MATHEMATICS   COURSE DESCRIPTION

WHAT IS THE COURSE ABOUT?

Mathematics plays an essential role both within the school and in society. It promotes a powerful universal language, analytical reasoning and problem-solving skills that contribute to the development of logical, abstract and critical thinking. MYP mathematics aims to equip all students with the knowledge, understanding and intellectual capabilities to address further courses in mathematics, as well as to prepare those students who will use mathematics in their workplace and life in general.
MYP mathematics outlines five branches of mathematical study: **numbers**, **algebra**, **geometry and trigonometry**, **statistics and probability** and **discrete mathematics.**

The school offers four lessons of mathematics per week.
Textbooks:
MYP4: P.Vollmar, M.Haese, R.Haese, S.Haese, M.Humphries: *Mathematics for the international student, MYP4 second edition*, Haese & Harris publications
A.McSeveny, R,Conway, S.Wilkes, M.Smith: *international Mathematics for the Middle Years 4;* Pearson
MYP5: P.Vollmar, M.Haese, R.Haese, S.Haese, M.Humphries: *Mathematics for the international student, MYP5 (Extended)*, Haese & Harris publications
A.McSeveny, R,Conway, S.Wilkes, M.Smith: *international Mathematics for the Middle Years 5;* Pearson

TOPICS:
MYP4
UNIT 1: NUMBERS AND ALGEBRA
Relationships in natural world can be simplified by algebraic models
- Forms of numbers
- Substitution
- Rearranging algebraic expressions
- Integer exponents
- Scientific notation
- Linear equations and inequalities
- Absolute value (extended)

UNIT 2: COORDINATE GEOMETRY AND SIMULTANEOUS EQUATIONS
Patterns between variables and relationships can be represented visually
- The Cartesian plane
- Distance
- Lines
- Simultaneous equations
- Simultaneous inequalities (extended)

UNIT 3: TRIGONOMETRY AND TRANSFORMATION GEOMETRY
Observing positions, angles and measurements in patterns could help us understand forms.
- Trigonometric ratios in right-angled triangles
- Simple isometric transformations
- Identical representation of transformations (extended)

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UNIT 4: FURTHER ALGEBRA AND QUADRATIC EQUATION

Discovering mathematical identities and relationship leads to effective action

- Factorization of algebraic expressions
- Further factorization (extended)
- Algebraic fractions
- Quadratic equations

UNIT 5: STATISTICS AND PROBABILITY

Statistics are a powerful model to develop global perspective

- Graphical analysis and representation
- Measures of central tendency for discrete and continuous data
- Measures of dispersion for discrete and continuous data
- Standard deviation
- Histograms for continuous fixed interval groups (extended)

MYP5

UNIT 1: PROBABILITY

Establishing relationships represented by quantities allows the exploration of access to equal opportunities

- Experimental probability
- Theoretical probability
- Tree diagrams and Venn diagrams
- Probabilities of independent and combined events

UNIT 2: NUMBER PLANE GRAPHS

Using a model to represent a form can give us a strategy in urban planning

- Relations and functions
- Graphing quadratic function by transformations, by vertex and intercepts
- Determining and interpreting maximum or minimum of the quadratic function
- Graphing cubic and rational function by transformations
- Applying functions in real life situations
- Arithmetic and geometric sequences (extended)

UNIT 3: GEOMETRY AND TRIGONOMETRY

Understanding form and shape help us to create new and efficient products

- Determining surface area and volume of a 3D object
- Solving triangles using sine and cosine rule
- Solving some 3-dimensional problems using geometry and trigonometry

UNIT 4: INTERDISCIPLINARY UNIT: 1 m² OF OUR COMMUNITY

Relationships between various communities are based on predictable patterns what helps us to understand interactions in natural and human landscapes.

