

# Computing at STA



## GCSE Exam Results

2007 – 2015: 100% A – C

## KS3

### Year 7

In Year 7, students study: Computer Science. The course allows students to learn the basics of computing theory which enhances their ideas and knowledge about how computers work. Students are further introduced to programming which enables them to understand the concept of sequencing instructions which is followed by the computer to control what is being developed.

In Computing at St Aloysius College we strive to develop, maintain and stimulate students' curiosity, interest and enjoyment in the subject. We encourage students to have open, enquiring minds and equip them to use computational thinking and creativity to understand and change the world.

We enable students to become self-directed users of technology with the associated skills supporting life-long study, the pursuit of personal interests and prospective employment in a modern technological society. Enabling students to acquire appropriate, transferable computing skills, knowledge and understanding, we ensure that progression is a key feature.

Through computing lessons, all students will have a basic level of capability, which can be applied to students' learning in a specific area of the wider curriculum. Students should feel confident enough with their transferable skills that they are encouraged to use unfamiliar software.

## **Course Content**

In Year 7 students are set a number of specific tasks which give them an introduction to a variety of different skills and software packages.

Students are introduced to the concept of computer programming and are taught to understand key algorithms that reflect computational thinking. Students use different programming languages to solve a variety of computational problems.

Students create a presentation which they have to adapt to meet both the needs of a child and adult audience. Students refine their research skills, understanding information bias and validity and go on to create an advertisement for a specific audience.

Students are challenged to model a situation to answer a number of 'what-if' questions and use data handling techniques to create information. Students are further challenged to devise a system to control a Pelican Crossing and test it in a virtual environment.

Computing develops students' independent learning skills, their sense of self confidence, and provides a variety of ways for them to present and share their knowledge and ideas. The skills we teach support the student's development in their work in all other curriculum subjects.

## **Why Computing?**

Computing contributes to developing successful learners by providing powerful tools for developing creativity, initiative and independent thinking. It enables students to understand and apply the fundamental principles and concepts of computer science. Students analyse problems in computational terms and have experience of writing programs to solve problems. Computing enables students to follow enquiries and solve problems, and enhances their skills in logical reasoning, questioning, analysis and research. Computing prepares students for a world driven by Technology.



## Year 8

The Year 8 schemes of work are based on the new Computing syllabus set out by the government. This includes the following topics:

- Representation of Data
- Binary for numbers
- Binary logic – Denary to binary, adding binary
- Data Structures
- Maths for Computing
- Boolean Logic and Bitwise Boolean Logic (also Truth Tables, Operator Precedence and Duality)
- Introduction to paths and graphs
- Use of spreadsheets (or programming language?) to convert between denary and binary
- Scaling and reflection
- Algorithms and Programming (Mazes and robots sequences)
- Programming – general
- Programming - Python (the same as the BASIC course, plus extra variable types, lists, among others).
- Networking
- Systems – Hardware, software, networks
  - Uses of the internet
  - Use of the Worldwide Web
  - Information Systems
  - Spreadsheets
  - Models – Spreadsheet modelling

- Data Encryption – graphics, ASCII, types of images
- Databases (Introduction to Databases)
- Creative – Designing game sprites, animated gifs, html images
- Introduction to HTML
- Project management: Gantt charts / Critical Path Analysis
- E-Safety Internet safety, advice and preventative method

This course will also support the general development of ICT skills in all our students. Lessons for year 8 are one hour per week. Homework is set weekly, and there are half-termly assessments. These are graded in percentages, and overall average marks are reported to parents.

Things to do, books your son can read or appropriate websites which will be of help.

Websites:

Students are encouraged to use websites such as Bitesize Keystage 3 Computer Science

<http://www.advanced-ict.info/programming/tasks.html>

Key Dates in the Year (e.g. half termly assessments, controlled assessment dates, field trips)

- November, February, May and July

# KS4



## Year 9 - Options

### Computer Science

This course is available to students who select Computer Science as an option in Year 9.

The Year 9 Cohort is pursuing the OCR GCSE (9-1) Computer Science (J276) programme. This course is relevant to the modern, changing world of computing, it's designed to boost computing skills essential for 21st century.

Aspects of the course focuses on cyber security – It looks at phishing, malware, firewalls and people as the 'weak point' in secure systems, which students will study for the first time at this level.

A greater emphasis on 'computational thinking' – cloud based programming and course content platform where students can learn the theory and apply it in real life situations, in any computing language.

The course encourages mental versatility – Students use their new-found programming skills on an independent coding project by solving a real-world problem of their choice.

### Specification

The specification is split into three components:

- Component 01 – Computer Systems

The first component is an exam focused on computer systems covering the physical elements of computer science and the associated theory.

- Component 02 – Computational Thinking, Algorithms and Programming. This component is focused on the core theory of computer science and the application of computer science principles.
- Component 02 – Programming Project

This is a non-exam assessment. This component is the non-exam assessment where candidates are challenged by a range of exciting and engaging tasks to apply the knowledge and skills they have learned.

