St. Paul Catholic High School
Calculus and Vectors
MCV 4U
2014-2015

Teacher Mrs. C. Bartlett, Mrs. S. McDougall

Prerequisite Course MHF 4U

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.

Overall Course Expectations or Topics

In this course, students will:

- ✓ Review and further explore the properties of instantaneous and average rates of change
- ✓ Investigate and interpret the graphical definition of derivatives
- ✓ Apply the derivative to make detailed sketches of the graphs of various functions
- ✓ Solve a variety of problems using the techniques of differential calculus
- ✓ Investigate vectors in two-space and three-space
- ✓ Investigate lines and planes in two-space and three-space

Course Resources

Text: *Calculus and Vectors*, Kirkpatrick, Crippin et al; Nelson, 2008

On-Line Textbook: http://www.nelson.com/secondarymath/calculusandvectors/sb/

Login: vectors Password: calc12

Technology: Graphing Calculator, Desmos. Geogebra

Website: Mrs. Bartlett: http://bartlettstp.weebly.com/mcv4u.html, Mrs. McDougall: http://mcdougallstp.weebly.com/mcv4u.html

Required Materials to meet with success in this course

Paper, graph paper, pencil, pen, ruler calculator (graphing capabilities permitted)

Core Content and Sequence	# Classes
PART I: RATES OF CHANGE AND THE DERIVATIVE	**27**
1. Introduction to Calculus	
2. The Derivative	
3. Derivatives of Exponential and Trigonometric Functions	
PART II: DERIVATIVES AND THEIR APPLICATIONS	**21**
4. Using Derivatives to Sketch Curves	
5. Using Derivatives to Solve Problems	
PART III: GEOMETRY AND ALGEBRA OF VECTORS	**30**
6. Representing Vectors	
7. Representing Lines and Planes	

Make-Up Test Opportunities – April 10, 2015 and June 12, 2015

Any student who has an approved absence on the day of a test will have an opportunity to write a multiple choice Make-Up test for that unit during one of two "Make-Up" days:

Prior to Midterm Reporting: Friday April 10, 2015
Prior to Final Exams: Friday June 12, 2015

Students who have been present for all tests may choose to write a Make-Up test for one unit in order to replace the lowest mark.

Report Card Grade

The Report Card grade is based on evidence collected through observations, conversations, and student products (tests/exams, assignments for evaluation).
Some evidence will carry greater weight than other evidence. Determining a report card grade will involve professional judgement and interpretation of evidence that reflects the student's most consistent level of achievement, with special consideration given to more recent evidence.

Mark Breakdown

Term Work - 70 %
Term work is based on a variety of performance tasks over the course of the term that demonstrates: knowledge, thinking, communication, and application.
Summative - 30% (Final exam will be written during exam week)
The summative evaluation must take place completely in class and will take the form of a final exam that demonstrates the comprehensive achievement of the overall course expectations and the four areas of the achievement chart (knowledge, thinking, communication, and application).

✂ **(Please have this page signed)**

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Student and Parent/Guardian Acknowledgement

We have read the above course outline and are aware of the student responsibilities to attend class on a regular basis and to provide evidence of learning within the established timelines.

Student's Name (print): _____

Student's Signature _____

Parent/Guardian Name (print): _____

Parent/Guardian Signature: _____

Parent or Student Comments or Expectations for this course (optional):

**** This section will be provided to staff for the first day of school. The homeroom teacher will hand out this information - it applies to all courses. The Board will provide sufficient copies for all students in the school (teachers will not need to make copies) ****

Standards for all Courses

Catholic Graduate Expectations

Our goal for all students is that they experience an education based on the Catholic Graduate Expectations to become:

- A Discerning Believer Formed in the Catholic Faith Community
- An Effective Communicator
- A Reflective and Creative Thinker
- A Self-Directed, Responsible, Life-Long Learner
- A Collaborative Contributor
- A Caring Family Member
- A Responsible Citizen

http://www.eoccc.org/expectations.html

Assessment, Evaluation, and Reporting

The primary purpose of assessment and evaluation is to improve student learning. The development of learning skills and work habits is a key indicator of future success.

The following learning skills and works habits will be developed, assessed, and reported during this course:

Responsibility	fulfills responsibilities and commitments
Organization	manages time to complete tasks and achieve goals
Independent work	uses class time appropriately to complete tasks
Collaboration	works with others and promotes critical thinking
Initiative	demonstrates curiosity and an interest in learning
Self-Regulation	sets goals and monitors progress towards achievement

The Achievement Chart

Students will be assessed and evaluated in a balanced manner on the following four areas:

1. Knowledge and Understanding – specific content and understanding of its meaning
2. Thinking – the use of critical and creative thinking skills and/or processes
3. Communication – the ability to convey meaning through a variety of forms
4. Application – the use of knowledge and skills to make connections

Students may be given multiple opportunities using a variety of assessment tasks to demonstrate their achievement of the curriculum expectations in this course.

Levels of Achievement

The achievement chart identifies four levels of achievement:
Level 1 achievement falls below the provincial standard
Level 2 achievement approaches the provincial standard
Level 3 achievement is at the provincial standard
Level 4 achievement surpasses the provincial standard

Group Work

Collaboration is an important 21st Century skill. Students will take part in a variety of group work activities throughout the year. Student work within group work will be evaluated independently and each student will be assigned an individual mark.

Homework

Homework that is assigned is intended to assist the student in consolidating their skills and preparing for classroom instruction. Homework will be reported as part of the learning skills on the report card.

Attendance

In order to fully participate in this course, students must have regular attendance. Excessive absences and lates have a negative impact on student learning. Attendance will be reported as part of the learning skills on the report card.

Evidence for Evaluation

Evidence of student achievement for evaluation is collected over time from three different sources –observations, conversations, and student products. "Student products" may be in the form of tests or exams and/or assignments for evaluation.

Students are responsible for providing evidence of their learning within given timelines. Students will be assigned consequences for cheating, plagiarism, and not completing work. A number of strategies will be attempted to ensure that all work is submitted on time. Loss of school privileges may be a consequence for not meeting academic responsibilities. Deducting marks for late assignments may occur if the student does not submit materials despite being provided alternative opportunities for work completion.

Awarding of Course Credit

Students who earn a mark of 50% or greater will earn one credit for the course with the following exceptions:

Students who do not provide sufficient evidence of achievement of course expectations will not earn their credit regardless of their mark.

Students who do not complete their summative evaluation (exam and/or end of year performance task) will not earn their credit regardless of their mark.