Course Profile

Calculus and Vectors, Grade 12
MCV4U

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 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.

Note: The new Advanced Functions course (MHF4U) must be taken prior to or concurrently with Calculus and Vectors (MCV4U).

Level:	University	**Credit Value:**	1.0	**Program Enhancement Fee:**
Pre-requisite:	MCR3U	**Department:**	Mathematics	None

Textbooks & Resources:

- Growing Success: Assessment, Evaluation and Reporting in Ontario Schools, 2010
- The Ontario Curriculum, Grades 11 & 12: <MATHEMATICS>, 2007 (Revised)
- HARCOURT MATHEMATICS 12, Advanced Functions and Introductory Calculus + Geometry and Discrete Mathematics (Replacement Costs:$100.00 + $100.00)

Course Evaluation: Student Evaluation consists of three components...

1) Learning Skills & Work Habits:

Students are evaluated on 6 Learning Skills & Work Habits. They 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 — 20%
- Thinking and Inquiry — 15%
- Communication — 10%
- Application — 25%

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

It is the student's responsibility to submit 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 (out of 30%):

Final Exam	30%

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

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

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Course Outline:

Unit	Description	Approximate Length	Major Unit Evaluation
RATE OF CHANGE	1. 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. Draph the derivatives of polynomial, sinusoidal, and exponential functions, and make connections between the numeric, graphical, and algebraic representations of a function and its derivative; 3. 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	30 days	Test
DERIVATIVES AND THEIR APPLICATIONS	1. 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; 2. 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.	25 days	Test
GEOMETRY AND ALGEBRA OF VECTORS	1. Demonstrate an understanding of vectors in two-space and three-space by representing them algebraically and geometrically and by recognizing their applications; 2. 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. 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; 4. Represent lines and planes using scalar, vector, and parametric equations, and solve problems involving distances and intersections.	25 days	Test

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

General Information

Refer to the agenda for Wexford CSA Academic Conduct & Evaluation policies.

How to seek extra help:
1)   Speak to your subject teacher and book a time to meet (Students & Parents).
2)   Speak to a Peer Helper
3)   Use reliable sources on the Internet.
4)   Speak to your Guidance Councellor (Students & Parents).who can guide you to other sources.

Recommended Internet Resources:

www.khanacademy.org
www.resources.elearningontario.ca
www.explorelearning.com
www.math.com