Calculus & Vectors
MCV4U1

Course Description:

This course builds on students' previous experience with functions and their developing understanding of rates of change. Students will also 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 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.

Level:	University
Credit Value:	1.0
Pre-requisite:	MCR3U1
Co-requisite:	MHF4U1
Department:	Mathematics
Course Fees:	None

The Advanced Functions Course (MHF4U) must be taken prior to or concurrently with the Calculus and Vectors Course (MCV4U)

Textbooks & Resources:

- Growing Success: Assessment, Evaluation and Reporting in Ontario Schools
- The Ontario Curriculum Document, Grades 11 and 12: Mathematics, 2007 (revised)
- McGraw Hill Calculus & Vectors 12 (Replacement Cost: $87.00)

Course Evaluation: Student Evaluation consists of three components…

1) Learning Skills & Work Habits:

Students are evaluated on 6 Learning Skills & Work Habits. The 6 essential skills are:

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

These six attributes are evaluated on a scale of Excellent (E), Good (G), Satisfactory (S) & Needs Improvement (N) and reported on the report card. They are not included in the course mark, unless specified in the curriculum expectations.

2) Term Mark (Assessment of Learning):

Student performance standards for knowledge and skills are described in the curriculum Achievement Chart. The curriculum is assessed in four categories:

• Knowledge and Understanding	30%
• Thinking and Inquiry	20%
• Communication	20%
• Application	30%

Evaluation of these four categories generates the term mark. The term mark accounts for 70% of the final mark.

It is the student's responsibility to submitting evidence of learning.

3) Final Evaluation (Assessment of Learning):

The final evaluation, administered at or towards the end of the course is based on the evidence shown to the right. The final evaluation accounts for 30% of the final mark.

The final evaluation consists of:

Exam	30 %

Final Mark = 70% Term Mark + 30% Final Evaluation

For a detailed description on Course Evaluation, see "How Did I Get That Mark!" at www.satec.on.ca

Course Conduct Policies: See Student Agenda.

Please retain this page in the front of your notebook for future reference.

Toronto District School Board

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Course Outline:

Unit	Description	Approximate Length	Unit Evaluation
Rates 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.	2 weeks	assignments, tests, quizzes
Derivatives	Graph the derivatives of polynomial 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, rational, and radical functions, and simple combinations of functions; and solve related problems.	2 weeks	assignments, tests, quizzes
Curve Sketching	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.	2 weeks	assignments, tests, quizzes
Derivatives of Sinusoidal Functions	Apply the derivative rules to determine the derivatives of sinusoidal functions and solve related problems.	2 weeks	assignments, tests, quizzes
Exponential and Logarithmic Functions	Apply the derivative rules to determine the derivatives of exponential and logarithmic functions and solve related problems.	2 weeks	assignments, tests, quizzes
Geometric Vectors	Demonstrate an understanding of vectors in two-space and three-space by representing them algebraically and geometrically and by recognizing their applications.	2 weeks	assignments, tests, quizzes
Cartesian Vectors	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.	3 weeks	assignments, tests, quizzes
Lines and Planes	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.	3 weeks	assignments, tests, quizzes

Note: The order of the units of study may change due to student needs and resources available during the course.

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General Information:

Mathematics continually builds on previous lessons. Hence, daily attendance is important. Students are responsible for catching up on missed lessons and work.

It is expected that all students will write tests as a class group. If a student is unable to write the evaluation with the class, then the student must inform the teacher at least two school days in advance of the test so that alternate arrangements can be made.

Students who are absent on the day of the test due to illness or a family emergency must have their parents phone the math office at 416 396-3365 x20245 on the day of the test explaining why they will be absent. (Doctor's notes will be required from students who miss more than one scheduled test.) Alternate arrangements will be made for these students to write the test.

Students missing their tests or assignment deadlines due to unexplained absences will receive a mark of zero.

For more information on the missed test/assignment policies, please see the agenda.