Group 5:

Mathematics

IB Mathematical Studies

Course Description

Mathematics is a tool we use to understand and interpret our world. It is the language used to describe patterns and solve quantitative problems in fields ranging from art and graphic design to science and engineering. It also develops creativity and higher order thinking skills. Because the level of mathematical thinking and problem solving needed in the workplace and in the world continues to increase, those who understand mathematics will have opportunities others do not. Mathematical competence opens doors to productive futures, and the IB Math Studies program is one of the courses where students gain such competence. Mathematical Studies, available as a standard level (SL) subject only, caters to students with varied backgrounds and abilities. Students embarking on this course need to be equipped with fundamental skills and a rudimentary knowledge of basic processes. The nature of mathematical studies is such that it concentrates on mathematics which can be applied to contexts related as far as possible to other curriculum subjects, to common general world occurrences and to topics that relate to home, work and leisure situations. The Internal Assessment project provides an opportunity for the student to undertake an investigation of a mathematical nature in the context of another subject in the curriculum, a hobby or interest of his/her choice using skills learned before and during the mathematical studies course.

Mathematical Studies SL Total 150 hrs

The course consists of the study of eight topics. All topics are compulsory and students must study all the sub-topics in each of the topics as listed.

Syllabus content	130 hrs
Topic 1 - Introduction to the graphic display calculator	3 hrs
Topic 2 - Number and algebra	14 hrs
Topic 3 - Sets, logic and probability	20 hrs
Topic 4 - Functions	24 hrs
Topic 5 - Geometry and trigonometry	20 hrs
Topic 6 - Statistics	24 hrs
Topic 7 - Introductory differential calculus	15 hrs
Topic 8 - Financial mathematics	10 hrs

Project 20 hrs

The project is an individual piece of work involving the collection of information or the generation of measurements, and the analysis and evaluation of the information or measurements.

Textbook

Mathematical Studies, Course Companion, Oxford University Press, 2007.

Assessment
Mathematical Studies SL is graded through an external and internal assessment. The external assessment, worth 80% of the final mark, is composed of a Paper 1 and a Paper 2. The internal Assessment is marked by the course instructor and is worth the remaining 20% of final mark.

Paper 1
This paper is worth 90 marks, representing 40% of the final mark.
Consists of 15 compulsory short-response questions based on the entire syllabus
Exam duration: 1 hr 30 min.

Paper 2
This paper is worth 90 marks, representing 40% of the final mark.
Consists of 5 compulsory extended-response questions based on the entire syllabus
Exam duration: 1 hr 30 min.

Mathematics SL

Course description: Mathematics [SL] is for students who already possess knowledge of basic mathematical concepts and who are equipped with the skills needed to apply simple mathematical techniques correctly. Mathematics SL prepares students for future studies in fields such as engineering, medicine, chemistry or business studies. The intention is to introduce students to these mathematical concepts in an understandable and coherent manner, rather than insisting on mathematical rigour. Whenever possible students should apply the mathematical knowledge they have acquired to solve realistic problems, set in an appropriate context.
The aims of the course are to enable students to:
Develop an appreciation of the multicultural and historical perspectives of mathematics
Develop an enjoyment of mathematics
Communicate mathematically clearly and confidently
Develop problem solving skills
Develop mathematical knowledge and skills and use these in real life
Topics covered:
Algebra
Functions and Equations
Circular functions and Trigonometry
Matrices
Vectors
Statistics and Probability
Calculus
Assessment:
Internal Assessment **20%**

Portfolio
A collection of two pieces of extended mathematical work; consisting of an investigation and modeling

External Assessment **80%**

Written examinations
Paper 1: A mixture of short –response and extended response questions based on the whole

Syllabus; the use of calculators is prohibited (40%)

Paper 2: A mixtures of short response and extended response questions based on the whole

Syllabus; Graphic calculators are required (40%)

Mathematics HL

Course description:

The course is a rigorous two year program designed for students with a good mathematical background and who have done well in their IGCSE Mathematics. The majority of these students will be expecting to include mathematics as a major component of their university studies, within courses such as mathematics, physics, engineering, medicine and technology.
The core components of the higher level course are algebra, functions and equations, circular function and trigonometry, matrices, vectors, statistics and probability and calculus.
Our students will be covering the option series and differential equations.
The nature of the course focuses on developing the important mathematical concepts to help students comprehend rationally and thoroughly. There is a much greater emphasis on proof than in any of the other mathematics courses and students are encouraged to apply their knowledge to solving problems in a variety of ways and in real life applications. Graphical calculators, autograph and other relevant computer software will be used to assist in this aim.
The portfolio, counts to 20% of the final grade and consists of two pieces of work. This is based on different areas of the syllabus, representing an investigation and a modeling task.
The students will be involved in practicing a variety of mathematical symbols, which are accepted internationally. All the mathematical symbols and notations will be covered extensively. Students will be exposed to the historical mathematics, which was contributed to internationally. Examples of teachable historical mathematics are the Babylonian contribution of place value, Pascal's triangle and the Chinese role to negative numbers and the decimal system.

Topics covered:

Algebra
Functions and Equations
Circular functions and Trigonometry
Matrices
Vectors
Complex Numbers
Mathematical Induction.
Statistics and Probability
Calculus
Series and differential equations.

Assessment:
Internal Assessment:

Portfolio 20% (15 hours)

A portfolio containing two assignments, based on different areas of the syllabus representing an investigation and a mathematical modeling task.

External Assessment

Paper 1 30%

2hours, 20 questions based on the common core giving a total of 120 marks. (Non-Calculator)

Paper2 30%

2 hours, 5 extended questions on the core syllabus giving a total of 120 marks. (Calculator)

Paper 3 20%

1 hour, a small number of questions based on the chosen option giving a total of 60 marks. (Calculator)