

**Computer Technology Grade 8 (1 Semester Elective)****Grade 8**

Prerequisite : all students are welcome, including both "beginners" and "experts"

Leads to : Computer Technology Advanced

This is a survey course, covering a variety of technical topics in Computer Technology. The goal of the course is to enable students to accomplish IT work more effectively, using a wide variety of tools, and to understand a large variety of common tools and problems.

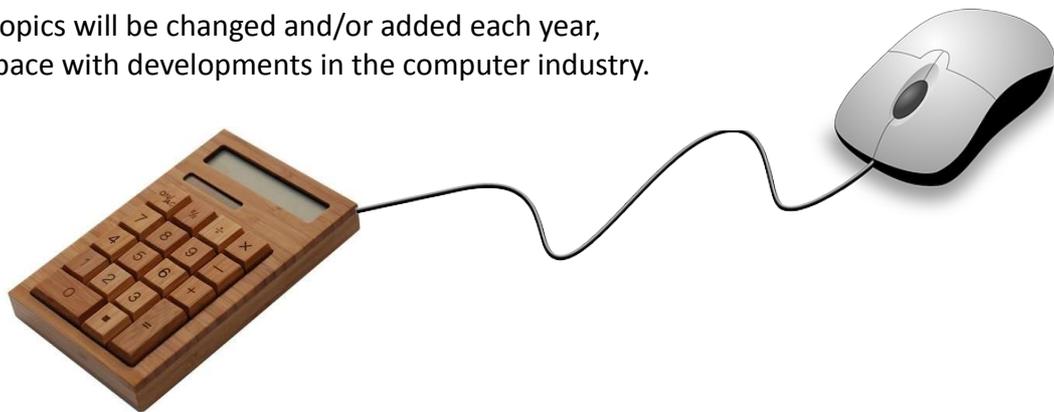
Topics include:

- web-page design & construction
- graphics design and editing
- Web 2.0 tools (blogs, wikis, etc)
- Javascript programming for the Web
- vector graphics design
- sound editing
- video editing
- Basic programming for video games (Scratch)



Stop . . . waiting . . .  
***Start DEVELOPING***

Further topics will be changed and/or added each year, keeping pace with developments in the computer industry.



Most assessment involves practical projects, completed in class with ample assistance from the teacher. Most projects include both technical skills and creative components.

This course is appropriate for students who have normal experience with IT tools (word-processing, web-browsing, e-mail, etc), and are interested in learning some more technical, challenging techniques, using more sophisticated tools. It is also a good preparation for the Grade 9 Computer Technology Advanced course.

**Computer Technology Standard (1 year)****Grades 9 - 12**

Prerequisite : all students are welcome, including both "beginners" and "experts"

Leads to : Graphics Programming

This is a survey course, covering a variety of technical topics in Computer Technology. The goal of the course is to enable students to accomplish IT work more effectively, using a wide variety of tools, and to understand a large variety of common tools and problems.

Topics include:

- web-page design & construction
- graphics design and editing
- Web 2.0 tools (blogs, wikis, etc)
- Javascript programming
- vector graphics design
- sound editing
- video editing
- Powerpoint automation
- Basic programming for video games (Scratch)
- 3D animation (Alice)
- technical word-processing
- hardware vocabulary and specifications
- ethical issues in ICT

**Take Control of Computers**

Further topics will be changed and/or added each year, keeping pace with developments in the computer industry.

Most assessment involves practical projects, completed in class with ample assistance from the teacher. Most projects include both technical skills and creative components.

This course is appropriate for students who have normal experience with IT tools and are interested in learning some more technical, challenging techniques, using more sophisticated tools. It is also a good preparation for the subsequent Graphics Programming course. (Students who have already taken the grade 8 course should enroll in the Advanced course, not this course).

