

# IB Math Studies SL

## Humble High School IB Program

### Syllabus

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### **Course Description:**

Students taking the IB Math Studies SL course will follow curriculum outlined by the International Baccalaureate Diploma Programme. This course is offered for students who intend to pursue university studies, which do not require a great deal of further mathematical study. The key objective of this course is to introduce students to mathematical concepts and principles through the development of various techniques, allowing for the possibilities of the practical and real-world applications of the subject.

Math Studies SL students are expected to analyze problems using the appropriate notation, terminology, techniques, and graphical presentations. An important focus of this course is critical thinking and logic, allowing students to demonstrate their comprehension of both the significance and the reasonableness of their results. Students gain experience formulating mathematical arguments and effectively communicating their justifications through a variety of means, including tables, graphs, and diagrams. The applications of technology are also employed as appropriate mathematical tools for problem-solving, data analysis, and presentation of mathematical investigations and modeling.

To incorporate internationalism into the Math Studies curriculum, this course addresses the regions of the world where discoveries in the mathematical community have been made. In addition to exploring the historical and social context of these discoveries, regional adaptations to different methods and techniques will be investigated.

A minimum of 130 hours of Math Studies SL theory and 20 hours of an internally assessed project are completed for this course. In addition to completion of the Math Studies project, further assessments in the form of tests, quizzes, homework, technology projects, and literature research, are used to evaluate student progress throughout the course and address individual weaknesses as needed.

### **Grading**

Formative: 30%

Summative: 70%

## **IB Math Studies SL Summary**

IB Math Studies SL course begins with an introduction to the graphic calculator display (GCD) and a review of student knowledge of numbers and Algebra. Other topics highlighted are functions and equations, analytical geometry and trigonometry, set theory, and probability. Semester II resumes with financial applications of mathematics, sequences, series, and statistics. This semester includes an introduction to differential calculus, and allows for a comprehensive review for external assessment.

<b>IB Diploma Programme Topic of Study Semester I</b>		<b>Teaching Hours</b>
<b>Unit I: Introduction to the Graphic Display Calculator (IB Core Topic 1)</b>		
1.1	Use of GDC to graph functions	1
	Arithmetic Calculations	1
	Entering data into lists	1
<b>Unit II: Numbers and Algebra (IB Core Topic 2)</b>		
2.1	Sets of natural numbers, integers, rational numbers and real numbers	1
2.2	Approximation: decimal places, significant figures; Estimation	1
2.3	Expressing numbers using exponents and scientific notation	1
2.4	SI system of measurement and other basic units	2
2.5	Arithmetic sequences and series	2
2.6	Geometric sequences and series	2
2.7	Solutions of systems of equations in two variables	2
	Solutions of quadratic equations: algebraically and graphically	3
<b>Unit III: Geometry and Trigonometry (IB Core Topic 5)</b>		
5.1	Coordinates in two and three dimensions (Points, lines, mid-points)	2
5.2	Equation of a line in two dimensions	3
	Points of intersection, parallel, and perpendicular	2
5.3	Right-angled trigonometry – use of Sine, Cosine and Tangent	3
5.4	Sine and cosine rules	4
5.5	Geometry of three dimensional shapes	3
	Vertices; angles between lines	3

<b>IB Diploma Programme Topic of Study</b>		<b>Teaching Hours</b>
<b>Unit IV: Sets, Logic, and Probability (IB Core Topic 3)</b>		
3.1	Basic concepts of set theory: subsets, intersections, union, complement	1
3.2	Venn diagrams and simple applications	1
3.3	Sample space; events and complementary events	2
3.4	Basic concepts of symbolic logic: definition of proposition	2
	Symbolic notation of propositions	2
3.5	Compound statements: implication, negation, and, or.	1
	Translation between verbal statements, symbolic form and diagrams.	2
3.6	Truth tables	2
3.7	Definition of implication: converse, inverse, contrapositive	1
3.8	Probability of events	2
3.9	Probability using Venn diagrams, tree diagrams, table of outcomes	2
3.10	Laws of Probability	2
<b>Unit V: Functions (IB Core Topic 4)</b>		
4.1	Concept of a function as a mapping – domain, range	3
4.2	Linear functions and their graphs	3
4.3	Graph of the quadratic function (symmetry, vertex, intercepts)	3
4.4	Graphs and properties of exponential functions	4
4.5	Graphs and properties of the Sine and Cosine functions	4
4.6	Accurate graph drawing	3
4.7	Solving equations using combinations of simple functions	4

