

## *AP AB Calculus*

**Instructor: Kathryn K. Smith**

**Email: [katesam327@aol.com](mailto:katesam327@aol.com) , [kksmith@philasd.org](mailto:kksmith@philasd.org)**

**Telephone: 215 400 7580 ext. 2180**

**Text: AP Calculus, 5<sup>th</sup> edition**

**Authors: Finney, Demana, Waits, Kennedy, Bresoud**

### **Prerequisites:**

This course will build on the foundation established with the prior study of functions, the properties of functions, the algebra of functions, and the graphs of functions. These functions include linear, polynomial, rational, exponential, logarithmic, logistic, trigonometric, inverse trigonometric, and piecewise-defined functions. Students should know the language of functions (domain, range, periodicity, odd and even, zeros, intercepts....) and know the values of the special trigonometric functions at the numbers 0,  $\pi/6$ ,  $\pi/4$ ,  $\pi/3$ ,  $\pi/2$ , and their multiples.

### **Course Description:**

The primary purpose of this course is to develop the students' ability to understand the concepts of calculus and its methods and applications. This course represents a multi-representational approach to calculus with concepts, results, and problems being expressed graphically, numerically, analytically, and verbally.

### **Evaluation:**

40% tests

30% quizzes and special projects

20% class work: projects, group problem sets, presentations

10% homework

### **Technology:**

Students are required to have graphing calculators

### **Expectations:**

Successful mastery of the AP calculus curriculum will transpire only through active participation in class, consistent and persistent efforts to complete homework and project assignments, and thorough preparation for exams so that retention of material including relevant formulas, relevant mathematical terms, and techniques occurs. Students must be both prompt and regular with respect to attendance, and when absent, take responsibility to get relevant notes and assignments, and make arrangements to take exams.

### **Tutoring:**

Extra help is available on a weekly basis by appointment. Morning and afternoon hours are available.

### **Code of Conduct and Academic Integrity:**

Students are expected to abide by the Philadelphia School District's and J.R. Masterman's Codes of Conduct with respect to cheating, plagiarizing, use of electronic devices, and classroom behavior.

### **Late Policy:**

#### **Homework:**

Homework is due on the following day. You may receive half credit for homework that is one day late (assuming you were not absent on due date). After one day, homework is not accepted for credit unless there are compelling reasons for an extension (i.e. extended illness).

#### **Projects and Special Assignments:**

There is a 10% penalty for each day a project or special assignment is late. After 5 days, the assignment will receive a zero (unless there are compelling reasons for an extension).

#### **Tests:**

Students who are absent on the day of the test must make the test up the following day. Failure to do so will result in a 10% penalty. If a student is absent for several days, leading up to and including the test day, then the student is required to meet with me to arrange a suitable time to take the exam.

### **Syllabus:**

#### **1<sup>st</sup> Quarter:**

Chapters 1-3.4

#### **3<sup>rd</sup> Quarter**

Chapters 6, 7.1,7.2,7.4

#### **2<sup>nd</sup> Quarter**

Chapters 3.5-5.6

Midterm Exam- mid January

#### **4<sup>th</sup> Quarter**

Chapters 8.1-8.3, 9.2; review

AP Exam- date to be announced

### **Course Topical and Chapter Outline**

#### **Chapter 1 – Prerequisites**

Summer review

#### **Chapter 2 – Limits and Continuity**

- 2-1 Rates of Change and Limits (2)
- 2-2 Limits Involving Infinity (2)
- 2-3 Continuity (2)
- 2-4 Rates of Change and Tangent Lines (2)

#### **Chapter 3 – Derivatives**

- 3-1 Derivative of a Function (3)
- 3-2 Differentiability (3)
- 3-3 Rules for Differentiation (4)
- 3-4 Velocity and Other Rates of Change (4)
- 3-5 Derivatives of Trigonometric Functions (3)

#### **Chapter 4 – More Derivatives**

- 4-1 Chain Rule (3)
- 4-2 Implicit Differentiation (3)
- 4-3 Derivatives of Inverse Trigonometric functions (2)
- 4-4 Derivatives of Exponential and Logarithmic functions (3)

#### **Chapter 5 – Applications of Derivatives**

- 5-1 Extreme Values of Functions (5)
- 5-2 Mean Value Theorem (2)
- 5-3 Connecting  $f'$  and  $f''$  with the Graph of  $f$  (4)
- 5-4 Modeling and Optimization (5)
- 5-5 Linearization, Sensitivity, and Differentials (3)
- 5-6 Related Rates (4)

#### **Chapter 6 – The Definite Integral**

- 6-1 Estimating with Finite Sums (3)
- 6-2 Definite Integrals (4)
- 6-3 Definite Integrals and Antiderivatives (8)
- 6.4 Fundamental Theorem of Calculus (5)
- 6.5 Trapezoidal Rule (3)

#### **Chapter 7 – Differential Equations and Mathematical Modeling**

- 7-1 Slope Fields and Euler's Method (5)
- 7-2 Antidifferentiation by Substitution (5)
- 7-4 Exponential Growth and Decay (4)

#### **Chapter 8 – Applications of Definite Integrals**

- 8.1 Accumulation and Net Change (5)
- 8.2 Areas in Planes (4)
- 8.3 Volumes (5)
- 8.5 Applications from Science and Statistics (5)

#### **Chapter 9- L'Hospital's Rule**

- L' Hospital's Rule (2)

AP Exam Review 15 days, as time permits

**Juniors: In lieu of a final exam, all juniors must complete a final calculus project that explores either an extended application of calculus or new material not covered in the AB curriculum.**