AP CALCULUS AB SYLLABUS

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Textbook : Calculus; Graphical, Numerical, Algebraic 5 th edition; Finney, Demana, Waits, Kennedy.
Required Materials : Graphing Calculator, AP Calculus AB/BC practice test book, Notebook

Welcome to AP Calculus AB. You have chosen a difficult course: good for you! It will get tough, but if you stick it out and work hard then you will not fail. This syllabus is showing you exactly what you are getting yourself into, along with required materials. Below is an outline of the topics we will be studying this year.

1 st Semester

Unit	Chapter and Section Titles	Chapter Overview	Calculator Functions
1	**1 PreRequisites for Calculus** 1.1 Lines 1.2 Functions and Graphs 1.3 Exponential Functions 1.5 Functions and Logarithms 1.6 Trigonometric Functions	In this section we will cover some important prerequisite topics that will frequently come up as we study Calculus. It is by no means an exhaustive list, so we will be brushing up on PreCalculus topics throughout the year.	Order of operations Storing Values Graphing functions Finding Intersections Finding Maxima and Minima Finding Linear, Quadratic, and Exponential Regressions
2	**2 Limits and Continuity** 2.1 Rates of Change and Limits 2.2 Limits Involving Infinity 2.3 Continuity 2.4 Rates of Change and Tangent Lines	In this section we begin the study of the behavior of functions as they approach an x value on a graph. We begin by using a table of values to estimate a limit and gain an instinct for infinitesimal change. We will also study horizontal and vertical asymptotes as limits involving infinity, as well as removable and non-removable discontinuities We then move on to evaluating limits analytically and one sided limits.	Estimating the limit using a graph. Finding a limit using a table by calculating the value of the function within a tenth, a hundredth, and a thousandth of the x value
3	**3 Derivatives** 3.1 Derivative of a Function 3.2 Differentiability 3.3 Rules for Differentiation 3.4 Velocity and Other Rates of Change 3.5 Derivatives of Trigonometric Functions	In this section we introduce the concept of the derivative as the slope of a line tangent to a curve. Beginning with average velocity and average rate of change, we will continue studying the idea of infinitesimal change by introducing the limit definition of the derivative. We will study tangent line problems, position, velocity and acceleration problems, minima and maxima as well as starting our analysis of the slope of a function, determining slope.	Finding average rate of change using a table of values. Approximating a derivative using a table of values Finding a numerical derivative using nDeriv where it is increasing, decreasing, or zero and sketching a graph of the derivative based on this information.

4	**4 More Derivatives** 4.1 Chain Rule 4.2 Implicit Differentiation 4.3 Derivatives of Inverse Trig Functions 4.4 Derivatives of Exponential and logarithmic functions	In this chapter we will continue the analysis we started in unit 3, but we will add more complex differentiation techniques, as well as find the derivative of equations that are not functions. We introduce the derivatives of exponential and logarithmic functions.	Graphing implicitly defined functions Graphing inverse functions

5	**5 Applications of Derivatives** 5.1 Extreme Values of5 Functions 5.2 Mean Value Theorem 5.3 Connecting f′ and f′′ with the graph of f 5.4 Modeling and Optimization 5.5 Linearization and Differentials 5.6 Related Rates	In this chapter we will dive deeply into the analysis of how a function changes. With our recently learned differentiation skills, we will continue the analysis we started in unit 3, and also add in a more thorough analysis of the second derivative and explore the concavity of a function, and how it relates to how a function increases and decreases. We will also study applications of differentiation, namely Optimization and Related Rates. We will also introduce the concept of an antiderivative as an "inverse" of the derivative.	Finding maxima and minima. Using a table of values to connect Mean Value Theorem and Intermediate value theorem Estimating inflection points by graphing f and f′

