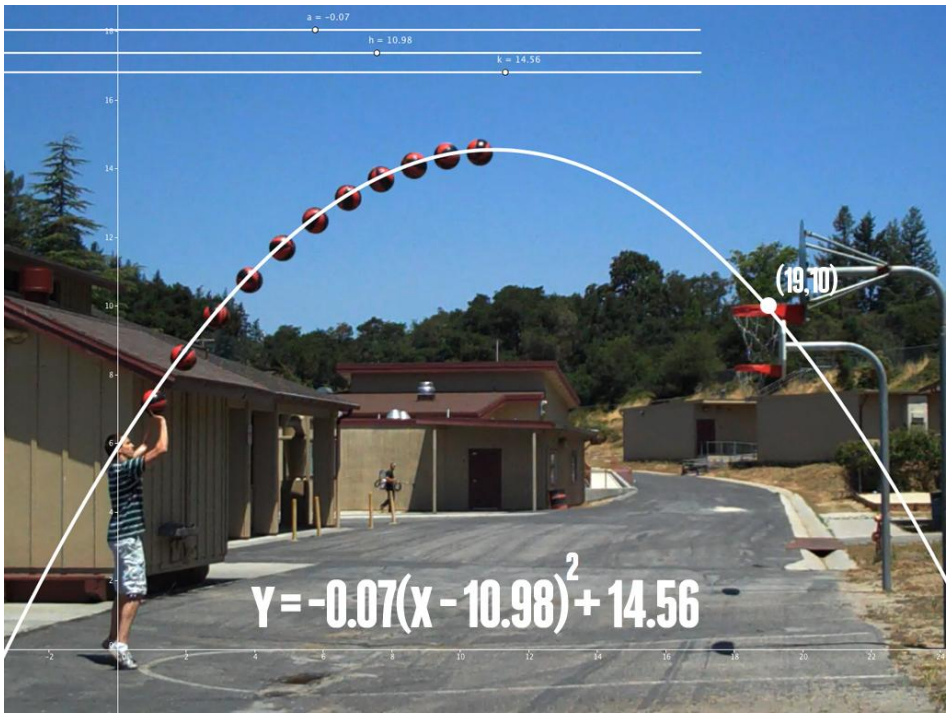
MATHEMATICAL STUDIES SL

COURSE DESCRIPTION



http://www.mathconcentration.com/profiles/blogs/real-world-application-of-solving-equations:

"As far as the laws of mathematics refer to reality, they are not certain; and as far as they are certain, they do not refer to reality"
Albert Einstein

What is the course about?

Mathematics is a compulsory subject for all IB diploma students. Learning it is an excellent way to develop 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.

Mathematical Studies is offered as a standard level subject only. It has an emphasis on applications of mathematics, and the largest section is on statistical techniques. No complex manipulative skills are needed because more emphasis is given to student understanding of fundamental concepts than on symbolic manipulation.

The syllabus consist of seven big topics compulsory for everyone:

- Number and Algebra
- Mathematical Models
- Geometry and Trigonometry
- Descriptive Statistics,
- Statistical Applications,
- Logic, Sets and Probability
- Introduction to Differential 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 Programme.

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.

Final written exam consist of two papers based on all topics from the syllabus. Paper 1 consists of 15 compulsory short-response questions and Paper 2 consists of 6 extended-response questions. Together, they contribute 80% of the final mark for the course. The Graphical Display Calculator is required for both papers.

In addition each student has to completes a Project – a written piece of mathematical work based on their own research and data collected, which contributes 20% of the final mark for the course.

Are there any requirements?

Mathematical Studies SL is open to any student. There are no any specific requirements.

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:

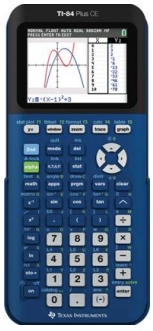
TI-84 Plus CE

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?

An inquiry-based approach is mostly used. Many lessons start with a practical investigation which is followed by analyzing results and formulating a mathematical principle. It is important that students develop mathematical intuition and understand how they can apply mathematics in real life. Each student completes a project - a supervised by teacher piece of written work, based on their own research. This will give them an opportunity to address personal interest and take responsibility for their own studying.

Mathematical Studies lessons will give students an opportunity to gain:

- the development of their mathematical knowledge through investigation and practice
- an ability to use mathematical processes to solve real- life problems
- knowledge how to anayse data collected using statistical tools including statistical tests
- skills in communication and reasoning using mathematical concepts
- a solid foundation for further study in social sciences, humanities, languages or arts

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 technics and communicate mathematics in a clear, effective and concise manner force them to be ***THINHERS*** and ***COMUNICATORS***. All the students are encourage 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 encourage 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 nor their whole world!

What career paths are open to me?

Mathematical Studies course is the best for students who prepare for future studies in social sciences, humanities, languages or arts. These students may need to utilize the statistics and logical reasoning that they have learned as part of the mathematical studies SL course in their future studies.

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 Studies students it will be however more difficult to meet some criteria related to sophistication and a level of difficulty of mathematical processes used.

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.