



CARDINAL LEGER CATHOLIC SECONDARY SCHOOL

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 905-453-2232

We believe that each one, created in the image and likeness of God, is called by name into the Dufferin-Peel community to realize the Ontario Catholic School Graduate Expectations to the fullest extent possible as we all journey from the early years to vocation.

COURSE OUTLINE

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| Department: | Mathematics |
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| Course: | Grade 12 Calculus & Vectors |
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| Course Code: | MCV4U |
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| Common Course Calendar | <p>Course Description:</p> <p>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.</p> <p>This course will help students address the Ontario Catholic School Graduate Expectation that they adopt a holistic approach to life by integrating learning from various subject areas and experience.</p> |
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| Ministry/ICE Curriculum Documents | Strand/Unit Title | Corresponding Catholic Graduate Expectation Indicators for each Strand/Unit |
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| | <p>DERIVATIVES AND THEIR APPLICATIONS</p> <p>By the end of this course, students will:</p> <ol style="list-style-type: none"> 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 | <p>- Thinks critically about the meaning and purpose of work.</p> |

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| | <p>RATES OF CHANGE By the end of this course, students will:</p> <ol style="list-style-type: none"> 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. 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; 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 | <p>- Integrates learning from various subject areas and experiences</p> |
| | <p>GEOMETRY AND ALGEBRA OF VECTORS By the end of this course, students will:</p> <ol style="list-style-type: none"> 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 | <p>- Applies effective communication, decision-making, problem-solving, time and resource management skills.</p> <p>- thinks reflectively and creatively to evaluate situations and solve problems</p> |

Assessment and Evaluation:

| Category Weightings | Weight % |
|-------------------------|----------|
| Knowledge/Understanding | 30 |
| Thinking | 20 |
| Application | 30 |
| Communication | 20 |

| Assessments | % of Grade |
|-------------|------------|
| Term Work | 70% |
| Final Exam | 30% |

Learning Skills and Work Habits

E= Excellent G=Good S=Satisfactory N= Needs Improvement

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| Responsibility | <ul style="list-style-type: none"> • Fulfills responsibility and commitments. • Takes responsibility for and manages own behavior. |
| Organization | <ul style="list-style-type: none"> • Devises and follows a plan and process for completing tasks. • Establishes priorities and manages time |
| Independent Work | <ul style="list-style-type: none"> • Independently monitors, assesses, and revises plans to complete tasks and meet goals. • Uses class time to complete tasks. |
| Collaboration | <ul style="list-style-type: none"> • Accepts various roles and an equitable share of work in a group. • Builds healthy peer-to-peer relationships. |
| Initiative | <ul style="list-style-type: none"> • Looks for and acts on new ideas and opportunities. • Approaches new tasks with a positive attitude. |
| Self-Regulation | <ul style="list-style-type: none"> • Sets own goals and monitors progress towards achieving them. • Seeks clarification or assistance when needed. |