Subject: **Computer Science**

Vision: **Influence today, Innovate tomorrow!**

Brief overview of topics, themes, skills or key questions for each term:

Year	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
7	**7.1 Introduction**: Passwords Logon Email SMHW Hardware Computer systems Kodu - *Sequence-Block based programming*	**7.2 E safety**: Cyberbullying Social media Netiquette Digital footprint Reporting concerns. *To include;* *Word, PowerPoint, Publisher.*	***7.3 Spreadsheets**:* *Basic and advanced functions and formulas* *Representing data* *Formatting*	**7.4 *Cryptology* & Flowol:** *Sequence* *Shapes* *Boolean operators*	**7.5 Scratch** : *Sequence-Block based programming*	**7.6: Introduction to text-based programming:** (logo, turtle, Python)
8	**8.1 HTML (notepad)**: Input Output Processing	**8.2 Animation & Video editing:** File type Frame rate Transition	**8.3 Web Authoring**: (Serif Webplus) E-Safety information Reliability Bias Legislation Plagiarism Ethical issues.	**8.4 Python Chatbot:** (binary, logic AND OR NOT, list) *Selection* *Iteration* *Sequence*	**8.5 *Spreadsheets**:* *basic and advanced functions and formulae* *Formatting* *What if modelling* *Vlookup* *Macros*	***8.6* Database Flat file**: *Interrogation* *Data entry form* *Multiple criteria queries* *Data types* *Simple queries* *Data entry* *Simple reports* *Mail merge (letter to businesses)* *DPA/GDPR*

9	***9.1 Bitmap editing**:* *Vector* *Bitmap* *File types* *Compression* *Resolution* *RGB* *CMYK*	***9.2* Coding-** **Data representation:** Text ASCII Unicode Sounds-audacity Analogue Digital Pictures Metadata Resolution Compression	9.**3 Database relational:** *Key fields* *Entity relationship* *Importing data from a text file and a spreadsheet* *Validation* *Verification* *Foreign key*	9.4: **Python;** Searching Linear & Binary Sorting Bubble Merge Text files Array (1D & 2D) Divide & Conquer	9.5 and 9.6: **Integrated Project**:: Planning Mind maps Gantt charts system life cycles Researching Designing Implementing Evaluating *Spreadsheets - Financial Models*

10 Computer Science	**Unit 1** **Computer hardware** • Computer system • Input & output devices • Specialist devices • Converging & changing technology **Unit 2** **Computational thinking** • Algorithms • Program control flow • Handling data • Programming languages • IDE • Testing	**Unit 1** **Systems Architecture** • CPU • Performance • Memory • Secondary storage **Unit 2** **Practical programming skills** • Fundamentals • Sequence • Selection • Iteration	**Unit 1** **Software** • Application • User interface • Functions of OS • System utilities **Unit 2** **Data Representation** • Units • Binary numbers • Binary arithmetic • Hexadecimal • Characters • Images • Sound • Compression	**Unit 1** **Networks** • Internet • WAN • LAN • Wireless networking • Client server • P2P networks • Standards, Protocols & Layers **Unit 2** **Algorithms** • Searching • Sorting	**Unit 1** **Network Security & Systems software** • Network threats • Preventing vulnerabilities • OS • Utility software **Unit 2** **Practical programming skills** • Arrays • Procedures • Functions • Records • Files	**Problem solving** Battle of the Bands

11 Computer Science	**Unit 1** **System security & software:** • Network threats • Preventing vulnerabilities • OS • Utility software **Unit 2** **Algorithms** • Searching • Sorting	**Unit 1** **Database:** • Tables, records & fields • Entities & Relationships • Queries & SQL • Data independence • DBMS **Unit 2** **Logic & Languages** • Logic diagrams • Truth tables • Defensive design • Errors & Testing • Translators • IDE	**Unit 1** **Impacts of digital technology** • Ethical • Cultural • Environmental • Legislation • Privacy **Unit 2** **Computational Thinking:** • Algorithms • Program control flow • Handling data • Programming languages • IDE • Testing	**Revision using PLCs and Practice papers**	**Practice papers**	**External exams**
11 ICT	**R013** Controlled Conditions		**R012** Exam paper practice and targeted revision			**External examination**

