ICT

Preparing students for tomorrow, bit by bit

The ICT department will help to create, share, and apply knowledge in all branches of Computer Science and ICT. We will educate students to be successful, ethical, and effective problem-solvers with a passion to innovate and create, rather than just passive consumers and users of technology. We will develop an understanding and appreciation of all aspects of digital products, from how they work to how they look. We will foster curiosity and encourage exploration to create students who can contribute positively to the well-being of our society and who are prepared to tackle the complex 21st Century challenges facing the world.

Summary focus areas:
- Innovate, create, develop
- Solving 21st Century problems
- Active developers not passive consumers

Autumn		Spring	Summer	
Data types and representation User interfaces and audiences System development skills	Controlled assessment 1	Communications and networks Emerging technologies	Data security, encryption and malicious software Environmental impact of technology	Specialist software (inc. bespoke vs. off-the-shelf) Knowledge based systems/ expert systems

Homework for ICT is set weekly to support and extend the students' studies from their lessons. Work may be a mixture of practical, computer-based tasks and paper-based written work or design tasks. Activities set as homework may be:

- Preparatory work or research ahead of a new topic or concept being discussed in lessons.
- Extension work that allows the student to explore a topic in more depth or in other contexts.
- Application work that allows students to practise skills or demonstrate abilities.

Students are expected to spend around an hour on a homework activity each week and work is marked promptly to help students to identify and understand their weaknesses to make incremental improvements over the course of the year.

Unit	Duration (lessons)	Learning Objectives/Outcomes
Data Types and Representation	2	• different data types, alpha numeric text, numeric (integer, real for example currency, percentage, fraction), date/time, limited choice (e.g. drop down lists, radio buttons, tick list) object, logical/Boolean (e.g. yes/no true/false) types • the main issues governing the design of file structures: folders, subfolders, filenames, file types, paths, how encoding affects data entry and retrieval • the main issues governing the design of data capture methods – advantages and disadvantages of using different data capture and collection methods: forms questionnaires, online forms, chip and PIN, OMR, barcode reader, voice recognition, biometrics, and RFID tags • validation: range checks, type checks, format checks, presence checks, check digits, parity checks • verification: batch totals, hash totals, double keying, visual checks
User Interfaces and Audiences	5	• the need for good design of user interfaces and their impact on the health of users • the selection and use of the features of user interfaces • use a range of ICT tools and media to communicate data and information effectively and in a form that demonstrates a clear sense of purpose and audience • understand how information should be interpreted and presented to suit purpose and audience • present information in ways that are fit for purpose and audience
System Development Skills	5	• identify and assess existing solutions to similar problems • produce a plan for the development of a multimedia solution •
Controlled Assessment 1	25	• identify and assess existing solutions to similar problems • produce a plan for the development of a multimedia solution • specify the required hardware and software • specify the user requirements • define the success criteria for a solution to a problem

		• explain how the proposed solution will be fit for purpose • design individual components of the solution • design screen layouts • design the overall solution incorporating navigational aids • design testing routines • create new, or modify existing, components of a solution • create screen layouts • create navigational aids • create a working solution • adhere to a prepared plan for their solution • test the solution they have produced • have potential users test their solution • test solutions that other people have produced • use the results of testing and identify the limitations of their solution • use the results of testing and recommend possible improvements to their solution • evaluate the solution with regard to purpose • evaluate the solution with regard to the success criteria • improve their solution • plan work with others, identifying objectives and clarifying responsibilities • work with others towards achieving given objectives, carrying out tasks to meet their responsibilities • recommend ways of improving work with others to achieve given objectives.
Communications and Networks	4	• the main components of computer networks • network topologies • the advantages and disadvantages of using computer networks • the use of internal and external networks
Emerging Technologies	4	• changes in everyday ICT use • evolving communication systems and how they affect the way people live • how emerging technologies affect the way companies and their staff operate and work together: employment patterns, retraining, changes in working practices, teleworking, videoconferencing, remote/home working • how new and emerging technologies could assist organisations

Data Security, Encryption, Malicious Software	4	- appropriate methods that could be used to make backups and archives - appropriate secure and safe practices that could be used - appropriate user security methods and devices that could be used: restricted physical access (e.g. biometric scans, electronic passes), restricted access to data (e.g. hierarchy of passwords, access rights, encryption), monitoring (e.g. transaction logs) - the procedures that could be used to minimise the risks of security breaches - how data encryption could be used within a defined context - the need for security of data and personal information when using ICT
Environmental Impact of Technology	4	- environmental issues connected to the production, use and disposal of ICT systems, the effect on natural resources of the creation and use of ICT systems - the environmental impact of digital devices: their use, deployment and eventual recycling and disposal
Specialist Software (including bespoke and off-the-shelf)	4	understand the differences between bespoke and off-the-shelf software including advantages and disadvantages in terms of initial cost, maintenance cost, complexity and transferable skills for employees moving to other companies
Knowledge-based and Expert Systems	4	- the purpose of IKBS and Expert Systems and how they are used for diagnostic work and decision making - emerging data handling applications: models for financial forecasting, queuing, weather forecasting, flight simulators, expert systems for decision making