<b>IB Diploma Programme Topic of Study Semester II</b>		<b>Teaching Hours</b>
<b>Unit VI: Financial Mathematics (IB Core Topic 8)</b>		
8.1	Current conversions	2
8.2	Simple Interest	2
8.3	Compound Interest	3
8.4	Use of tables for various topics (loan repayment, interest, inflation)	3
<b>Unit VII: Sequences, Series, and Statistics</b>		
6.1	Classification of data as discrete or continuous	1
6.2	Simple discrete data (frequency tables)	2
6.3	Grouped discrete or continuous data (mid-intervals, boundaries)	2
	Frequency histograms; stem and leaf diagrams	2
6.4	Cumulative frequency (percentiles and quartiles)	2
	Box and Whisker plots	2
6.5	Measures of central tendency	2
6.6	Measures of dispersion (deviation)	2
6.7	Scatter diagrams (best-fit line); correlations	3
6.8	Linear regression	3
6.9	Chi-square test for independence	3
<b>Unit VIII: Introductory Differential Calculus (IB Core Topic 7)</b>		
7.1	Gradient of the line through two points	2
	Tangent to the curve	1
7.2	Derivatives of functions	4
7.3	Gradients for given values of $x$ (equation of tangent at given point)	2
7.4	Increasing and decreasing functions	2
7.5	Solutions where the gradient of a curve is zero	2
	Local maximum and minimum points	2
<b>Comprehensive Exam Review</b>		

## **Assessment**

### **Internal Assessment**

Each IB Math Studies SL student will assume responsibility for completion of a project involving the collection, analysis, and evaluation of data. Students can choose from a wide variety of project types such as modeling, investigations, applications, or statistical surveys. Math Studies students use mathematics learned from the curriculum to explore an area of study related to their own individual interests. Student work is assessed internally and submitted to IBO for moderation. Project work should be thorough, and contain evidence of a student's knowledge of notation and terminology, ability to communicate mathematical information verbally and graphically, and their ability to appropriately use technology to assist their studies in mathematics.

### **External Assessment**

External assessment will consist of two exam papers given in the spring semester of the course. Paper 1 consists of fifteen short answer questions that test knowledge across the scope of the Math Studies SL syllabus. Paper 2 is comprised of five extended response questions, involving sustained mathematical reasoning with an emphasis on real-life applications. While Paper 1 requires the student to perform a mechanical approach to solve the problems, Paper 2 entails problem-solving strategies.

# Humble High School International Baccalaureate Late Work Policy

The following rules regard the acceptance of late work in IB classes at Humble High School. Remember that we are required by the International Baccalaureate Organization to turn in IB assessments on time, so deadlines must be taken seriously.

**A.** The following rules apply to assignments in IB classes:

**The due date of any assignment is the due date.**

1. Late work will be given only ½ credit if turned in before 7:25 the following day.
2. If you are absent on the day an assignment is due and you have an excused absence, you must turn in the assignment to the appropriate teacher before 7:25 am on the day you return.
3. Any major assignment that has been assigned for one week or more **absolutely must** be turned in on its due date. If you find it necessary to be absent on this due date, it is your responsibility to secure a way for your assignment to be turned in on time.

**B.** The following rules apply to make up work:

1. It is your responsibility to obtain your make up assignments from each of your teachers.
2. If you have an unexcused absence, you will not be allowed to make up any work you missed and will receive a zero for that day's assignments.
3. If you have an excused absence, you have the same number of days to make up your missed assignments as the number of days you were absent. For example, if you are out for one day, you have only one day to make up missed assignments. You are strongly encouraged to be at school every day. Remember that each day you are absent you miss valuable information.

**C.** The following rules apply to tests

1. If you are absent on the day of a test and you have an unexcused absence, you will receive a zero on that test.
2. If you are absent on the day of a test and you have an excused absence, you must be ready to take the test on the day you return to school.
3. A field trip on the day of a test is **not** an opportunity to put off the test. If you have a field trip or any other school-sponsored activity that will cause you to miss a test, you must make arrangements with the teacher to take the test on an alternate date