

# IB Diploma Computer Science

## Course content

HL content in blue

### A1 Computer fundamentals

CPU structure, GPUs, pipelining, memory, fetch-decode-execute cycle), SaaS/PaaS, Binary & hexadecimal number systems; logic gates, truth tables, circuit diagrams; Operating systems & resource management, control systems, compilers/interpreters.

### A2 Networks

Devices, client/server v peer, topologies, protocols (tcp/ip, ip4/ip6, http, dns), switching, routing, security vulnerabilities & countermeasures, encryption & certificates.

### A3 Databases

Schema, relational databases, ERD, 1NF/2NF/3NF, SQL including joins, update/insert, aggregate functions, views, transactions, data warehousing.

### A4 Machine learning

Hardware, types of ML, preprocessing, linear regression, classification, hyperparameters, unsupervised clustering, association rule, reinforcement learning, genetic algorithms, ANNs, CNNs, ethical challenges.

### B1 Computational thinking

Abstraction, algorithm design, decomposition, pattern recognition, trace flowcharts.

### B2 Programming

Data types and their operations, selection, iteration, functions, static/dynamic structures, arrays/lists, stacks, queues, big O, sorting algorithms, recursion, file processing.

### B3 Object oriented programming

Classes/objects, constructors, static/non-static, encapsulation, inheritance, polymorphism, abstract classes, composition/aggregation, design patterns.

### B4 Abstract data structures

Linked lists (singular, double, circular), binary search trees, hash-maps, sets.

### Case study

An annually changing case study that prompts students to research into a field of emerging technology.

New syllabus  
for 2025

No more pseudocode  
Assessed in Python or Java



## Assessment structure

### Paper 1

Topics: A1, A2, A3, A4 + Case study  
SL: 1:15 hours, 35% of grade  
HL: 2:00 hours, 40% of grade

### Paper 2

Topics: B1, B2, B3, B4  
SL: 1:15 hours, 35% of grade.  
HL: 2:00 hours, 40% of grade.

### Internal assessment

A programming project of the students own choice. 35 hours of class time is devoted to it.  
SL: 35 hours, 30% of grade  
HL: 35 hours, 20% of grade.