	• Planning tools • System Life cycle • Risk mitigation • Legislation • Iterative testing	• Importing data files • Data entry forms • Queries • Reports • Business cards • Leaflets	• Selecting information • PPE	• Interactions between stages of life cycle • SMART goals	• Storage methods • Types of threats • Impact of cyber security threats	
12 Computer Science	**Unit 1** **Systems & architecture:** • Processor components • Processor performance • Types of Processor • Input devices • Output devices • Storage devices • Fetch decode execute **Data types, data structures and algorithms:** • Binary hexadecimal and denary • ASCII & Unicode	**Unit 1** **Assembly Language** • FDE cycle • LMC **Software development** • Systems analysis • Writing & following algorithms • Programming paradigms	**Unit 1** **Systems Software:** • OS functions • Types of OS • Nature of applications • Programming languages • Assembly code **Boolean Algebra:** • Logic Gates • Boolean expressions • Karnaugh maps • Adders & D type flip flops	**Unit 1** **Networks:** • Internet • Internet communication • Security & Threats • HTML & CSS • Javascript • Search engine indexing • Client server • P2P •		**Unit 1** **Ethical, Cultural and Moral issues:** • Computers in the workplace • Artificial • Intelligence • Automated decision making • Analysis of personal information • Privacy

	• Binary arithmetic • Floating point • Bitwise manipulation • masks **Unit 2** **Programming techniques:** • Programming basics • Selection • Iteration	**Unit 2** **Programming techniques:** • Subroutines • Recursion • OOPS	**Unit 2** **Elements of Computational Thinking** • parameter passing by value and reference • Identify the components of • a solution to a problem	**Unit 2** **Algorithms** • Analysis & design • Searching • bubble sort, • insertion sort • Merge sort • Quick sort	**Unit 2** **Object-oriented languages** • Tkinter	**Unit 2** **Object-oriented languages** • Pygame **Unit 3** **Practical programming project** • Analysis • Design

13 Computer Science	**Unit 1** **Networks:** • HTML & CSS • Javascript • Search engine indexing • Client server • P2P **Elements of computational thinking:** • parameter passing by value and reference • Identify the components of • a solution to a problem	Unit 1 **Exchanging Data:** • Compresssion & encryption • Database concepts • Relational database normalisation • SQL • Transaction processing **Algorithms & complexity**: • Analysis & design • Searching • bubble sort, • insertion sort • Merge sort • Quick sort	Unit 1 **System Life cycle** • Stages • Waterfall • Agile • RAD • Spiral • Extreme **Algorithms & complexity:** • Graph traversal • Optimisation	**Unit 1** **Legal, ethical & cultural issues:** • Computers in the workplace • Artificial • Intelligence • Automated decision making • Analysis of personal information • Privacy **Topic revision based on PLCs and practice papers**	**Revision and practice papers**	**External assessment**

	Unit 2 **Data structures:** • Arrays, tuples • Queues • Lists & linked lists • Stacks • Hash tables • Graphs • Trees **Unit 3** **Practical Programming Project** • Design	**Unit 2** **OOPs:** • classes, • objects, • methods, • attributes, • inheritance, • encapsulation polymorphism **Unit 3** **Practical Programming Project** • Development • Iterative testing	**Unit 2** **Encryption** **Unit 3** **Practical Programming Project** • Testing • Evaluation			

Competitions taken part in: E safety (Year 7, October), Game Design (Year 7, Trust, July), FXP (Year 12/13, July), Scratchoff (Year 9, June)

External speakers in/visits out/field: Computer Science clubs Lunchtime organised by Year 12 for KS3; TTA Computer Science trip to London (KS5, November); Mr S. Elvin Computer Science in Industry; Illuminate T. Merritt, J.Jarvis, Local businessmen (Josh Ayres ECS)

Exam syllabus followed (GCSE/A level (or equivalent) – if different for different year groups please state: OCR GCSE Year 11 Computer Science (9-1) J276; Year 10 J277

OCR A Level Computer Science H446, Cambridge National in Information Technologies J808

Any cross-curricular opportunities: ERASMUS+ participation, Contexts for skills in each area

Any further resources you wish children/parents to be directed to?

https://www.python.org/ . https://www.bbc.com/education/guides/zts8d2p/revision/1 (Introduction to programming). https://scratch.mit.edu/