

Computer Science

I. Course description and aims

The DP Computer Science Higher Level course requires an understanding of the fundamental concepts of computational thinking as well as knowledge of how computers and other digital devices operate. The course, underpinned by conceptual thinking, draws on a wide spectrum of knowledge, and enables and empowers innovation, exploration and the acquisition of further knowledge. Students study how computer science interacts with and influences cultures, society and how individuals and societies behave, and the ethical issues involved. During the course the student will develop computational solutions. This will involve the ability to:

- identify a problem or unanswered question
- design, prototype and test a proposed solution
- liaise with clients to evaluate the success of the proposed solution and make recommendations for future developments.

The aims of the computer science Higher Level courses are to:

1. provide opportunities for study and creativity within a global context that will stimulate and challenge students developing the skills necessary for independent and lifelong learning
2. provide a body of knowledge, methods and techniques that characterize computer science
3. enable students to apply and use a body of knowledge, methods and techniques that characterize computer science
4. demonstrate initiative in applying thinking skills critically to identify and resolve complex problems
5. engender an awareness of the need for, and the value of, effective collaboration and communication in resolving complex problems
6. develop logical and critical thinking as well as experimental, investigative and problem-solving skills
7. develop and apply the students' information and communication technology skills in the study of computer science to communicate information confidently and effectively
8. raise awareness of the moral, ethical, social, economic and environmental implications of using science and technology
9. develop an appreciation of the possibilities and limitations associated with continued developments in IT systems and computer science
10. encourage an understanding of the relationships between scientific disciplines and the overarching nature of the scientific method.

II. Curriculum model overview

Standard and Higher Level core

- Topic 1: System fundamentals
- Topic 2: Computer organization
- Topic 3: Networks
- Topic 4: Computational thinking, problem-solving and programming

Higher Level extension

- Topic 5: Abstract data structures
- Topic 6: Resource management
- Topic 7: Control

Case study

Additional subject content introduced by the annually issued case study

Option

Standard and Higher Level core

Higher Level extension

Students study one of the following options:

- Option A: Databases
- Option B: Modelling and simulation
- Option C: Web science
- Option D: Object-oriented programming (OOP)

Internal assessment

Solution

Practical application of skills through the development of a product and associated documentation