St. Clair Catholic District School Board

Student Information Sheet/ Outline of Course Study

School	Ursuline College Chatham
Department	Mathematics
Course Title	Calculus and Vectors (MCV4U0)
Grade and Level	Grade 12, University Preparation
Credit	One full
Prerequisite	Grade 11 Functions University Preparation
Note:	**The new Advanced Functions Course (MHF4U) must be taken prior to or concurrently with Calculus and Vectors**
Textbook	Calculus & Advanced Functions (McGraw-Hill Ryerson) and other sources
Teacher(s)	Mr. P. Edmondstone
Department Head	Mrs. M. Taylor-Joyes
Ministry Document	Mathematics Grade 11 and 12 (Revised 2007)
Date	September 2009/February 2010

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 derivatives of polynomial , rational, exponential, logarithmic, radical and trigonometric functions; and develop facility in applying these concepts and skills to 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 chose 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-levl calculus, linear algebra, or physics course.

How this course supports the Ontario Catholic Graduate Expectations:

The following expectations from the Ontario Catholic Graduate Expectations will be stressed throughout the course: The graduate is expected to be: - An effective communicator who reads, understands and uses written materials effectively; - A reflective, creative and holistic thinker who thinks reflectively and creatively to evaluate situations and solve problems ;- A self-directed , responsible, lifelong leaner who sets appropriate goals and priorities in school , work and personal life; - A collaborative contributor who works effectively as an independent team member; - A responsible citizen who accepts accountability for one's one actions.

How this course supports the competencies of Choices Into Action:

Career exploration activities through classroom experience (page 19, Choices into Action)

1) Expectations regarding Learning Skills

It is expected that students will demonstrate the following:
(this is not intended to be an exhaustive list)

- Independent learning ability
- Team work ability
- Organizational skills on a daily basis
- Strong work habits during class time
- Completed homework and assignments
- Initiative in all areas of the course

Learning skills will be assessed according to criteria, which have been clearly communicated to students and will be reported separately from student achievement of the curriculum expectations. The student's demonstrated learning skills in each course will be evaluated using the four-point scale, E- Excellent, G- Good, S- Satisfactory, N – Needs Improvement.

2) Overall expectations for student learning

Through this course, the student will be expected to demonstrate knowledge, skills and values related to the following strands:

Unit 1: Rates of Change of Functions • Explore rates of change in context to consolidate their understanding from Advanced Functions • Connect Instantaneous rates of change with the derivative • Connect the characteristics of the instantaneous rate of change with the characteristics of the function	**Unit 2: Derivative Function from First Principles** • Investigate connections graphically and numerically between the graph of a function and its derivative • Determine, using limits, the algebraic representation of derivatives • Determine and apply the power, chain and product rules to rational and radical functions • Develop the derivatives for the exponential, logarithmic and sine and cosine functions • Solve problems involving instantaneous rates of change
Unit3: Graphical Analysis and Derivatives • Examine the relationship between first and second derivatives and the original function • Sketch curves of polynomial or rational functions given information of equations • Apply the properties of derivatives to real-world problems	**Unit 4 : Applications of Derivatives (Optimization)** • Solve rate of change and optimization problems in a wide variety of contexts using properties of derivatives • Collect data and create models and solve problems arising from real-world contexts
Unit 5: Representing Vectors • Introduce vectors in 2-D and 3-D space • Represent vectors geometrically and algebraically • Determine vector operations and properties • Solve problems involving vectors	**Unit 6: Lines and Planes** • Represent equations of lines in two space and three space using a variety of forms • Develop the representations of planes in three space • Investigate the intersections of planes geometrically and algebraically • Solve problems involving planes arising from real-world situations

3) Individual Education Plan

Whenever accommodations are made to address student learning needs, or alternative or modified expectations are identified for a student, these accommodations, modifications, or alternative expectations will be outlined in an IEP and will be communicated to parents.

4) Course breakdown & assessment and evaluation strategies

Unit title/Description	Suggested Timing
Unit 1 Rates of Change	9 periods
Unit 2 Derivative Functions	20 periods
Unit 3 Derivatives and Curves Sketching	9 periods
Unit 4 Applications/Optimization	13 periods
Unit 5 Vector Representation	19 periods
Unit 6 Lines and Planes	12 periods

Summative Performance Tasks	5 periods

5) Teaching/Learning Strategies

Instruction in this course will be evaluated according to the following breakdowns:
Group work, pairs activities, individual work, computers and graphical calculators.

6) Assessment and Evaluation

Student achievement of the learning expectations will be evaluated according to the following breakdowns:

Categories of Knowledge, Skills and Values	Weighting (%) Term Evaluation (100%)	Final Evaluation
Knowledge & Understanding	45	
Thinking, Inquiry, Problem Solving	20	
Communication	15	
Applications	20	
BREAKDOWN OF FINAL MARK	70% of term mark	30%

7) School, department and classroom policies

a) See student handbook for school rules

b) **HOMEWORK** will be assigned almost every day. Depending on the topic, the time required to complete the assignment will vary, but at the grade twelve level the homework should require 45-60 minutes per night. To ensure success, any suggested homework assignments are to be completed for the beginning of the next class. The completion of assignments, neat and orderly notes, and routine correction of problems are essential for success.

c) **REGULAR** and **PROMPT** attendance is required in order to be successful. If a student is absent it is their responsibility to make up for missed work. Notes should be copied from a reliable student, and homework exercises attempted. Extra help is available and can be arranged with the teacher.

d) **TESTS AND ASSIGNMENTS MISSED OR LATE**. The reasons for the absence or late will be taken into account, but a mark of zero can be assigned to the student for circumstances that seem to warrant such a mark. Assignments not submitted within the stated time frame may be cause for the student's overall grade to fall to a lower level.

Every effort should be made to write the test at the scheduled time period. Below are some test and assignment procedures:

i) If you know that you will be away for a scheduled test and/or assignment due date for some legitimate reason, inform your teacher and make alternate arrangements before you leave.

ii) If a test is missed due to a legitimate or sudden absence, it will be written at a time determined by the teacher after consultation with the student. The usual date for writing the test would be the first day back after the absence. A note signed by the parent/guardian must support such legitimate absences.

iii) As a general rule, there will be no make-up tests or assignments. If special circumstances warrant, make-up tests or assignments may be provided to students who have demonstrated that earlier difficulties have been corrected.

To the student, Parent(s) or Guardian(s):

We have read and understand this Students Information Sheet/Outline of Course of Study

Course Code: MCV 4U0 (Grade 12 Calculus and Vectors)

Student: _____ Date: _____

Parent/Guardian: _____ Date: _____