IB Diploma Computer Science

Course content

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, 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

IB endorsed textbooks available

Assessment structure

Paper 1

Topics: A1, A2, A3, A4 + Case study
SL: 1:15 hours, 30% 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.