

# Computer Science/ICT Update

# **A/AS Level (KS5)**

# New A Level Computer Science

- Pretty much everything!
- Inline now with HE and Industry expectations
- Comparison of complexity of algorithms
- Number representation and bases
- Use any relevant language, Python, C++, Java etc
- Project more refined and more focussed on coding
- Higher weighting for skills
- Relevant and engaging

# AS

- 2 papers
- Computing principles
- Algorithms and problem solving
- 1 hour 15 minutes
- 70 marks
- 50% each

# A Level

- 2 papers
- Computer Systems
- Algorithms and programming
- 2 hours 30 minutes
- 140 marks
- 40% each
- Programming Project (20% NEA)

# Computing principles (AS)

This component will be a traditionally marked and structured question paper with a mix of question types: short-answer, longer-answer, and levels of response mark scheme- type questions. It will cover the characteristics of contemporary systems architecture.

- Characteristics of contemporary processors
- Software and software development
- Programming
- Exchanging data
- Data types, structures and algorithms
- Legal and ethical issues

# Algorithms and problem solving

- Elements of computational thinking
  - Thinking abstractly
  - Thinking ahead
  - Thinking procedurally
  - Thinking logically
- Problem solving
  - Programming techniques
  - Software development

# Algorithms and problem solving

- Algorithms
  - Analysis and design of algorithms
  - Standard algorithms
  - Suitability of algorithms
  - Measures to determine efficiency

We are producing a suite of algorithm and computational thinking resources to support teachers and learners. These will be out soon.

# Level of response exercise:

Pick a news article or topic and dissect it using the following framework. This should form the base of a reasonable LOR answer.

## **Stake holders:**

- Anybody involved either directly or indirectly
- How are they effected and to what extent

## **Technology Involved:**

- Any technology and how it relates to the problem/topic
- Different technologies that are related
- How the technology works within the context
- Comparisons

## **Moral/Social/Cultural/Legal Issues:**

- How the issue relates to any moral, social or cultural context
- What are the legal issues?
- How are the stakeholders effected?
- How does the technology relate?

## **Solutions:**

- Any technological or other solution and how it solves the problem
- Analysis of solution and its effects
- How it all fits together



## Content Overview

- Characteristics of contemporary processors
- Software and development
- Exchanging Data
- Data types structures and algorithms
- Legal, moral and ethical issues.

- Elements of computational thinking
- Problem solving and programming
- Algorithms to solve problems and standard algorithms

- Analysis of the problem
- Design of the solution
- Developing the solution
- Evaluation

## Assessment Overview

Computer systems (01)  
140 Marks  
2 hours 30mins

**40%**  
of total  
A Level

Algorithms and programming (02\*)  
140 Marks  
2 hours 30mins

**40%**  
of total  
A Level

Programming project (03 or 04\*)  
70 Marks  
Non-exam assessment

**20%**  
of total  
A Level

# Programming languages

- The project must be a coded solution, some languages are specified
  - Python
  - C family of languages (for example C# C+ etc.)
  - Java
  - Visual Basic
  - PHP
  - Delphi.
- Others by negotiation

# GSCE Computer Science (9-1) (KS4)

# Aim, purpose, rationale

- Computer Science is now firmly in vogue
- Entries growing steadily
- New GCSE will feed into the new A Level
- Complete rejig to meet Ofqual requirements
- Build on past success

# Computer Science Community

- CS now firmly embedded in the curriculum
- CS now appearing in primary schools
- CAS really helping in supporting teachers
- Our input is very welcome
- Ebacc and the 4<sup>th</sup> Science
- None specialists and technical support

# Coursework

- Centres like our new tasks (harder but better)
- NEA a strong differentiator!
- New 20% NEA mixed blessing
- Potential NEA changes
- Welsh board considering not offering a GCSE
- Statistical moderation
- Practical endorsement model

# Process for success

- **Success criteria** (what will a successful solution be)
- **Planning and design** (flow charts and pseudocode)
- **Development** (narrative of the process with explanations of code)
- **Testing and remedial actions** (with narrative of changes made)
- **Evaluation** (clearly linked to success criteria)

# Subject aims and learning outcomes

- understand and apply the fundamental principles and concepts of computer science, including **abstraction, decomposition, logic, algorithms, and data representation**
- analyse problems in computational terms through **practical experience** of solving such problems, including designing, writing and debugging programs to do so
- think creatively, innovatively, analytically, logically and critically
- understand the **components** that make up digital systems, and how they communicate with one another and with other systems
- understand the impacts of digital technology to the individual and to wider society
- apply mathematical skills relevant to computer science



# Developments

- MOOC V3 – [www.codio.com](http://www.codio.com)
- Papers are harder and implications in centres
- Different approach to teaching
- Communicating change
- The ICT/CS divide