

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	
Basic hardware and software (inc. systems software)	Legislation	Social impact of computing	Data security, encryption and malicious software	Communications and networks	Data types and representation
Inputs & Outputs	Data capture	Health & safety	Environmental impact of technology		User interfaces and audiences
Accessibility					

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
Basic Hardware & Software	12	<ul style="list-style-type: none"> • the main components of a computer system: Central Processing Unit (CPU), internal/main memory, backing storage, input and output devices and power supplies • a range of common applications where microprocessor technology is used: personal computers, mainframe computers, super computers and embedded systems • the difference between hardware and software • input devices and their appropriate use: keyboards and pads, specialist keyboards, mouse, joystick, tracker ball, touch pad, microphones, remote controls, scanners, digital cameras, webcams, touch screens, readers for bar codes, magnetic stripes and chip and pin, sensors, MIDI instruments • output devices and their appropriate use: monitor/screens, printers, speakers, head/earphones, digital projectors, plotters, actuators • storage devices and their appropriate use: hard disks, optical storage devices, magnetic tape, drives, flash memory devices • communication devices and their appropriate use: modems, routers, hubs, network interface cards in fixed and mobile systems • the advantages and disadvantages of a variety of input, output, storage and communication devices • systems software: operating systems, utility software, drivers • user interfaces: human-machine interfaces – graphical, command line, direct neural interface • applications software: word processors, desktop publishing software, spreadsheets, database management software, multimedia software, slideshow software, web authoring software, photo-editing software, video-editing software, graphics manipulation software, communications software (e.g. social networking software, chat, instant messaging, web browsers, file transfer and email clients), presentation software, gaming software

		<ul style="list-style-type: none"> • programming software: compilers, debuggers, interpreters, linkers, editors • appropriate uses of software • the advantages and disadvantages of different software applications
Systems Lifecycle	2	<ul style="list-style-type: none"> • understand the necessity for a uniform approach to system development • understand the different stages of the lifecycle and explain the purpose of each stage
Interactive Systems (Practice Coursework)	10	<ul style="list-style-type: none"> • have experience of creating an interactive system (such as a restaurant menu) following the systems lifecycle • research a given context documenting sources of information • analyse systematically the information requirements to solve ICT problems • think creatively, logically and critically throughout the development process of a set ICT-based solution • find and select appropriate data and information that is fit for purpose, relevant and accurate • work effectively with others to gain and share knowledge • produce a design brief • produce a design specification with a measurable success specification • produce a fully working solution to a chosen set task • select and use a range of ICT tools and techniques to develop effective solutions • understand software features and their use • create sequences of instructions • manipulate and process data and other information effectively and efficiently • integrate software tools and techniques to work efficiently and to meet user needs • apply a wide range of software tools and techniques across one or more software applications • understand and adopt safe, secure and responsible working practices when using ICT • use software features • model situations and data to explore and develop ideas • enter, develop and format data to suit processing purpose and audience • apply creative and technical skills, knowledge and understanding of ICT tools and methods • check data accuracy and plausibility • create a suitable data structure for a task

		<ul style="list-style-type: none"> • 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 • evaluate their own and others' contribution to group work • test their own solution • create and review their own ICT-based solution • review and modify work as it progresses to improve the quality of the ICT-based solution • evaluate and amend their own solutions to a set problem • identify strengths and weaknesses of an ICT system • identify areas to improve and recommend and justify appropriate changes that could be made • present their evaluation in a relevant, clear, organised, structured and coherent format • use specialist terms correctly and appropriately
Accessibility	5	<ul style="list-style-type: none"> • the potential health problems related to the prolonged use of ICT systems: stress, eye problems, wrist problems, Repetitive Strain Injury (RSI), back and neck problems, Carpal tunnel syndrome • the need for good design of user interfaces and their impact on the health of users • how ICT systems can affect the quality of life experienced by persons with disabilities: screen filters, voice recognition software, text to voice software, customised desktop environments, Braille keyboards, specialist input devices, communication and control device, software accessibility options
Social Impact of Computing	5	<ul style="list-style-type: none"> • how ICT systems have changed the way people go about their daily lives: communication, shopping, gaming, entertainment, education and training, banking and financial services, social networking, online/remote working, the advantages/benefits and disadvantages/dangers of using ICT/the internet • the impact of emerging technologies on organisations: artificial intelligence, robotics, biometrics, vision enhancement, computer-assisted translation, quantum cryptography, 3D and holographic imaging, 3D printing, virtual reality
Data Handling	10	<ul style="list-style-type: none"> • Build skills and understanding regarding

		<p>Spreadsheets and Databases. Students to learn practical uses of the application types (bolstering their learning from Autumn 1) and develop skills in handling data in both types of software</p> <ul style="list-style-type: none"> • understand software features and their use • create sequences of instructions • manipulate and process data and other information effectively and efficiently • integrate software tools and techniques to work efficiently and to meet user needs • apply a wide range of software tools and techniques across one or more software applications
Legislation	5	<ul style="list-style-type: none"> • the main aspects of legislation relating to the use of ICT: the Computer Misuse, Data Protection, Copyright Design and Patents Acts and other legislation as it applies to the use of ICT • the social and ethical implications of the electronic transmission of personal information: monitoring/detecting loss or corruption of information, preventing the abuse of personal information, the purpose and costing of national databases, security of public data, links between public and private databases, national identity cards, CCTV, government access to personal data, the surveillance society
Data Capture/Data Types	5	<ul style="list-style-type: none"> • 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
Exam Technique	8	<ul style="list-style-type: none"> • Students to develop exam technique and improve their ability to gain marks in exam situations