

# SUBJECT KS4: Year 10 Computer Science

OCR GCSE

**Learn to Code in Python**  
Input/Output, If statements, Loops, Text & Numbers, Random Values, Python Turtle, Creating robust programs, Lists, 2D Lists, Sub Programs. Python Challenges & practice.



**SUMMER 9.6**

**2.2 Programming fundamentals**  
Understanding of these principles and how they are used to define and refine problems

**SUMMER 9.5**

**Designing, creating and refining algorithms**  
Identify the inputs, processes, and outputs for a problem " Structure diagrams " Create, interpret, correct, complete, and refine algorithms using: o Pseudocode o Flowcharts o Reference language/high-level programming language " Identify common errors " Trace tables

**2.1 Algorithms**  
This unit will enable student to

- understand the main steps of each algorithm,
- Understand any pre-requisites of an algorithm
- Apply the algorithm to a data set
- Identify an algorithm if given the code or pseudocode for it

**2.1.1 Computational thinking**  
Principles of computational thinking: o Abstraction o Decomposition o Algorithmic thinking

**Summer Term 3**

**2.5 Programming Languages & IDEs**  
What are the characteristics of languages; high and low-level. What is the purpose of translators, compilers, interpreters? What is Little Man Computer? Tools in an IDE; editors, error diagnostics, run-time environments & translators.

**1.6 Ethical, Legal and Cultural Concerns**  
What are the issues created and addressed by technology and the impact on society including ethical, legal, cultural, environmental and privacy (I'm back to being Police again)? Legislation (now I'm a politician), Data Protection, computer misuse, copyright and licences

**1.4 Network Security**  
What forms of attack happen to computers and networks? What's malware, phishing (I fish), brute force attacks (dangerous) DoS (about?) Interception & theft (sounds dodgy). How to prevent attacks (who from?) What is an SQL injection, does it hurt? Firewalls, so I'm training to be a Firefighter too, who needs password encryption and security, sounds more like the Police!

**2.1 Computer Network**  
What are LANS & WANS? What factors affect the performance of networks? What does client server and peer-to-peer mean? What hardware do you use on a LAN? What is the Internet really? What is a DNS, hosting, the cloud, web server and client mean? Routers & switches (sounds like a dance)? What are star and mesh network topologies? Wired or not to be wired, is that the question? What is Ethernet, WiFi and Bluetooth connections and how do they work? Why is cryptography and encryption. What are private and public keys and how do they work? What's an IP and MAC (I've got a Mac!) address? How do I learn these TCP/IP, HTTP, HTTPS, FTP, POP, IMAP, SMTP, and what are layers?



**EXAM PREPARATION**

**Spring Term**

**AUTUMN**

**1.2 Memory and storage:** What is primary & secondary storage and what is the purpose of RAM and ROM, the differences between them, the advantages and disadvantages? Why do we need virtual memory? What is flash memory? What are the common types of storage? What types are use for what? What is data capacity? What's a nibble (is that break time?) What is binary, denary, hexadecimal and ASCII? What is a character set? What are bitmaps, image resolution, colour depth and metadata? How can sound be sampled and stored? How does sampling rates, duration and bit depth affect the size of sound files and quality of its playback? What is compression? What is the difference between lossy and lossless compression?

**1.1 Systems Architecture**  
What is the CPU? How does it function? What are the components it is made of? What are the common characteristics which affect performance? What are embedded systems? Who is Von Neumann?

**Introduction**  
Introduction Specification requirements. Mark Scheme. Course calendar. Where to find resources. Folder Setup. Workbooks. Homework calendar. Student/Teacher expectations. Understanding of flipped and unflipped learning. What is a computer?