found here:

<https://www.ocr.org.uk/Images/170844-specification-accredited-a-level-gce-computer-science-h446.pdf>





**“For I know the plans I have for you,” declares the Lord,
“plans to prosper you and not to harm you,
plans to give you hope and a future.”**

Jeremiah 29:11

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