Calculus and Vectors, Grade 12, University Preparation
MCV4U1 Course Overview

Academic Year	2016-2017	Teacher Names	Mrs.N.Kowalewski
Department	Mathematics	Curriculum Chair	Mr. D. Lamontagne

Curriculum Policy Document: Mathematics 2007 - The Ontario Curriculum Grades 11 and 12			
Course Title	Calculus and Vectors	Course Code	MCV4U1
Prerequisite	MHF4U1	Grade and Course Type	12 University
Program Developer	Ministry of Education	Credit Value	1.0
Course Outline Developed	August 2013	Course Outline Revised	Sept 2016

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 threedimensional 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 modelling 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.

Course Content and Overall Expectations

Unit 1 – 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.

Unit 2 – Derivative 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.

Unit 3 – 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.

Class Guidelines and Program Considerations

Student Expectations:
Each student shall:
1. Be present for all lessons and tests (on time).
2. Be prepared with all necessary materials each class. (These include: pencils, coloured pencils, ruler, 3-ring binder, lined paper, graph paper and scientific and/or graphing calculator).
3. Complete all homework and assignments to the best of his/her ability.
4. Contribute to classroom discussions.

Classroom Expectations:
Each student must:
1. Behave appropriately in class and work on task, giving full attention to the topic being studied.
2. Work cooperatively with other students and the teacher.
3. Maintain a positive attitude and display common courtesy to others in the classroom.
4. Treat computers, calculators and other classroom work tools with respect and closely follow teacher directives concerning such items.

Course Evaluation:
1. Homework is generally assigned each class. Homework difficulties will sometimes be discussed in class but it is the student's responsibility to seek extra help when necessary. Peer tutoring (Tues and Wed after school, room 1321), the Ontario Homework Help Online website, and extra help from the teacher are all resources available to help support students. Contact your teacher for more information.
2. Students need to be on time for class. If a student is persistently and consistently late, appropriate consequences will be determined by the teacher. If a student is legitimately late then they must present their teacher with a note explaining the lateness.
3. Student absence has a significant impact on student achievement. It is the student's responsibility to make up missed class work from illness, participation in school extracurricular activities or any other reason, so find a buddy! If a student must be absent, then it is the students' responsibility to complete the work missed and have the work completed upon the student's return. Please advise the teacher in advance if you know that you are going to be away.
4. Students must understand that there will be consequences for not completing assignments for evaluation or for submitting those assignments late. Late marks may be deducted in accordance with the Growing Success document. Failure to submit indicates that curriculum expectations are not being met; a zero may be recorded.
5. Most units/chapters will conclude with a Unit/Chapter Test. Students who are absent for a test have the responsibility of discussing their absence with the teacher. An undocumented absence for a test will result in an automatic mark of zero assigned. If, for a valid medical reason, a student is unable to write a Unit Test, the student must contact the teacher *prior* to the test. A note or phone call from a parent/guardian must confirm the reason for the student's absence.
6. Plagiarism is the act of passing off someone else's work as your own. Misuse of scientific calculators and /or technological devices is considered cheating. Plagiarism or cheating will result in the student receiving a mark of zero on the assigned work.

Learning Strategies:
1. Assessment is an ongoing process that reflects how well a student is achieving the expectations. Based on the School Effectiveness Framework, assessment *as* and *for* learning involves goal setting for students and allows the teacher to gather evidence to determine where students are in their learning.
2. Strategies may include, but are not limited to: oral discussions, co-operative learning activities, differentiated instruction, homework checks, and individual consultations. These strategies are in place to help students clearly understand learning goals and success criteria.
3. Assessment *of* student learning involves assigning a value to judge the quality of student learning, for communication to parents and students. This may take place in the form of, but is not limited to: rich performance tasks, demonstrations, projects, essays, lab reports, problem solving tasks, written assignments, quizzes, tests, and presentations.

Student Evaluation Criteria

Term Work (70% of final total)

Category	Knowledge	Thinking	Communication	Application	
Weighting	**30%**	**15%**	**10%**	**15%**	

Final Culminating Activities (30% of final total)

Final Examination (30%)	

Mark Reporting Periods

	Semester 1	Semester 2
Parent-Teacher Interviews	October 20, 2016	March 30, 2017
Midterm Report Cards	November 11, 2016	April 21, 2017

Resources

Textbook: Calculus & Vectors, Nelson	Replacement Cost: $100.00
Mrs.K's math website	http://www.mrsk.ca
Desmos Graphing Calculator Online	https://www.desmos.com/calculator
MOODLE	http://www.notredamecss.ca/moodle/