

NOUVEL CATHOLIC CENTRAL HIGH SCHOOL

AP CALCULUS

COURSE SYLLABUS

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| COURSE DESCRIPTION: | <p>AP Calculus consists of a full high school academic year of work that is comparable to a Calculus I course at the collegiate level. The AP Calculus course is an extremely rigorous class that calls on the skills and information acquired from previous math courses to perform limits, derivatives, anti-derivatives, integrals and differentials with major emphasis on applications. The course emphasizes a multi-representational approach to calculus, with concepts, results, and problems being expressed geometrically, numerically, analytically, and verbally. It is expected that students who take AP Calculus will seek college credit through the AP Calculus exam given by the College Board each spring.</p> <p>Grades offered: 11 and 12</p> <p>Prerequisite: "B" average in Honors Pre-Calculus.</p> |
| MAJOR COURSE GOALS: | <p>The goal is to provide students with the critical thinking skills and mathematical know-how needed to succeed in college or any endeavor. The goal includes graphing technology skills. Student's goal is to develop an in depth understanding of calculus that they can apply to college calculus courses and the AP Calculus exam.</p> |
| COURSE ASSESSMENT PLAN: | <p>QUIZZES/TESTS: The learner should be able to perform well on quizzes and tests, if the learner pays attention in class, studies notes regularly and completes homework independently.</p> <ul style="list-style-type: none">• Quizzes will be given almost every week.• There will be a test after completion of each chapter.• If the student is absent (excused) on the day a test is given, he/she will make it up upon his/her return to class.• Assignments including tests/quizzes that are missed due to unexcused absence(s) can't be made up.• Late assignments will be accepted for 75% of earned credit by the date of the test for the chapter and will not be accepted after that day. It is the student's responsibility to make up his/her missing work within this time frame. <p>EXTRA CREDIT: I do not offer extra credit. Your score in this course is reflective of your proficiency of the material. Therefore, your grade is based on your knowledge and understanding of the course objectives and concepts.</p> |

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| <p>RECOMMENDED SUPPLIES AND MATERIALS:</p> | <p>The learner is required to bring the following to class everyday:</p> <ul style="list-style-type: none"> • A folder or three-ring binder to keep and organize lecture notes, homework/activities, graded tests/quizzes and etc. • Loose leaf and graph paper • Pencils preferred, no pens please • Straight edge • Graphing or scientific calculator (TI-83, TI-84 or TI-34) <p>Textbook: Finney, Demana, Waits and Kennedy. <i>Calculus—Graphical, Numerical, Algebraic</i>. Third edition. Pearson, Prentice Hall, 2007.</p> |
| <p>EXTRA HELP:</p> | <p>Additional classroom teacher assistance is provided to the student before and after school. Never be afraid to ask for help. Remember that your success depends on you and your effort.</p> |
| <p>INSTRUCTIONAL PHILOSOPHY:</p> | <p>This course utilizes lecture, discussion, demonstration, and student centered teaching styles. In doing so, the purpose is to maximize learning by branching across many learning and teaching styles and therefore helping all students gain a deeper understanding of mathematics.</p> <p>Learning is a two sided relationship where both the student and the teacher need to put forth their best effort. It is the student's responsibility to put forth that effort in order to get the most that the course, stay engaged, and gain the knowledge and understanding of this math course. Each student should make every effort to do their best in and out of class. By doing their best, students can achieve higher standards, influencing their entire life. By forming these skills, students will exponentially increase their overall academic abilities.</p> |
| <p>INSTRUCTIONAL ACTIVITIES AND COURSE PROJECTS:</p> | <p>There will be a combination of individual, group and partner work in this class to challenge all students towards their absolute potential. Within the presentation of a lesson, the learner will have time each class time to try out assigned problems and ask questions if necessary. Students who use their time wisely will be able to finish most of the assigned problems in class. All assigned problems for a particular lesson are due the day after that lesson is presented.</p> <p>The learner will also participate in projects and class investigations in order to achieve the most out of his/her learning experience.</p> |

Unit 1 – Review of Pre-Calculus for Calculus (1-2 weeks)

- Lines
- Functions and Graphs
- Exponential Functions
- Parametric Functions
- Functions and Logarithms
- Trigonometric Functions

Unit 2 – Limits and Continuity Lines (3-4 weeks)

- Rates of Change and Limits
- Limits involving infinity
- Continuity
- Rates of Change and Tangent Lines

Unit 3 – Derivatives (5-6 weeks)

- Derivative of a function
- Differentiability
- Rules for Differentiation
- Velocity and other Rates of Change
- Chain Rule
- Implicit Differentiation
- Derivatives of Inverse Trig Functions
- Derivatives of Exponential and Logarithmic Functions

Unit 4 – Application of Derivatives (4-5 weeks)

- Extreme Values of Functions
- Mean Value Theorem
- Connecting f' and f'' with the Graph of f
- Modeling and Optimization
- Linearization and Newton's Method
- Related Rates

Unit 5 – The Definite Integral (3-4 weeks)

- Estimating the Finite Sums
- Definite Integrals
- Definite Integrals and Antiderivatives
- Fundamental Theorem of Calculus

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| | <p>Unit 6 – Differential Equations and Mathematical Modeling (3-4 weeks)</p> <ul style="list-style-type: none"> • Slope Fields and Euler’s Method • Antidifferentiation by Substitution • Antidifferentiation by Parts • Exponential Growth and Decay • Logistic Growth <p>Unit 7 – Applications of Definite Integrals (3-4 weeks)</p> <ul style="list-style-type: none"> • Integral As Net Change • Areas in the Plane • Volumes <p>Review of Concepts and Preparation for AP (2-3 weeks)</p> <ul style="list-style-type: none"> • Multiple Choice from Past Exams • Free-Response from Past Exams • Projects based on application of concepts learned (if time) <p>After the AP Exam the class will be doing projects to apply Calculus concepts to different aspects of the real world from business to industry.</p> |
| <p>CLASSROOM EXPECTATIONS:</p> | <p>The learner is expected to uphold the values and policies of the Nouvel Catholic Community. The Parent/Student Handbook policies are set forth to create a safe learning environment that will enable you to gain a mastery of academia and become a leader in the world. The policy will be enforced.</p> <ul style="list-style-type: none"> • Come prepared to class every day and ready to learn. • Be in his/her assigned seat with the required materials <u>before the bell rings</u>, otherwise, he/she is marked tardy. • Contribute positively to the learning environment in the classroom. • Show respect toward self, other students, teacher and all personal/school property by words and actions. • Be in compliance with the dress code at all times. <p>ATTENDANCE: Attendance is crucial. Students are expected to attend every scheduled class. It is the learner’s responsibility to keep informed of any announcements, syllabus adjustments, or policy changes made during scheduled classes.</p> |

HOMEWORK POLICY AND GRADING SCALE:

The goal of assignments is to help you gain mastery of concepts covered in this course. Your desire should be to work very hard towards the development of your mathematics skills. Homework will be assigned, correct, and collected most days. All assignments must show work and assignments without work will not be accepted. You earn points on homework based on effort and completion (100% - 5 pts., 95% - 4 pts., 90% - 3 pts., 85% - 2 pts., 80% - 1 pt., assignments less than 80% complete will not be accepted. Late assignments will be accepted for 75% of earned credit by the day of the test for the chapter and will not be accepted after that day. Students should expect to have at least one quiz or test a week over the concepts covered.

Tests, Quizzes, & Projects: 85% of overall grade
Homework: 15% of overall grade



CONTACT INFORMATION:

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