

MATHEMATICS SL

COURSE DESCRIPTION



<http://www.hark1karan.com/elephant-and-castle-maths>

“Nobody untrained in geometry may enter my house”

Plato

What is the course about?

Mathematics is a compulsory subject for all IB diploma students. Learning it is an excellent way to develop not only logical thinking but also patience and persistence in problem solving. For many of us it is a tool to solve problems from every-day life and for some it extends into their chosen profession. However, because of different needs, abilities and interests of students BISC offers three different courses to choose:

Mathematics HL

Mathematics SL

Mathematical Studies SL.

The Mathematics SL course focuses on introducing important mathematical concepts through the development of mathematical techniques. Students are challenged to think globally and become self-directed learners to solve different type of problems. Students will have opportunity solve different types of problems using their mathematical knowledge and analytical skills. This course does not have however the depth found in the mathematics HL courses.

The syllabus consist of six big topics compulsory for everyone:

- Algebra
- Functions and Equations
- Circular Functions and Trigonometry
- Vectors
- Statistics and Probability
- Calculus.

How is the course structured?

Ideally all the topics from the syllabus will be taught during the first four terms (whole IB1 and the first term of IB2), giving an opportunity for revisions during the last term before final exams. However the time left for revisions depends on a class individual pace. Topics will be sequenced in an order which provides the best preparation for students, not necessarily in the order in which they appear in the syllabus. During the first term of the first year similar topics in all three levels (Mathematical Studies, Mathematics SL, Mathematics HL) will be covered to give students a chance for a smooth transfer in a case they want to change a level of mathematics. Students will start their research for the Internal Assessment during the first year (in IB1) but the final version of it will be submitted around December/January of the second year of the IB diploma program.

What distinguishes this course from other mathematical courses?

Great care should be taken to select a mathematical course that is most appropriate for an individual student. The choice depends on their own abilities in mathematics, their own interest in mathematics and those particular areas of the subject that may hold the most interest, their academic plans, in particular the subjects they wish to study in future, their other choices of subjects within the framework of the Diploma Programme.

Comparison between mathematical courses available in BISC.

Mathematical Studies SL	Mathematics SL	Mathematics HL
For students with varied mathematical background and abilities.	For students who already possess knowledge of basic mathematical concepts, and who are equipped with the skills needed to apply simple mathematical techniques correctly.	For students with a good background in mathematics who are competent in a range of analytical and technical skills.
For students who prepare for future studies in social sciences, humanities, languages or arts.	For students who prepare for future studies in subjects such as chemistry, economics, psychology and business administration.	For students who prepare for future studies in mathematics, physics, engineering or technology.
Not recommended for students taking Physics HL or Chemistry HL.	Suitable for students taking Physics HL or Chemistry HL.	Suitable for students taking Physics HL or Chemistry HL

An inquiry-based approach of learning is mostly used.	A development of mathematical techniques and skills however without a mathematical rigour.	Developing important mathematical concepts in a comprehensible, coherent and rigorous way.
For both examination papers, students must have access to a Graphic Display Calculator at all times.	Students are not permitted access to any calculator for one of written exam papers.	Students are not permitted access to any calculator for one of written exam papers.

How is the course assessed?

Regular homework, written tests after every chapter and short quizzes between them are parts of the current monitoring of a student progress and encourage them to regular work. Test and quiz results will be given as a percentage of total marks and as a grade from 1 to 7.

The end of year assessment at the end of the first year of the course will be structured in a way similar to a real exam and marked using the same criteria to give students an opportunity to know their level and decide about them being promoted to IB2.

The final exam consist of two written papers based on all topics from the syllabus. Paper 1 consists of 10 compulsory questions and no calculator is allowed. Half of them are short-response questions and half of them are extended-response questions. Paper2 is structured in the same way but the Graphical Display Calculator is required for this paper. Together, they contribute 80% of the final mark for the course.

In addition each student has to prepare an independent piece of mathematical writing based on their research, called an Exploration which gives an opportunity to explore the area of mathematics of their own interest. It contributes 20% of the final mark for the course.

Are there any requirements?