Semester 2

Unit	Chapter and Section Titles	Chapter Overview	Graphing Calculator Functions
6	**6 The Definite Integral** 6.1 Estimating With Finite Sums 6.2 Definite Integrals 6.3 Definite Integrals and Antiderivatives 6.4 Fundamental Theorem of Calculus 6.5 Trapezoidal Rule	In Unit 6 we will discover the integral as both an area and a summation. We will introduce problems that utilize the integral in both contexts. We cover basic integration techniques such as the power rule and the antiderivatives of trigonometric functions. We continue studying the concept of the antiderivative as an inverse of the derivative through the first and second Fundamental Theorems of Calculus. We will also learn methods of approximating an antiderivative using rectangles and trapezoids.	Summations Doing LRAM, RRAM, MRAM, and Trapezoid rule using a table of values Evaluating definite integrals using fnInt
7	**7 Differential Equations and Mathematical Modeling** 7.1 Slope Fields 7.2 Antidifferentiation by Substitution 7.4 Exponential Growth and	In unit 7 we will continue our analysis of antiderivatives by studying differential equations. We will introduce the indefinite integral as a family of functions, and compare indefinite integrals to definite	Using graphing calculator software to create a slope field Evaluating numerical integrals to check answers for substitution problems

	Decay 7.5 Logistic Growth	integrals. Students will learn more advanced techniques of taking antiderivatives algebraically. We will use slope fields and algebraic antiderivatives to find particular solutions of a differential equation. We will also study exponential growth and decay and logistic growth as differential equations.	Graphing and analyzing exponential, logarithmic, and logistic functions.

8	**8 Applications of Definite Integrals** 8.1 Integral as Net Change 8.2 Areas in the Plane 8.3 Volumes 8.5 Applications from Science and Statistics	This final chapter discusses area between curves. We use both the idea of the integral as area and the integral as a summation to find volume using the disk and shell methods. We also study other applications of antiderivatives in scientific and statistical fields.	Finding intersections of functions to define an area between two curves. Using statistics functions on the calculator to solve real world problems with calculus

Grading Scale

Tests/Quizzes 50%
Participation 30%
Homework 20%

Tests
Tests are 50% because the main aim of this course is to prepare you for the AP Calculus AB exam. Don't be discouraged if you struggle on the tests! They are difficult to reflect the difficulty of the AP exam. You will have opportunities to make up the points you lose on tests, but the better you do on tests, the higher your final grade will be. This category will also include AP Calculus Free Response practice questions that we do individually in class. We will talk through problems in class, and you must be able to both describe both orally and in complete sentences what your answers mean.

Quizzes
Quizzes will be given every 2 or 3 sections to check for understanding. They will be open note quizzes, so make sure you take good notes! Challenge problems and AP Calculus multiple choice practice will be included in this category.

Homework
Homework will be given daily. You will be responsible for taking some of your notes at home, mostly vocabulary. You will also be given practice problems from the sections we went over in class. It is important that you keep up with the homework and the vocabulary. The tests and quizzes are based on the problems you are assigned for homework, and the free response questions will require you to know the vocabulary definitions.

Class Expectations
Be prepared for class every day. Pencil, paper, homework, notes, calculators need to be out and ready when we start class. Mr. Cox will be coming around to check your homework at the beginning of class.
Bell work will be posted every day. You are expected to begin working on this without prompting from Mr. Cox
Please don't ask to leave while I'm teaching. If it's an emergency, just go.
Be respectful of your classmates and the classroom environment
Ask Questions!

Attendance/Tardy Policy
You need to be here every day and on time. There is a lot of stuff to cover and almost every day we will learn something new. I don't expect there to be any problems with this, but if there is I will start making timeliness part of your grade.

Hall Passes
You may leave the class if you have an emergency any time. You will be responsible to sign the hall pass binder by the door.

Makeup Work
If you miss a day, please get the notes from someone. If we had a worksheet, I will file it in the shelf in the back of the classroom, and it is your responsibility to get it. If you are not here to turn in an assignment to the makeup folder and label the paper "Make up" so I know what it is.

Late Work
If you don't have your homework done on time, it will count as up to 70% credit.

Discipline
Just don't misbehave. I don't see this as an issue, but if so I will have to call your parents. Be respectful of the learning environment.

Cheating
Cheating on tests or quizzes will result in a zero. Homework can be worked on in groups, but remember that copying will not help you learn.

Tutoring
I will be available for tutoring please write down the times you wish to attend. Afterwards, I will let you know the updated schedule.

AP Calculus Exam is Thursday, May 5th, 2021

Mr. Cox's Math Syllabus

Your signature below ensures that you have read and understood the course requirements, procedures, and policies:

STUDENT NAME _____ Period _____

STUDENT SIGNATURE_____Date _____

PARENT/GUARDIAN SIGNATURE _____Date _____

PARENT EMAIL _____

PHONE # (_____)_____AP CALCULUS AB SYLLABUS