## Relevance

The Computer Science qualification is relevant to the modern and changing world of computer science. Computer Science is a practical subject where learners can apply the knowledge and skills learned in the classroom to real-world problems. It is an intensely creative subject that involves invention and excitement. The Computer Science qualification values computational thinking, helping learners to develop the skills to solve problems and design systems that do so. These skills help to prepare learners who want to go on to study Computer Science at AS and A Level and beyond. The qualification also provides a good grounding for other subject areas that require computational thinking and analytical skills.

## Course Overview

Component title	Component overview
Computer Systems	<ul style="list-style-type: none"> <li>• Systems architecture</li> <li>• Memory</li> <li>• Storage</li> </ul>

	<ul style="list-style-type: none"> <li>• Wired and wireless networks</li> <li>• Network topologies, protocols and layers</li> <li>• Network security</li> <li>• System software</li> <li>• Moral, social, legal, cultural and environmental concerns</li> </ul>
<p>Computational Thinking, Algorithms and Programming</p>	<ul style="list-style-type: none"> <li>• Translators and facilities of languages</li> <li>• Algorithms</li> <li>• High- and low-level programming</li> <li>• Computational logic</li> <li>• Data representation</li> </ul>
<p>Programming Project</p>	<p>Programming techniques</p> <ul style="list-style-type: none"> <li>• Design</li> <li>• Development</li> <li>• Effectiveness and efficiency</li> <li>• Technical understanding</li> <li>• Testing, evaluation and conclusions</li> </ul>

## Assessment

		Marks	Duration	Weighting
<b>Component 01</b>	<b>Computer Systems</b> <ul style="list-style-type: none"><li>• Systems architecture</li><li>• Memory</li><li>• Storage</li><li>• Wired and wireless networks</li><li>• Network topologies, protocols and layers</li><li>• Network security</li><li>• System software</li><li>• Moral, social, legal, cultural and environmental concerns</li></ul>	80	1 hour 30 minutes	40% of the total GCSE
<b>Component 02</b>	<b>Computational Thinking, Algorithms and Programming</b> <ul style="list-style-type: none"><li>• Translators and facilities of languages</li><li>• Algorithms</li><li>• High- and low-level programming</li><li>• Computational logic</li><li>• Data representation</li></ul>	80	1 hour 30 minutes	40% of the total GCSE
<b>Component 03</b>	<b>Programming Project</b> <ul style="list-style-type: none"><li>• Programming techniques</li><li>• Design</li><li>• Development</li><li>• Effectiveness and efficiency</li><li>• Technical understanding</li><li>• Testing, evaluation and conclusions</li></ul>	40	Approx. 20 hours	20% of the total GCSE

## Aims

This exciting GCSE gives you an excellent opportunity to investigate how computers work and how they are used, and to develop computer programming and problem-solving skills. It aims to give learners a real, in-depth understanding of how computer technology works and develop critical thinking, analysis and problem-solving skills. You will also do some in-depth research and practical work. For example, some of the current investigations look at JavaScript, encryption and assembly language programming.

## Looking Ahead

If you take a GCSE in Computer Science and then go on to study the subject at A Level or university, you will have an advantage over fellow students who are picking up the subject at these higher levels. The increasing importance of information technologies means that there will be a growing demand for professionals who are qualified in this field.

The course is also an excellent preparation if you want to study or work in areas that rely on the skills you will develop, especially when they are applied to technical problems. These areas include Engineering, Financial and Resource Management, Science and Medicine.

## **Examination Board**

OCR

## **Year 10**

The Year 10 cohort is pursuing the NCFE Certificate in Computer Technology. This is an option course.

## **Qualification purpose**

This qualification is designed for learners who have an interest in digital literacy, solving problems and creating simple computer programs. It will provide learners with knowledge of different software packages to enable them to use these within further education or apprenticeships and it will give them an introduction to writing simple computer programs.

The Aim of the qualification is to:

- Develop a broad understanding of computer technology
- Develop a significant knowledge core which spans the vocational sector
- Provide academic and study skills that will support progression within computer technology and more broadly.

The objectives of the qualification are to help learners to: use a variety of software packages in response to a research scenario; use their knowledge of computer programming to produce a simple program in response to a research problem; use simple programming languages; raise awareness of working safely and securely when using digital technology.

<b>Unit number and title</b>
Unit 01 Digital literacy (H/505/4331)
Unit 02 Digital technology (K/505/4332)
Unit 03 Introduction to computer programming (M/505/4333)

To be awarded the NCFE Level 1 Certificate in Computer Technology, learners are required to successfully complete 3 mandatory units. To achieve the NCFE Level 1 Certificate in Computer Technology, learners must successfully demonstrate their achievement of all learning outcomes and assessment criteria of the units detailed in the qualification specification.

### **Progression opportunities**

Learners who achieve this qualification could progress onto other V Cert qualifications, such as:

- NCFE Level 2 Certificate in Computer Technology

Or further Level 2 qualifications and GCSEs, such as:

- GCSE in Computing
- GCSE in Computer Science
- Level 2 Computer Science qualification
- Level 2 IT User Skills qualification

It may also be useful to those studying qualifications in the following sectors:

- Business Studies
- Digital Literacy
- Computer Science
- Computer Programming

### **Year 11 ICT**

Students in year 11 currently follow the Edexcel BTEC First qualification in Information & Creative Technology. This course gives students the opportunity to excel and also gain

recognition for their efforts with a nationally recognized qualification. All students can achieve a GCSE equivalent by the end of year 11.

