**Curriculum**

**IB Math Studies Y1**

**Course Overview**

This is the first year of a two year course of study to prepare students for the IB exam leading to the International Bacculeate Diploma. Students will study the core elements of the curriculum, including number and algebra, sets and logic, geometry and trigonometry, statistics and probability, functions, linear and exponential algebra, quadratic algebra, and sequences and series.

**Department Standards**

Students will be able to comprehend mathematical concepts.

Students will apply mathematical procedures accurately, efficiently, and appropriately.

Students will be able to formulate, represent, and solve mathematical problems.

Students will develop logical mathematical thought and precise mathematical communication.

**Benchmarks**:

Updated Sept 2015

Numerical, graphical and listing properties of the graphic display calculator (GDC) TI-84 required

Basic Elements and concepts of mathematics

Set notation and concepts

Application of functions

Two dimensional diagrams

Application of geometric and trigonometric techniques

**Performance Indicators**

Updated Sept 2015

First Quarter

Students will be able to:

perform basic operations with numbers;

approximate answers;

use correct notation involving decimal places and significant figures;

calculate the percentage error in a measurement;

use scientific notation (System International);

describe properties of Whole number, Integers, Rational, and Real numbers; and

use set theory to describe subsets, intersect, union and complement; and draw and apply Venn diagrams to describe a given set of numbers.

Second Quarter

Students will be able to:

apply the rule of Pythagoras to solve real life problems;

classify data as discrete or continuous;

use frequency tables or polygons;

display and use grouped discrete or continuous data;

use frequency tables and mid-interval values to find measures of central tendency;

create and translate histograms;

create and translate stem and leaf diagrams;

create and translate box-and-whiskers plots;

read and draw cumulative frequency curves;

find the percentiles and quartiles of given data;

find measures of dispersion: range, inter-quartile range, and standard deviation;

solve linear equations; and

solve exponential equations; and find the solution to a pair of linear equations in two variables by use of a GDC.

Third Quarter

Students will be able to:

determine the coordinates in a two dimensional plane;

calculate the distance between two points;

calculate the midpoint of a line segment;

write an equation of a line in the form y = mx+c or ax+by+c=0;

determine the gradient and axis-intercepts from an equation;

graph a line from a given equation;

determine the points of intersection of two lines;

determine if two lines are parallel or perpendicular;

expand a polynomial multiplication;

find the roots of a quadratic equation by factoring, completing the square, or the quadratic formula;

classify a set of numbers as a relation or a function;

use correct interval notation to express the domain and range of a function;

determine the domain and range of a function correctly using function notation;

map a function's domain and range;

express a linear function given its graph;

write the equation of a quadratic function given the x-intercepts, y-intercept and/or the vertex; and

find the intersection of two functions; and write and solve real world problems involving quadratic functions.

Fourth Quarter

Students will be able to:

use the ratios of sine, cosine and tangent to solve real world problems;

use the sine rule to solve real world problems;

use the cosine rule to solve real world problems;

find the area of a triangle using sine;

construct an accurate diagram with given information;

understand the concept of an arithmetic series and its application;

determine the general statement for the n-th term of an arithmetic sequence ;

determine the general statement for the n-th term of a geometric sequence;

calculate the sum of n-terms of an arithmetic series;

calculate the sum of n-terms of a geometric series; and

apply the concepts of geometric series to compound interest, growth and decay.

**Assessments**

Updated Sept 2015

First Quarter

Daily Homework Checks (not used for formal assessments)

Paper 1 Assessments

Paper 2 Assessments

Semester I Exam

Second Quarter

Daily Homework Checks (not used for formal assessments)

Paper 1 Assessments

Paper 2 Assessments

Third Quarter

Daily Homework Checks (not used for formal assessments)

Paper 1 Assessments

Paper 2 Assessments

Fourth Quarter

Daily Homework Checks (not used for formal assessments)

Paper 1 Assessments

Paper 2 Assessments

Semester II Final (covers whole year)

**Core Topics**

Updated Sept 2015

First Quarter

Number sets and properties

Measurement

Sets and Venn Diagrams

Second Quarter

Rule of Pythagoras

Descriptive statistics

Linear and exponential algebra

Third Quarter

Coordinate Geometry

Quadratic Geometry

Function Notation and Quadratic Functions

Fourth Quarter

Numerical Trigonometry

Perimeter, Area and Volume

Sequences and Series

**Specific Content**

Updated Sept 2015

First Quarter

Properties of numbers

Language of math

Order of operations

Scientific Notation

Measuring accuracy

Error and Percentage of error

Set Builder notation

Complements of sets

Venn diagrams

Numbers in regions

Second Quarter

Rule of Pythagoras and converse of Pythagoras

Problem solving

Bearing and navigation

Circle problems

3-dimensional problems

Describing data

Presenting and interpreting data

Grouped Data

Continuous Data

Frequency tables

Mean, median and mode

Box-and-whisker plots

Standard deviation

Algebraic substitution

Linear equations

Fractional equations

Problem solving

Formula substitution

Linear simultaneous equations

Problems solving

Index notation and laws

Exponential equations

Third Quarter

Distance between two points

Gradient

Midpoints

Vertical and horizontal lines

Equations of lines

Graphing lines

Products and expansions

Factorization of quadratics

Quadratic Equations

Completing the Square

Problem solving with quadratics

Relations and Functions

Interval notation

Domain and Range

Function notation and mappings

Linear Functions

Quadratic functions

Graphs of quadratic functions

Axes intercepts

Graphs from axes intercepts

Axis of symmetry and vertex

Intersection of functions

Quadratic modelling

Fourth Quarter

Trigonometric ratios

Trigonometric problem solving

Constructing trigonometric formula

3-dimensional problem solving

Areas of triangles

Cosine Rule

Sine Rule

Unit Conversions

Perimeter and Area

Problem solving with area

Surface area

Volume/Capacity

Density

Number Patterns

Arithmetic sequences and series

Geometric sequences and series

Compound Interest

Growth and decay

**Resources**

Updated Sept 2015

TI 83+ or TI 84+

Excel