**Computer Technology Advanced (1 year)**

**Grades 9 - 12**

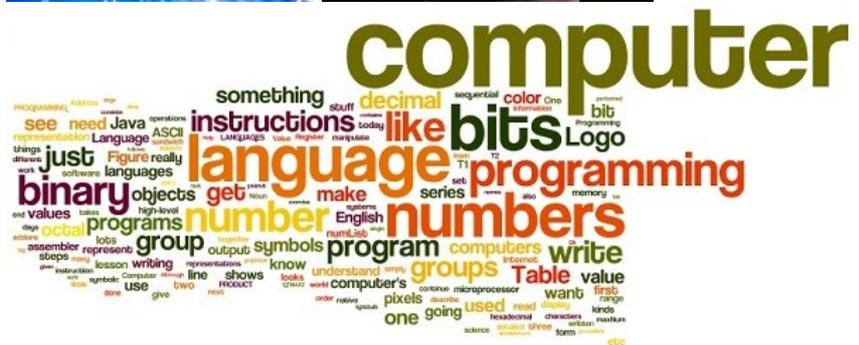
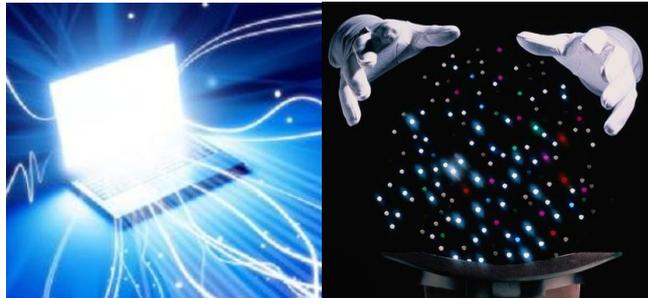
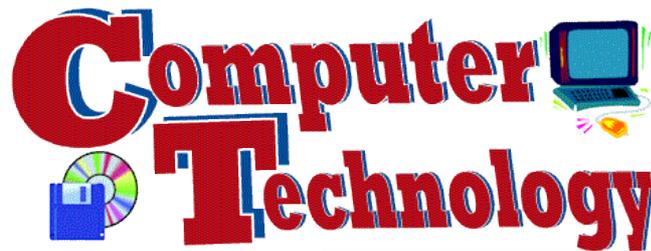
Prerequisite : all students are welcome, including both "beginners" and "experts"

Leads to : Graphics Programming

This is a technical course, covering a variety of technical topics in Computer Technology. The goal of the course is to introduce students to computer programming and some other technical tools used to create software and project solutions to problems.

Topics include:

- web-page design and construction
- Javascript programming
- vector graphics design
- Basic programming for video games (Scratch)
- sound editing
- Powerpoint automation
- 3D animation (Alice)
- technical word-processing
- web-pages for mobile devices
- introduction to Java programming
- web-servers
- server-side programming



Further topics will be changed and/or added each year, keeping pace with developments in the computer industry.

Most assessment involves practical projects, completed in class with ample assistance from the teacher. Most projects include both technical skills and creative components.

This course is appropriate for ambitious students who have normal experience with IT tools (word-processing, web-browsing, e-mail, etc), and are interested in learning more technical, challenging techniques, especially computer programming. It is also a good preparation for the subsequent Graphics Programming course.

**Graphics Programming (1 year)****Grades 10 - 12**

Prerequisite : None, but Computer Technology or equivalent knowledge is helpful

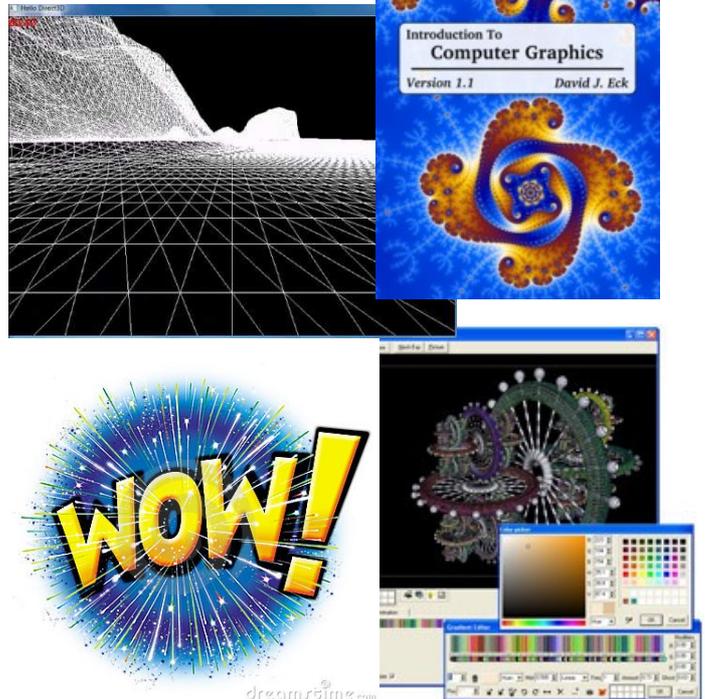
Leads to : Good preparation for IBDP Computer Science

This course emphasizes **programming** as the primary computer tool and **graphics** as the primary application area.

Students learn to write programs in **Java** and **JavaScript** .

Projects include:

- slide show with effects
- animated video game
- educational quiz program
- graphical screen-saver
- animated gambling game
- text + graphics adventure game
- mathematical transformations
- scientific simulations
- web-page animations
- using various graphics design tools



Most of the assessment involves practical programming assignments, completed in class time with ample teacher assistance (though further work at home may be required). There are also a few in class tests covering fundamental concepts and vocabulary.

Students develop and improve their ability to think clearly and logically. They learn to organize and analyze their own thinking and to express their thoughts as algorithms in a programming language. Many students find that this work improves their understanding of some mathematics topics.

This course is appropriate for students who already have a good set of basic IT skills and are interested in learning something more technical, as well as students who want a good preparation for IB Computer Science.

