



# Cameron Heights Collegiate Institute

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Subject	Grade	Level	Code	Prerequisite
Analysis and Approaches (Standard Level)	12	University/IB	MHF4UW	MCV3UW

This course will alternate days with MCV4UW and can only be taken with that course throughout the same school year.

## Course Description

This course has curriculum from both the International Baccalaureate programme and Ontario programme.

This course recognizes the need for analytical expertise in a world where innovation is increasingly dependent on a deep understanding of mathematics. This course includes topics that are both traditionally part of a pre-university mathematics course as well as topics that are amenable to investigation, conjecture and proof. There is a strong emphasis on the ability to construct, communicate and justify correct mathematical arguments. There will be a recognition that the development of mathematical thinking is important for a student.

This course will:

- Emphasize algebraic methods
- Develop strong skills in mathematical thinking
- Develop real and abstract mathematical problem solving

The course is intended for students interested in mathematics, engineering, physical sciences, and some economics.

## IB Documents

- [Math Curriculum](#)
- [Mathematics Analysis and Approaches Subject Brief](#)
- [Formula Sheet](#)
- [Calculator Requirements](#)

## Ministry Document

- [Ontario Grade 11-12 Math Curriculum](#)

## IB Grade

For the February report card, all students in this course will be given a predicted IB grade (1 - 7) and associated Ontario percent grade. This grade will be modified based on student performance for the April report card. The final mark in the course will be potentially modified based on the IB exam grade.

The predicted grade is based on the student performance in both grade 12 IB courses.

## Unit Outline

Each unit of study will have some form of assessment that will be weighted and used to determine a predicted grade for the February Report.

## IB Internal Assessment (IA)

- Worth 20% of student's final IB grade
- Student picks topic of personal interest and explores the mathematics of that topic
- Final product is a single essay of 8-12 pages in length

<p style="text-align: center;"><b>Unit of Study</b></p> <p>IB indicates the unit is part of the IB curriculum. ON indicates the unit is part of the Ontario curriculum.</p>	<p style="text-align: center;"><b>Overall Expectations (Essential Understandings)</b></p>
<p><b>Statistics (IB)</b></p>	<ul style="list-style-type: none"> <li>● Population, sampling, random sampling, discrete, and continuous data</li> <li>● Sampling techniques, bias, and outliers</li> <li>● Statistical measures and their interpretation</li> <li>● Measure of spread: range, interquartile range, variance, standard deviation, central tendency</li> <li>● Effect of constant change to changes to original data</li> <li>● Cumulative frequency curves, box-and-whisker charts, frequency histograms</li> <li>● Pearson's correlation coefficient and linear regression</li> <li>● Normal distribution and curves</li> </ul>
<p><b>Discrete Random Variables and Probability (IB)</b></p>	<ul style="list-style-type: none"> <li>● Probability of an event</li> <li>● Venn diagrams and tree diagrams</li> <li>● Combined events, mutually exclusive events, independent events</li> <li>● Conditional probability</li> <li>● Probability with and without replacement</li> <li>● Discrete random variables and their probability distributions</li> <li>● Expected values for discrete data</li> <li>● Choose notation and factorial notation</li> <li>● Binomial distribution</li> </ul>
<p><b>Vectors in 2-Space and 3-Space (ON)</b></p>	<ul style="list-style-type: none"> <li>● Vectors as displacements in the plane and in 3-space</li> <li>● Algebraic and geometric vectors</li> <li>● Parallel and perpendicular vectors</li> <li>● Angle between vectors</li> <li>● Dot and cross operators on vectors</li> <li>● Linear dependence and independence</li> <li>● Projection operators</li> <li>● Different applications of vectors including force, work, distance, and abstractions</li> </ul>
<p><b>Lines and Planes (ON)</b></p>	<ul style="list-style-type: none"> <li>● Representing lines in 2-space and 3-space using vectors, parametric form, and scalar form</li> <li>● Representing planes in 3-space using vectors, parametric form, and scalar form</li> <li>● Intersection between 2 or more lines</li> <li>● Intersection between 2 or more planes</li> </ul>
<p><b>Problem Solving and Mathematical Thinking (IB)</b></p>	<ul style="list-style-type: none"> <li>● Difference between deductive and inductive thinking (only deductive thinking is assessed)</li> <li>● Forming proof through a sequence of logical steps</li> <li>● Simple deductive proof</li> <li>● Assessing what makes a correct or incorrect proof</li> <li>● Develop the ability to make, test, prove, and extend a mathematical conjecture</li> <li>● Application of mathematical thinking to simple proofs and problem solving</li> </ul>