**AP Calculus AB Syllabus**

AP Calculus is a higher math class that provides you with a deeper understanding of various math concepts.

With the right score on your AP exam you can get college credit . Check the accreditation policy for the college you want to attend.

**Course Goals :**

After successfully completing the Course :

\* Students should understand the meaning of the derivative in terms of rate of change

and local linear approximations.

• Students should be able to work with functions represented graphically, numerically,

analytically, or verbally, and should understand the connections among these representations.

• Students should understand the meaning of the definite integral both as a limit of

Riemann sums and as a net accumulation of a rate of change, and understand the relationship

between the derivative and integral.

• Students should be able to model problem situations with functions, differential equations,

or integrals, and communicate both orally and in written form.

• Students should be able to represent differential equations with slope fields, solve

separable differential equations analytically, and solve differential equations using

numerical techniques such as Euler’s method.

**Textbook :**

Finney, Demana, Waits and Kennedy. Calculus - Graphical, Numerical, Algebraic. Third Edition. Pearson, Prentice Hall, 2007

**Technology Use :**

We will use the Texas Instrument TI-84 graphing calculator to explore functions and solve problems. Asymptotic behavior, limits and exploring differentiability are some of the topics where the graphing calculator will be utilized to solve problems or verify a solutions.

**Course Outline :**

*Unit : Limits and Continuity*

1. Rates of Change and Limits

2. Limits involving infinity

3.Continuity

4. Rates of change and tangent lines

*Unit : Derivatives*

1. Derivative of a function

2. Differentiability

3.Rules of differentiation

4.Velocity and other rates of change

5. Derivatives of trigonometric functions

6.Chain rule

7.Implicity differentiation

8. Derivatives of inverse trigonometric functions

9.Derivatives of exponential and logarithmic functions

*Unit : Application of Derivatives*

1. Extreme values of function

2.Mean Value Theorem

3.Modeling and Optimization

4.Linearization and Newton's method

5. Related rates

*Unit : The Definite Integral*

1.Estimating with finite sums

2.Definite integrals

3.Definite integrals and antiderivatives

4.Fundamental theorem of Calculus

5. Trapezoidal rule

*Unit : Differential Equations and Mathematical Modeling*

1.Slope Fields and Euler's Method

2.Antidifferentiation by substitution and by parts

3. Exponential growth and decay

4.Logistic Growth

*Unit : Applications of Definite Integrals*

1.Integral as net change

2.Areas in the plane

3. Volumes

4.Lengths of curves

5.Application from science and statistics

**Teaching Techniques :**

Students will be guided through with " Explorations" to explore and discover mathematical concepts independently or in a group. They are lead by questions that they will discuss amongst the group to arrive at the concept becoming active learners along the way.

As an ongoing preparation for the AP exam students will solve test items from older tests. One of the main goals is to train them on justifying their answers and expressing their arguments in written sentences.

To train them on justifying their answers orally Students are encouraged to come to the board and solve problems and explain it to their classmates. That will train them. They get extra participation grades if they answer questions from their peers on their explanation, which enhances their understanding as well as the class as a whole.