Mathematics SL course caters for students who already possess knowledge of some mathematical concepts, and who are equipped with the skills needed to apply mathematical techniques correctly. It is **recommended** that students receiving grade C or lower in Mathematics IGCSE(0580) exam take Mathematical Studies course as Mathematics SL may be too demanding for them. There will not be any entrance test for new students. During the first term of the first year similar topics in all three levels (Mathematical Studies, Mathematics SL, Mathematics HL) will be covered to give students a chance for a smooth transfer in a case they want to change a level of mathematics.

What materials will I need?

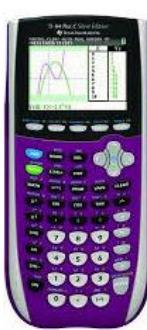
The school will provide students with a textbook and notebooks.

It is required however for every student to have a Graphical Display Calculator from the beginning of the course. They have to buy one by themselves. Models that are recommended:

TI-84 Plus CE



TI-84 Plus C Silver Edition



TI-84 Plus Silver Edition



TI-84 Plus

TI-83 Plus

Do not buy any different model of a calculator without consultation with your teacher!. They are expensive and not all graphical calculators are allowed for IB diploma courses. It is important for all the students in the class to have one of above Texas Instruments calculators.

What will I learn?

In Mathematics SL course students will develop an understanding of principles and nature of mathematics through study of new concepts from various branches of mathematics, from algebra, through geometry and statistics to calculus, however without the rigor required in the higher mathematics course.

Mathematics SL lessons will give students an opportunity to gain:

- knowledge of important mathematical concepts through the development of mathematical techniques
- an ability to use mathematical processes to solve different type of problems
- knowledge how to analyse data collected using statistical tools
- skills in communication and reasoning using mathematical concepts
- a solid foundation for further study in subjects such as chemistry, economics, psychology and business administration

In what ways does the mathematics syllabus promote the attributes of the IB learner profile?

The students become **KNOWLEDGABLE** by learning new mathematical concepts and be able to apply them in real-life. They develop their natural curiosity by performing lesson investigations and doing the Internal Assessment research to become **INQUIRERS** and **REFLECTIVE**. Necessity to solve different type of problems using mathematical techniques and communicate mathematics in a clear, effective and concise manner force them to be **THINKERS** and **COMUNICATORS**. All the students are encouraged to be **RISK-TAKERS** to try despite some difficulties and learn on their own mistakes. During all mathematics lessons students have to be **OPEN-MINDED** to different approaches of problem solving proposed by other students or a teacher. Academic honesty promoted during all the lessons, exams, Internal Assessment writing makes them **PRINCIPLED**. During mathematics lessons students will have an opportunity notice different abilities and need of individual students. They will be encouraged to be **CARING** and help students in need during lessons or after them. They have to be **BALANCED** and remember that mathematics, although important is not their whole world!

What career paths are open to me?

Mathematics SL course is the best for students who need sound mathematical knowledge without however the rigorous approach required for Mathematics HL. It prepares for future studies in subjects such as chemistry, economics, psychology and business administration.

Is it appropriate to write an extended essay in Mathematics when taking Mathematics SL course?

Any student can write an extended essay in Mathematic despite a level of this subject taken. For Mathematical SL students it will be however more difficult to meet some criteria related to sophistication of mathematical processes used and a rigorous approach to towards them.

Can an interest in Mathematics lead to a CAS project?

Some ideas for possible CAS projects in mathematics are:

- Teaching younger children mathematics.
- Preparing statistical analysis of ISA results, school sport competitions and other events.
- Planning and preparing mathematical events like π day or mathematical Halloween
- Creating a video series of “mathematics adventures” for younger children
- Learning how to do tax preparation and offering free services for elders or low-income populations

What is the relationship between TOK and Mathematics?

During the two year course of mathematics students' attention will be drawn to questions and aspects relating theory of knowledge (TOK) and mathematics. Examples of issues relating to TOK are given below.

- Informal and formal reasoning in mathematics.
- Is the language of mathematics a “universal language”?
- Beauty and elegance in mathematics.
- Validity of data and introduction of bias.
- Theoretical and experimental probability.
- The perception of risk, in business, in medicine and safety in travel from the point of view of probability.
- Does correlation imply causation?
- What is an axiomatic system?

Where can I find more information about the course?

You can download the Mathematics SL subject guide for more information. Please also feel free to email the Mathematics SL teacher at a.piskorz@bisc.krakow.pl.