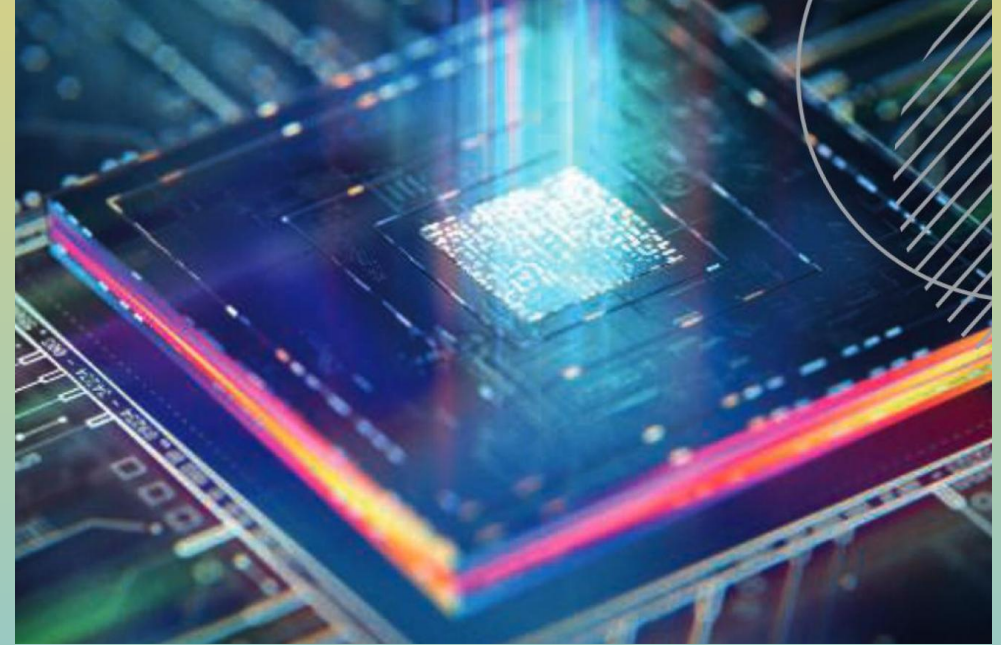


IB Computer Science



Standard Level (SL) & Higher Level (HL)

An Introduction
for Prospective Students
IB Diploma Programme (DP)
Anavryta Model Lyceum (AML)

Nature of the subject

Computer science guide

First assessment 2027

What is computer science?

Computer science is no more about computers than astronomy is about telescopes.

(Dijkstra, 1967)

Computer science is the study of computers and computational systems. It covers a range of topics related to the theoretical aspects of computing, including algorithms and software design, and the application of computer science to solve practical problems. Computer science is distinct from the natural sciences in that it does not rely on hypothesis and experimentation. Computer science can be considered to be cross-disciplinary, as it draws from a range of disciplines, especially mathematics.

What is IB Computer Science?

- A modern, challenging subject focused on problem-solving and logical thinking
 - ✓ Combines theory with practical programming skills
 - ✓ Explores how computers work and how software is designed
 - ✓ Ideal for students interested in technology, science, or engineering but also appropriate for students wishing to study any discipline as it is considered to be cross-disciplinary.

Distinction between Computer Science SL and HL

Students at both SL and HL study the following:

- 1) The nature of computer science, with computational thinking as an organizing concept
- 2) An understanding of computer science through the practical use of a programming language (Java or Python), and the object-oriented programming (OOP) paradigm
- 3) The application of Structured Query Language (SQL) to extract and manipulate data
- 4) One IA task: The computational solution (the practical use of skills in computer science to solve problems).
- 5) A case study focusing on emerging technologies
- 6) The collaborative sciences project

Distinction between Computer Science **SL** & **HL**

The distinction between SL and HL is in both ***breadth and depth***.

- ✓ The SL has a recommended 150 teaching (60 min) hours while the HL 240 (60 min) hours.
- ✓ **SL** students study **7 topics** on concepts and problem-solving in computer science, whereas **HL** students study **an extra topic (Abstract Data Types, ADTs) and additional HL-only material within the 7 (A1-4, B1-3) SL topics**.
- ✓ HL students study the topics to increased breadth, resulting in increased networked knowledge. HL requires the student to make more connections between diverse areas of the syllabus, thereby also increasing the depth of coverage.
- ✓ HL students also conduct deeper research in the case study, reflected in the extra two challenge questions in the case study for HL, additional recommended teaching hours, and additional time for Paper 1.

