

## IB Mathematics, Higher Level

### Knowledge Content

- **Algebra:** Sequences and Series, Exponents and Logarithms, Binomial Theorem, Proof by Induction, Complex Numbers
- **Functions & Equations:** Concept of a Function, Graph of a Function, Transformation of Graphs, Reciprocal Function, Quadratic Functions, Polynomial Functions, Exponential and Logarithmic Functions, Inequalities in One Variable
- **Circular Functions and Trigonometry:** Radian measure, Definitions, Compound Angle and Double Angle Identities, Inverse Functions, Trigonometric Equations, Solution of Triangles
- **Matrices:** Definitions, Algebra of Matrices, Determinants, Solution of Systems of Linear Equations
- **Vectors:** Definitions, Basic Operations, Scalar Product, Vector Product, Three Dimensional Geometry
- **Statistics and Probability:** Concepts, Interpretation of Data, Laws of Probability, Probability Distributions
- **Calculus:** Differentiation from First Principles, Rules of Differentiation, Applications of Differentiation, Integration, Indefinite Integrals, Definite Integrals, Applications of Integration, First Order Differential Equations
- **Sets, Relations and Groups:** Set Theory, Functions, Binary Operations, Group Theory.

### Skills Content

#### Students will develop skills that enable them to:

- Read, interpret and solve a given problem using appropriate mathematical terms
- Organise and present information and data in tabular, graphical and/or diagrammatic forms
- Know and use appropriate notation and terminology
- Formulate a mathematical argument and communicate it clearly
- Select and use appropriate mathematical strategies and techniques
- Demonstrate an understanding of both the significance and the reasonableness of results
- Recognise patterns and structures in a variety of situations and make generalisations
- Recognise and demonstrate an understanding of the practical applications of mathematics
- Use appropriate technological devices as mathematical tools
- Demonstrate an understanding of and the appropriate use of mathematical modelling.

### Assessment

- Homework exercises
- Class tests
- Portfolio items.

### Examinations

Internal end of semester exams

Final external IB exams:

- Paper One – Core (No Calculator)
- Paper Two – Core
- Paper Three – Option.

### Resources

- Smythe, *Mathematics HL & SL*
- Haese, *Mathematics for the International Student – Mathematics HL (Core)*
- Crawshaw and Chambers, *Advanced Level Statistics*
- Haese, *Mathematics for the International Student – Mathematics HL (Options)*
- *Autograph* software
- IB past papers.

### Prerequisites

Algebra 2 (Advanced course) *or* Grade B+ or above in Algebra 2 *or* Grade A\* in GCSE Mathematics.

### Credits

**One Credit per year.**