

Name of School:

Name of Course: **AP Calculus AB**

Instructor Information

Name:

E-mail address:

School phone number:

Web page address:

Best times to be reached:

Course Description

The AP Calculus AB course is designed to provide students with an AP experience equivalent to that of a college course in single variable calculus. This course will develop a student's understanding of the concepts of calculus and provide experience with its methods and applications. The course includes limits, differentiation and integration with problem solving and applications. Problems will be expressed graphically, numerically, analytically, and verbally. This three term course is intended for students who have a thorough knowledge of college preparatory mathematics including algebra, geometry, and pre-calculus.

District Standards and Power Benchmarks

Algebra Standard: Understand and apply concepts of algebra and functions

- 1: Understand patterns, relations and functions
 - a. Analyzes functions of one variable by investigating rates of change
 - b. Analyzes functions of one variable by investigating limits
 - c. Analyzes derivative functions
 - d. Applies derivative functions
 - e. Analyzes functions of one variable by investigating integrals as accumulated change
 - f. Applies definite integrals
- 2: Represent and analyze mathematical situations and structures using algebraic symbols
 - a. Uses symbolic algebra to represent and calculate derivatives
 - b. Uses symbolic algebra to represent and derive indefinite integrals (anti-derivatives)
 - c. Uses symbolic algebra to represent and derive definite integrals

Communication Standard: Communicates and reasons mathematically

- 1: Expresses ideas using mathematical terms and representations
 - a. Uses calculus terms to describe various problems and situations
- 2: Uses technology to enhance mathematical learning
 - a. Uses the graphing calculator to explore functions including limits
 - b. Uses the graphing calculator for calculus computation

Course Information

Course length: Three terms

Credits: 0.5 per term

Pre-requisite: Pre-Calculus

Course Outline/Calendar

Term 1: (39 days)

- Prerequisites for Calculus (10 days)
 - Functions and Graphs
 - Exponential Functions
 - Parametric Equations
 - Functions and Logarithms
 - Trigonometric Functions
- Limits and Continuity (9 days)
 - Rates of Change and Limits
 - Limits Involving Infinity
 - Continuity
 - Rates of Change and Tangent Lines
- Derivatives (18 days)
 - Derivative of a Function
 - Differentiability
 - Rules for Differentiation
 - Velocity and Other Rates of Change
 - Derivative of Trigonometric Functions
 - Chain Rule
 - Implicit Differentiation
 - Derivatives of Inverse Trigonometric Functions
 - Derivatives of Exponential and Logarithmic Functions
- AP Exam Review (optional)
- Final Exam Review (Optional)
- Final Exam (2 days)

Term 2: (39 days)

- Applications of Derivatives (18 days)
 - Extreme Values of Functions
 - Mean Value Theorem
 - Connecting f' and f'' with the Graph of f
 - Modeling an Optimization
 - Linearization and Newton's Method
 - Related Rates
- AP Exam Review (optional)
- The Definite Integral (18 days)
 - Estimating with Finite Sums
 - Definite Integrals
 - Definite Integrals and Antiderivatives
 - Fundamental Theorem of Calculus
 - Trapezoidal Rule
- AP Exam Review (optional)
- Final Review (1 day)
- Final Exam (2 day)

Course Outline/Calendar (cont)

Term 3: (39 days)

- Differential Equation and Mathematical Modeling (14 days)
 - Slope Fields and Euler's Method
 - Antidifferentiation by Substitution
 - Antidifferentiation by Parts
 - Exponential Growth and Decay
 - Logistic Growth
- Applications of Definite Integrals (16 days)
 - Integral as Net Change
 - Areas in the Plane
 - Volumes
 - Lengths of Curves
 - Applications from Science and Statistics
- Sequences, L'Hospital's Rule, and Improper Integrals (4 days)
 - L'Hospital's Rule
 - Relative Rates of Growth
- AP Exam Review and Final Review (3 days)
- Final Exam (2 days)

Text/Other Required Materials/Resources

Title: *Calculus: Graphical, Numerical, Algebraic*

Author: Finney, Demana, Waits, Kennedy

Publisher: Pearson Prentice Hall (2007)

ISBN: 0-1320-140-84

All students have access to a TI-83 or TI-84 graphing calculator.

Instructional Procedures & Support

Students are expected to bring all supplies to class every day including the textbook, a notebook, pencil and graphing calculator. Students are expected to participate in class discussions and in small group discussions. Written assignments will be given daily and should be completed before the next class period. Completion of assignments, reading the textbook, good attendance and punctuality are essential for success in this course.

Classroom Management Procedures

Students are expected to be in class and on time.

Assessment Plan

Concept Checks/Assignments	10%
Quizzes	20%
Tests	50%
Final Exam	20% Notes may not be used on the final.

Grading System

Grades will be determined by the DCSD Grading Scale.

100-90	A
89-80	B
79-70	C
69-60	D
59-0	F