Department: Mathematics
Course Name: Applied Calculus

Course Description:
Calculus is a one-year course for students who have completed precalculus preparation. Topics covered include a unified analysis of functions, limits, differentiation, and integration, with particular attention to the need of calculus techniques in problem solving. An emphasis on critical thinking, complex communication, collaboration, creativity, and risk-taking while promoting a global perspective will prepare students for rigorous college work. This course is an introduction to a college calculus course.

Content:
Functions
Limits and continuity
Differentiation
Applications of the derivative
Exponential and logarithmic functions
Integration
Applications of the definite integral
Principles of integral evaluation
Review of essential trigonometric functions and inverses
Derivatives and integrals of trigonometric functions
Differential Equations

Skills:
Define and develop the concept of a "function"
Generate graphs of equations and functions by hand and on the calculator
Combine functions
Find inverses of algebraic, trigonometric, and exponential functions
Mathematical modeling
Algebraic and graphic techniques for finding limits
Finding limits at infinity
Define and determine continuity of relations
Find tangent lines to curves
Analyze rectilinear motion
Find general rates of change
Define and calculate the derivative in terms of limits
Calculate derivatives using techniques of differentiation
Use derivative to solve related rates problems
Determine the exact shape of a graph and the precise locations of its key features
Find high and low points on the graph of a function
Use derivatives to analyze the graphs of polynomials
Use calculus to graph rational functions and other kind of curves
Finding absolute extrema
Solve optimization problems
Differentiate exponential and logarithmic functions
Differentiate functions that cannot be written in the form $y = f(x)$
Differentiate the inverse of a one-to-one function

Differentiate inverse trigonometric functions
Calculate areas of plane regions with curvilinear boundaries using antidifferentiation
Develop and use techniques of integration
Calculate definite integrals
Use integration to analyze rectilinear motion
Find area between two curves
Find integrals that involve trigonometric functions

Text and Materials:
Calculus, An Applied Approach by Ron Larson

Methods of Instruction:
Interactive discussions and questioning
Application activities
Guided individual practice
Cooperative learning
Graphing calculator demonstrations and exploration
Online videos
Desmos activities

Methods of Evaluation:
Homework
Quizzes on partial units of study
Tests on complete units of study
Cumulative semester and final exam