## IBDP Computer Science Year 1 (HL/SL) - Grade 11 – IBDP Group 4

**Prerequisite:** Graphics Programming or equivalent knowledge or instructor's permission

**Audience :** This is an excellent course for students intending to pursue technical or semi-technical careers – business, science, engineering, economics, computer science, etc.

This course fulfills the Group 4 (Science) requirement for an IB Diploma. So students taking this course do not need to take a traditional lab science course to complete the IB Diploma.

Topics include:

- programming in Java
- constructing efficient algorithms
- Object Oriented Programming and other advanced Java programming techniques
- problem solving through system design and Computational Thinking
- technical details and vocabulary about hardware and computer systems
- binary arithmetic and binary circuits
- technical details of the functioning of networks and the Web
- history and future of computers including artificial intelligence and simulations
- other topics that apply various skills and concepts to a real situation

Students develop problem solving skills, as well as reliable and productive work habits. They learn to design and create computer systems to solve both academic exercises and real-world problems.

About half of the assignments involve Java Programming. Some programming assignments are done in class, with teacher assistance, but programming practice work must be done outside class time. Students are required to bring a laptop to class with them. The teacher will provide all software needed for the class – all software used will be available as free downloads.

The other half of the course involves lectures and discussions about various technical details of how computer systems (including personal computers and the Web) function internally - the part that users don't see. This will be assessed through written quizzes and tests. Altogether, about 1/3 of assessment is programming projects, and 2/3 is done through quizzes and tests.

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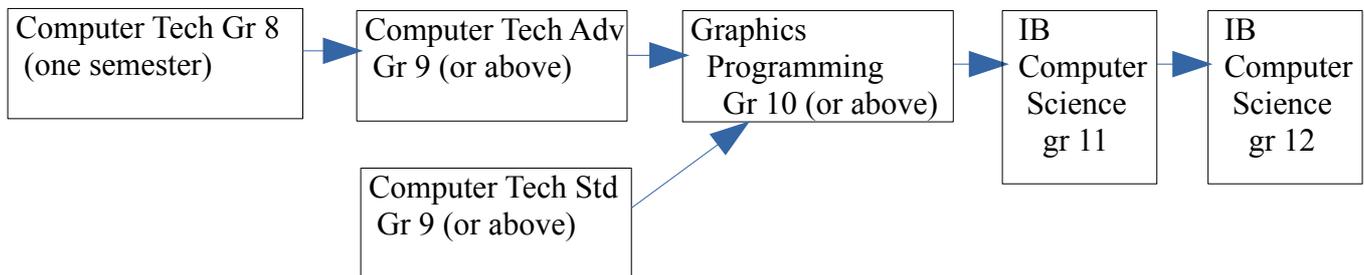
## IBDP Computer Science Year 2 (HL/SL) - Grade 12 - IBDP Group 4

**Prerequisite:** IB Computer Science Year 1

This continues and finishes the topics mentioned in Year 1 course (description above).

In year 2, students must complete a **programming project** to solve a real world problem, for a real user. This project is probably done using the skills learned in the Object Oriented Programming Option of the course. Students choose the topic/problem according to their own interests, such as a game simulation, a database for a teacher or parent, or a program that performs useful math or science calculations. This project contributes 20% (HL) or 30% (SL) of the final IB grade.

The second year of the course ends with an in depth review of all the topics from year 1 and year 2, to prepare for the IB Exams in May.

**-- Computer Science Courses Sequence --****-- Course Choices and Placements --**

Note that the Gr 8 course is one semester, which covers pretty much the same thing as the first semester of Gr 9 Standard. So students who have done Gr 8 should NOT enroll in the Gr 9 Standard course, but rather enroll in Gr 9 Advanced.

The difference between Gr 9 Standard and Gr 9 Advanced is not enormous - there is about 1/3 more challenging extra material in the Advanced class. So students from either the Standard class or Advanced class can enroll in Graphics Programming in Gr 10. A student from Gr 8 could skip a year and then enroll in Graphics Programming, but may find it quite challenging in the beginning. But this is not impossible.

New students may enroll in any of the Gr 8, Gr 9 or Gr 10 courses without a prerequisite, but some students may find Graphics Programming quite difficult if they have never done any programming before. Hence, a new Gr 10 student might be better off in the Gr 9 Advanced class.

IB Computer Science DOES have a prerequisite - that is either Graphics Programming or a similar background in programming. New students should discuss the course expectations with the teacher before enrolling in the IB course. Past experience has shown that inexperienced new students are VERY LIKELY to have substantial difficulty in the IB course, and they are unlikely to be able to make up their deficit during the IB course.

None of these courses are IT courses. Although some IT tools and IT skills might be taught and reinforced, these are not courses for students who just want to improve their Word Processing or Web Surfing skills. All the courses involve students CREATING PROJECTS, hence require substantial energy and commitment, as well as some creativity. That said, none of the courses are beyond the ability of average students - specifically, there is no mathematics level or background requirement.