- Comparing sets of data
- Using standard deviation, chi squared test
- Applying statistical approach in real life situations
- Selecting and using technology effectively for graphical representation of data and statistical calculations

UNIT 5: EXPONENTIAL FUNCTION

Discovering relationships can lead to understanding how systems are changing

- Exponential functions and their graphs
- Solving exponential equations and inequalities
- Applying exponential functions in real life situations
- Logarithms, laws of logarithms (extended)

AIMS:

The aims of MYP mathematics are to encourage and enable students to:

- enjoy mathematics, develop curiosity and begin to appreciate its elegance and power
- develop an understanding of the principles and nature of mathematics
- communicate clearly and confidently in a variety of contexts
- develop logical, critical and creative thinking
- develop confidence, perseverance, and independence in mathematical thinking and problem-solving
- develop powers of generalization and abstraction
- apply and transfer skills to a wide range of real-life situations, other areas of knowledge and future developments
- appreciate how developments in technology and mathematics have influenced each other
- appreciate the moral, social and ethical implications arising from the work of mathematicians and the applications of mathematics
- appreciate the international dimension in mathematics through an awareness of the universality of mathematics and its multicultural and historical perspectives
- appreciate the contribution of mathematics to other areas of knowledge
- develop the knowledge, skills and attitudes necessary to pursue further studies in mathematics
- develop the ability to reflect critically upon their own work and the work of others.

OBJECTIVES:

The objectives of MYP mathematics encompass the factual, conceptual, procedural and metacognitive dimensions of knowledge.

Knowledge and understanding are fundamental to studying mathematics and form the base from which to explore concepts and develop skills. This objective assesses the extent to which students can select and apply mathematics to solve problems in both familiar and unfamiliar situations in a variety of contexts.
In order to reach the aims of mathematics, students should be able to:

    i. select appropriate mathematics when solving problems in both familiar and unfamiliar situations

    ii. apply the selected mathematics successfully when solving problems

    iii. solve problems correctly in a variety of contexts

Investigating patterns allows students to experience the excitement and satisfaction of mathematical discovery. Working through investigations encourages students to become risk-takers, inquirers and critical thinkers. The ability to inquire is invaluable in the MYP and contributes to lifelong learning.
In order to reach the aims of mathematics, students should be able to:

    i. select and apply mathematical problem-solving techniques to discover complex patterns

    ii. describe patterns as general rules consistent with findings

    iii. prove, or verify and justify, general rules.

Communicating - mathematics provides a powerful and universal language. Students are expected to use appropriate mathematical language and different forms of representation when communicating mathematical ideas, reasoning and findings, both orally and in writing.
In order to reach the aims of mathematics, students should be able to:

i. use appropriate mathematical language (notation, symbols and terminology) in both oral and written explanations

ii. use appropriate forms of mathematical representation to present information

iii. move between different forms of mathematical representation

iv. communicate complete, coherent and concise mathematical lines of reasoning

v. organize information using a logical structure.

Applying mathematics in real-life contexts - MYP mathematics encourages students to see mathematics as a tool for solving problems in an authentic real-life context. Students are expected to transfer theoretical mathematical knowledge into real-world situations and apply appropriate problem-solving strategies, draw valid conclusions and reflect upon their results.

In order to reach the aims of mathematics, students should be able to:

i. identify relevant elements of authentic real-life situations

ii. select appropriate mathematical strategies when solving authentic real-life situations

iii. apply the selected mathematical strategies successfully to reach a solution

iv. justify the degree of accuracy of a solution

v. justify whether a solution makes sense in the context of the authentic real-life situation.

ASSESSMENT:

-written tests

-quizes

-homework

-oral exams through particular individual questions during the lessons

Students are assessed according to the prescribed descriptors for grading.

Criterion A	Knowing and understanding	Maximum 8
Criterion B	Investigating patterns	Maximum 8
Criterion C	Communicating	Maximum 8
Criterion D	Applying mathematics in real-life contexts	Maximum 8

At the end of the school year points are given in each criterion taking into account achievements in all individual tasks (formative and summative assessment).

Final grades are derived according to the grade boundaries provided by the IB (MYP 5):

MATHEMATICS	
GRADE	BOUNDARIES
1	0-5
2	6-9
3	10-14
4	15-18
5	19-23
6	24-27
7	28-32