### Qualification Structure

Unit 1	The Online World
Unit 3	A Digital Portfolio
<b>Optional specialist</b>	
	Creating Digital Animation
	Creating Digital Audio
	Creating Digital Graphics
	Creating Digital Video
	Spreadsheet Development
	Database Development

### Progression Opportunities

The Information and Creative Technology course provides the skills, knowledge and understanding for level 2 learners to progress to:

- Other level 2 vocational qualifications
- Level 3 qualifications, such as the Edexcel BTEC Level 3 Nationals in IT or an IT/Creative Media apprenticeship.
- Academic qualifications, such as GCSE or GCE A Level in ICT or Computing.
- Employment within the information technology and/or areas within the creative industries, such as electronic publishing or multimedia production.

# KS5



## ICT at KS5

At advanced level, the OCR ICT AS course is offered as part of its sixth form curriculum.

The OCR ICT AS course is made up of an exam and coursework with a wide range of ICT topics and applications covered during the course of study. This course aims to ready students for the world of work.

### Course Content.

## 'AS' Level

### Information, Systems and Application (Unit GO61)

- Hardware and Software
- The differences between data, information, knowledge and processing.
- Spreadsheet and Database concepts
- Characteristics of Standard Applications.
- The role and impact of ICT in society.

### Structured ICT Tasks (Unit GO62)

These are set by the exam board and are project based. They will require you to solve a given problem using a range of software applications and give you the opportunity to explore design, software development, testing and documentation.

## **‘A2’ Level**

### **ICT Systems, Applications and Implications (GO63)**

- Systems cycle
- Networks and communications
- Applications of ICT
- Implications of ICT

### **ICT Project (GO64)**

Users develop their own ICT project.

### **What do I need to know or be able to do this course?**

The aim of the course is to encourage students to develop and apply an understanding of the principles of problem solving using ICT, understand the range of applications of ICT and the effect of their use. You will need to have achieved a Grade B at GCSE in ICT or an ICT related qualification. You will need to show that you have an interest in the world of ICT and have developed a good level of ICT skills.

### **How will I be assessed?**

## **‘AS’ Level**

Information, Systems and Application (Unit GO61)

There will be a 2 hour written paper.

- 60% of total ‘AS’ Level marks; 30% of total of ‘A2’ Level marks.
- Structured ICT Tasks (Unit GO62)
- There will be 6 short structured practical ICT tasks.
- 40% of total ‘AS’ Level marks; 20% of total of ‘A2’ Level marks.
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## **‘A2’ Level**

### **ICT Systems, Applications and Implications (GO63)**

- There will be a 2 hour written paper.
- 30% of total of ‘A2’ Level marks.

- ICT Project (GO64)
- Coursework
- 20% of total of 'A2' Level marks.

### **What could I do with a qualification in this subject?**

In today's workplace, those with the knowledge and skills to use ICT creatively have the opportunity to pursue new and exciting careers. To meet these career challenges this course provides a sound knowledge of ICT together with interpersonal, technical and academic skills.

The three most commonly asked questions about this course are:

### **What software packages do I need for the course?**

You must have practical experience of the most common generic software packages, a word-processor, a spreadsheet package, and a database management system as well as presentation and drawing software.

### **Is the coursework element the same as GCSE ICT?**

No, at 'AS' Level the coursework questions are shorter tasks set by the examination board.

### **Do I need to be good at Mathematics to be successful in ICT?**

No, this is not a Computing course – it is based on the development of software skills to solve problems.

**Key Dates** in the year (e.g. half termly assessments, controlled assessment dates, field trips)

- November, February, May and July



## **Computing Facilities**

The Computing department consists of seven dedicated networked computer classrooms. There are also networked computers situated in the library and in all subject areas throughout the school. All computer suites have interactive white-boards and can accommodate a whole class of students working individually. Each of these suites is equipped with at least 30 computers. We ensure that students have access to color and black and white laser printers, scanners, webcams and digital cameras.

## **Extended School**

The ICT faculty runs a variety of different after-school sessions that are available to all students. The main focus is to enable students to extend their learning and reinforce topics that have been delivered in lessons.

There are also computing clubs that run for Year's 7, 8 and 9's.

### **Year 7 – 'Kode IT'**

### **Year 8 – Python Club**

### **Year 9 – 'Greek or Nerd' Kode Klub**

## **Future Plans**

For the immediate future the goals of the department are to: sustain and improve results; introduce curriculum enrichment activities and develop industrial links and partnerships while helping students to achieve their full potential.

# Staff

The teaching team is made up of specialised staff who deliver a rigorous and relevant curriculum and strive to provide an enjoyable and rewarding experience in Computing and ICT. It comprises:

- Ms M Acquah      Head of Department
- Mr Kakou          ICT Teacher
- Mr Bonsell        DT and ICT Teacher