COMPUTER SCIENCE AND IT – KS 5

Introduction to Courses

- At Key Stage 5 the Department offer an A Level in Computer Science, Cambridge IT Technicals Level 3 course and Level 3 Foundation Technical Level IT: Cyber Security

- The Computer Science qualification is relevant to the modern and changing world of Computing.
  - It puts computational thinking at its core, helping students to develop the skills to solve problems, design systems and understand human and machine intelligence.
  - It also applies all the academic principles learned in the classroom to real world systems.
- Our new Cambridge Technicals IT qualifications inspire and challenge students throughout their study of units with titles such as Global Information, Cyber Security, and Fundamentals of IT.
- The Level 3 Foundation Technical Level IT: Cyber Security will provide a core knowledge and understanding of IT: Cyber Security. Focusing on computer networks and the development of an understanding of threats and vulnerabilities, all based on underpinning units in the fundamental principles of computing and communication technologies, this qualification will prepare learners to work in this sector.

A Level Computer Science

Year 1

- **01 Computing principles -** This component will be a structured question paper with a mix of question types. It will cover the characteristics of contemporary systems architecture and other areas including the following:
  - Operating systems
  - Introduction to programming
  - Data types, structures and algorithms
  - Exchanging data and web technologies
  - Using Boolean algebra
  - Legal and ethical issues

- **02 Algorithms and Problem solving –** This component will be a structured question paper with a mix of question types. It will cover the characteristics of contemporary systems architecture and other areas including:
  - Elements of computational thinking
  - Programming techniques
  - Software development methodologies
  - Algorithms

Year 2

- **01 Computer systems -** This component consider the characteristics of contemporary systems architecture:
  - Software and its development
  - Types of programming languages
  - Data types, representation and structures
  - Exchanging data and web technologies
  - Following algorithms
  - Using Boolean algebra
  - Legal, moral and ethical issues

- **02 Algorithms and Programming -** This component will feature:
  - Traditional questions concerning computational thinking
  - Elements of computational thinking
  - Programming and problem solving
  - Pattern recognition, abstraction and decomposition
  - There will be a scenario/task contained in the paper, which could be an algorithm or a text page-
  - Algorithm design and efficiency
  - Standard algorithms

based task, which will involve problem solving

- **03 Programming project –** Students can select their own user-driven problem of an appropriate size and complexity to solve. This will enable them to demonstrate the skills and knowledge necessary to meet the Assessment Objectives. Students analyse the problem, design a solution, implement the solution and give a thorough evaluation.

Cambridge Technicals in IT Level 3

The new course offers a range of engaging units to study within the Emerging digital technology practitioner specialist pathway.

Fundamentals of IT - A sound understanding of IT technologies and practices is essential for IT professionals. Information learnt in this unit will create a solid foundation in the fundamentals of hardware, networks, software, Knowledge gained in the study of this unit will prepare you for industry qualifications.

Global Information - The purpose of this unit is to demonstrate the uses of information in the public domain, globally, in the cloud and across the Internet, by individuals and organisations. You will discover that good management of both data and information can give any organisation a competitive advantage.

Cyber Security - This unit has been designed to enable you to gain knowledge and understanding of the range of threats, vulnerabilities and risks that impact on both individuals and organisations. You will learn about the solutions that can be used to prevent or deal with cyber security incidents resulting from these challenges. You will be able to apply your knowledge and understanding of cyber security issues and solutions by reviewing and making recommendations for ways to best protect digital systems and information.

Virtual and augmented reality- Virtual reality is a simulated environment that is intended to replicate the physical experience of being in places in the real or imagined worlds by giving the user sensory experiences that match those which would be experienced were the user actually in that environment. Augmented reality is the process of changing the user's view of the real world in order to give them an improved, or more detailed, view of what they are seeing. You will learn about both technologies and how they are used. You will research both technologies and design both a virtual and an augmented reality resource.

Internet of Everything- This unit is about the use of the internet and how it is impacting people and society. You will learn about the Internet of Everything (IoE) and how it is used. Using your knowledge you will carry out a feasibility study for a potential idea. The Internet of Everything is expanding, appearing in all of the everyday devices found in homes, businesses and cities.

Level 3 Foundation Technical Level IT: Cyber Security

Students will learn how devices communicate, focusing on both physical transmission methods and the media they use. Design and develop a simple computer network from a user specification and creating a maintenance plan. Also, students will be able to identify and produce resolutions for a range of threats and vulnerabilities.

Fundamental principles of computing - This unit will provide the learner with the necessary knowledge to understand the different hardware and elements of a computer system and how these contribute to a fully functioning computer system. The student will also develop a range of skills required to make changes to computer systems to ensure that they are fit for the particular requirements of the users.

Communication technologies - This unit will provide the student with the necessary knowledge to appreciate the fundamental aspects of data communication. It will enable a firm conceptual grasp of how data is transmitted at lightning speeds from one point to another, thereby enabling the modern technologies, devices and services we take for granted every single day.

Developing and maintaining computer networks - This unit will provide students with the underpinning knowledge and understanding of a range of computer networks and methodologies to enable them to develop a

simple network from a specification and also the practical skills required to be able to develop and maintain networks for an organisation.

Network threats and vulnerabilities - The aim of this unit is to equip students with the knowledge and skills to counteract internal and external threats to networks.

Entry Requirements

GCE Computer Science

GCE Computer Science A Level is a natural progression from the GCSE Computing course. Computer Science will require a course will require students, in most cases, are expected to achieve 30 points from their top 6 subjects to study Level 3 courses. Where subjects have not moved to a numerical system, the following points will be awarded: A* = 8.5, A=7, B = 5.5, C=4). Students are expected to have at least a Level 6 in Mathematics.

Level 3 IT Technicals

The IT Technicals course will require students, in most cases, are expected to achieve 30 points from their top 6 subjects to study Level 3 courses. Where subjects have not moved to a numerical system, the following points will be awarded: A* = 8.5, A=7, B = 5.5, C=4)

Level 3 Foundation Technical Level IT: Cyber Security

The IT Cyber Security course will require students, in most cases, are expected to achieve 30 points from their top 6 subjects to study Level 3 courses. Where subjects have not moved to a numerical system, the following points will be awarded: A* = 8.5, A=7, B = 5.5, C=4)

Progression

These courses give students a wide choice of progression into higher education, further study, apprenticeship or relevant employment. Students who successfully complete either qualification will be well equipped to move onto degrees and BTEC Higher National Diplomas in related subjects such as ICT, Computer Science, Information Systems, Multimedia, Software Engineering, Computer Networking, cyber security, e-Business and Information Management.

Career Pathway

Jobs directly related to your degree include: Database Administrator, Information Systems Manager, IT consultant, IT technical support officer, Multimedia programmer, Network engineer, Systems analyst, Cyber Security and Systems developer.

Should you like to receive any additional information on this course please contact
Mr S Karunaratne - Head of Department