The HL course provides a solid foundation for the study of computer science or related subjects at university level.

What Will You Learn?

Syllabus outline

Syllabus component	Teaching hours	
	SL	HL
Syllabus content	105	195
Theme A: Concepts of computer science		
A1 Computer fundamentals	11	18
A2 Networks	11	18
A3 Databases	11	18
A4 Machine learning	5	18
Theme B: Computational thinking and problem-solving		
B1 Computational thinking	5	5
B2 Programming	40	42
B3 Object-oriented programming	7	23
B4 Abstract data types—HL only	–	23
Case study	15	30
Internal assessment	35	35
The computational solution	35	35
Collaborative sciences project	10	10
Total teaching hours	150	240

Theme A: Concepts of computer science	Theme B: Computational thinking and problem-solving
A1 Computer fundamentals - A1.1 Computer hardware and operation - A1.2 Data representation and computer logic - A1.3 Operating systems and control systems - A1.4 Translation (HL only)	B1 Computational thinking B1.1 Approaches to computational thinking
A2 Networks - A2.1 Network fundamentals - A2.2 Network architecture - A2.3 Data transmissions - A2.4 Network security	B2 Programming - B2.1 Programming fundamentals - B2.2 Data structures - B2.3 Programming constructs - B2.4 Programming algorithms - B2.5 File processing
A3 Databases - A3.1 Database fundamentals - A3.2 Database design - A3.3 Database programming - A3.4 Alternative databases and data warehouses (HL only)	B3 Object-oriented programming - B3.1 Fundamentals of OOP for a single class - B3.2 Fundamentals of OOP for multiple classes (HL only)
A4 Machine learning - A4.1 Machine learning fundamentals - A4.2 Data preprocessing (HL only) - A4.3 Machine learning approaches (HL only) - A4.4 Ethical considerations	B4 Abstract data types—HL only B4.1 Fundamentals of ADTs

Assessment outline—SL

Assessment component	Weighting
External assessment (2 hours 30 minutes)	70%
Paper 1 (1 hour 15 minutes) Section A—extended response questions linked to theme A: Concepts of computer science Section B—short-response questions linked to the pre-seen case study (50 marks)	35%
Paper 2 (1 hour 15 minutes) Extended response questions linked to theme B: Computational thinking and problem-solving (50 marks)	35%
Internal assessment (35 hours) This component is internally assessed by the teacher and externally moderated by the IB at the end of the course. IA consists of one task: the computational solution (30 marks)	30%

Assessment outline—HL

Assessment component	Weighting
External assessment (4 hours)	80%
Paper 1 (2 hours) Section A—extended-response questions linked to theme A: Concepts of computer science Section B—short- and extended-response questions linked to the pre-seen case study (80 marks)	40%
Paper 2 (2 hours) Extended-response questions linked to theme B: Computational thinking and problem-solving (80 marks)	40%
Internal assessment (35 hours) This component is internally assessed by the teacher and externally moderated by the IB at the end of the course. IA consists of one task: the computational solution (30 marks)	20%

Skills You Will Develop

- Logical and analytical thinking
 - Problem-solving and decomposition
 - Programming and algorithmic reasoning
 - Perseverance and attention to detail

Why Choose IB Computer Science?

Highly valued by universities worldwide

- Useful for almost every career path
- Teaches you how to think, not just what to use
- A subject for curious, creative problem-solvers

Is This Subject for You?

- You enjoy solving puzzles or logical problems
 - You are curious about how technology works
 - You like creating things and improving them
 - No prior programming experience required (especially for SL)

Ready to Get Started?

- IB Computer Science is challenging but rewarding
 - Both SL and HL offer valuable, future-proof skills
 - Ask questions (elehousou@sch.gr) and explore the subject further
 - Your journey into computing starts here!

Recommended book:

The programming language
used to teach CS
in Anavryta IB DP
will be **Python**.

