



THAMES VALLEY DISTRICT SCHOOL BOARD

London Central Secondary School



COURSE OVERVIEW 2019-2020

Course Name:	Calculus and Vectors	Course Code:	MCV 4U
Course Type:	Grade 12 University Preparation	Credit Value:	1.0
Teachers(s):	Mr. Bannon, Ms. Dymock		

**Course Description:**

This course builds on students' previous experience with functions and their developing understanding of rates of change. Students will solve problems involving geometric and algebraic representations of vectors and representations of lines and planes in three-dimensional space; broaden their understanding of rates of change to include the derivatives of polynomial, sinusoidal, exponential, rational, and radical functions; and apply these concepts and skills to the modeling of real-world relationships. Students will also refine their use of the mathematical processes necessary for success in senior mathematics. This course is intended for students who choose to pursue careers in fields such as science, engineering, economics, and some areas of business, including those students who will be required to take a university-level calculus, linear algebra or physics course.

<http://www.edu.gov.on.ca/eng/curriculum/secondary/math1112currb.pdf>

**Note: This course can be taken concurrently with or after Advanced Functions.**

**Course Overall Expectations:**

Strand	Overall Expectations
Rate of Change	demonstrate an understanding of rate of change by making connections between average rate of change over an interval and instantaneous rate of change at a point, using the slopes of secants and tangents and the concept of the limit;
	graph the derivatives of polynomial, sinusoidal, and exponential functions, and make connections between the numeric, graphical, and algebraic representations of a function and its derivative;
	verify graphically and algebraically the rules for determining derivatives; apply these rules to determine the derivatives of polynomial, sinusoidal, exponential, rational, and radical functions, and simple combinations of functions; and solve related problems.
Derivatives and their Applications	make connections, graphically and algebraically, between the key features of a function and its first and second derivatives, and use the connections in curve sketching;
	solve problems, including optimization problems, that require the use of the concepts and procedures associated with the derivative, including problems arising from real-world applications and involving the development of mathematical models.
Geometry and Algebra of Vectors	demonstrate an understanding of vectors in two-space and three-space by representing them algebraically and geometrically and by recognizing their applications;
	perform operations on vectors in two-space and three-space, and use the properties of these operations to solve problems, including those arising from real-world applications;
	distinguish between the geometric representations of a single linear equation or a system of two linear equations in two-space and three-space, and determine different geometric configurations of lines and planes in three-space;
	represent lines and planes using scalar, vector, and parametric equations, and solve problems involving distances and intersections.

### Assessment and Evaluation Strategies:

The purpose of assessment and evaluation is to improve student learning. Assessment and evaluation is based on the provincial curriculum expectations and the achievement levels outlined in the curriculum document. In order to ensure that assessment and evaluation are valid and reliable, and that they lead to the improvement of student learning, teachers use a variety of strategies throughout the course, including: providing students with feedback about their work (known as assessment for learning), helping to set learning goals and monitor their own progress (known as assessment as learning), and evaluation and reporting of progress in the form of grades and marks (known as assessment of learning).

Unit Overview	Assessment and Evaluation Methods (May include major evaluations)
Representing Vectors in $R^2$	quizzes, performance tasks, assignments, projects, unit tests
Representing Vectors in $R^3$	
Representing Lines and Planes	
Investigating Instantaneous Rates of Change as the Derivative of a Function	
Further Derivative Rules and Applications	
Optimization	
Derivatives of Common Functions	
Curve Sketching	
Course Culminating Activities-by strand	One for each strand
Final Exam	Culminating-vectors Culminating-calculus

### Assessment and Evaluation Categories and Weights:

Achievement Chart Categories		Evaluation/Weight of Marks	
Achievement Category	Percentage	Evaluation	Percentage
Knowledge/Understanding	35	Term Evaluation	70
Thinking/Inquiry	15	Final Evaluation • ISP • Exam	10,20
Communication	15		
Application	35		

## **Learning Skills and Work Habits Assessment:**

**The development of learning skills and work habits is an integral part of student learning. These skills are:**

- **Responsibility**
- **Organization**
- **Independent Work**
- **Collaboration**
- **Initiative**
- **Self-Regulation**

Learning skills and work habits influence student achievement and are included as a formal part of the assessment and evaluation process. Learning skills and work habits will be assessed through a variety of teacher strategies. ( e.g. observation, student /teacher conference, self-reflection, checklists, exit cards, etc.) These important learning skills and work habits will be formally reported on the Provincial Report Card according to the following scale: E- Excellent, G-Good, S-Satisfactory, N-Needs Improvement.

## **Academic Dishonesty - Cheating and Plagiarism:**

Learning tasks that students complete as well as the assignments, tests and exams that students submit for evaluation must be their own work. Cheating and plagiarism is a serious offence that will not be condoned. Academic consequences will result.

## **Test Policy:**

According to the Growing Success Document (2010) a student **MUST** fulfill his/her responsibilities and commitments within the learning environment, including completing all types of assessments according to agreed-upon timelines.

It is the math department expectation that all students will write tests on the date set out by the classroom teacher. In the event of an illness, emergency, or other significant situation, an exception can be made, provided sufficient documentation is given to the classroom teacher. Please note that parental approval is not a legitimate reason for missing an evaluation. If an acceptable absence is known prior to the assessment date, alternate arrangements must be made with the classroom teacher in advance.

If this expectation is not met, the evaluation will be completed but may not contribute to the student's course marks.

## **Late and Missed Assignments - Student Roles and Responsibilities**

Students are expected to:

- be responsible for providing evidence of their achievement of the overall expectations within the time frame specified by the teacher, and in a form approved by the teacher;
- understand that there will be consequences for not completing assignments for evaluation and/or for submitting those assignments late;
- use class time productively;
- in extenuating circumstances, request an extension from the teacher before the due date.

Mark deductions for late and missed assignments may apply to major assignments only.

References: ***TVDSB Assessment & Evaluation Policy, September 2011; Growing Success - Assessment and Evaluation, and Reporting in Ontario Schools, 2010.***

***Student Planner and School Web site***