

# AP Calculus BC

## Course Syllabus 2017/2018

### Course Overview

Our primary textbook is *Calculus: Early Transcendentals Single Variable*, 10<sup>th</sup> edition by Howard Anton, Irl Bivens, and Stephen Davis (John Wiley & Sons, Inc., 2012). We cover all of the topics in the Calculus BC topic outline as it appears in the *AP Calculus BC Course Description*. The two main objectives of the course are that students do well on the AP Exam and that they are prepared to succeed in future math courses. There is a focus on creating a balance of understanding, skills, and the use of technology.

### Course Planner

#### AP Calculus BC

Section	Topics	Timeline
CHAPTER 0	FUNCTIONS	7 DAYS
0.1	Functions	1 day
0.2	New Functions from Old	1 day
Appendix B	Trigonometry Review	1 day
0.3	Families of Functions	1 day
0.4	Inverse Functions	1 day
0.5	Exponential and Logarithmic Functions	1 day
CHAPTER 1	LIMITS AND CONTINUITY	12 DAYS
1.1	Limits (intuitively)	1 day
1.2	Computing Limits	1 day
1.3	Computing Limits: End Behavior	2 days
1.5	Continuity	1 day
1.6	Continuity of Trig & Inverse Functions	3 days
CHAPTER 2	THE DERIVATIVE	17 DAYS
2.1	Tangent Lines, Velocity, and General Rates of Change	1 day
2.2	The Derivative Function	3 days
2.3	Techniques of Differentiation	2 days
2.4	The Product and Quotient Rules	1 day
2.5	Derivatives of Trig Functions	2 days
2.6	The Chain Rule	3 days
CHAPTER 3	TOPICS IN DIFFERENTIATION	15 DAYS
3.1	Implicit Differentiation	2 days
3.2	Derivatives of Logarithmic Functions	2 days
3.3	Derivatives of Exponential and Inverse Trig Functions	2 days
3.4	Related Rates	3 days
3.5	Local Linear Approximation	2 days
3.6	L'Hopital's Rule	1 day



<b>Section</b>	<b>Topics</b>	<b>Timeline</b>
CHAPTER 4	THE DERIVATIVE IN GRAPHING AND APPLICATIONS	17 DAYS
4.1	Analysis of Functions I	2 days
4.2	Analysis of Functions II	4 days
4.3	More on Curve Sketching	2 days
4.4	Absolute Maxima and Minima	1 day
4.5	Applied Max and Min Problems	2 days
4.6	Rectilinear Motion	2 days
4.8	Rolle's Theorem; Mean-Value Theorem	1 day
CHAPTER 5	INTEGRATION	21 DAYS
5.1	The Area Problem	1 day
5.2	The Indefinite Integral	1 day
5.3	Integration by Substitution	2 days
5.4	Sigma Notation; Area as a Limit	2 days
5.5	The Definite Integral	1 day
5.6	The Fundamental Theorem of Calculus	4 days
5.7	Rectilinear Motion and Average Value	2 days
5.8	Average Value	1 day
5.9	Evaluating Definite Integrals by Substitution	2 days
CHAPTER 6	APPLICATIONS OF THE DEFINITE INTEGRAL IN GEOMETRY	7 DAYS
6.1	Area Between Two Curves	1 day
6.2	Volumes by Slicing; Disks and Washers	4 days
6.4	Length of a Plane Curve	1 day
CHAPTER 7	PRINCIPALS OF INTEGRAL EVALUATION	7 DAYS
7.2	Integration by Parts	2 days
7.5	Integration using Partial Fractions	1 day
7.7	Numerical Integration	1 day
7.8	Improper Integrals	1 day
CHAPTER 8	DIFFERENTIAL EQUATIONS	7 DAYS
8.1	Modeling with Differential Equations	1 day
8.2	Separation of Variables	2 days
8.3	Slope Fields; Euler's Method	2 days
CHAPTER 9	INFINITE SERIES	15 DAYS
9.1	Sequences	1.5 days
9.2	Monotone Sequences	1.5 days
9.3	Infinite Series	1 day
9.4	Convergence Tests	1 day
9.5	The Comparison, Ratio, and Root Tests	2 days
9.6	Alternating Series; Conditional Convergence	1 day
9.7	Maclaurin and Taylor Polynomials	2 days
9.8	Maclaurin and Taylor Series; Power Series	2 days
9.10	Differentiating and Integrating Power Series	1 day
CHAPTER 10	PARAMETRICS, POLARS, AND VECTORS	3 DAYS
10.1	Parametric Curves and Vectors	2 days
10.3	Polar Curves	1 day
AP EXAM REVIEW		14 DAYS

## Technology

A TI-83, TI-83 plus, or TI-84 plus graphing calculator is required for this course. Students learn how to use their calculators to solve problems, interpret results, and support conclusions. For example, students use their calculators to evaluate definite integrals, to approximate unfamiliar irrational answers, or to graphically confirm conclusions they reached algebraically.

## Teaching Strategies

I try to establish a classroom atmosphere where the students see me as their coach. We work together towards the common goal of doing well on the AP Exam. I try to help them see deeper mathematical connections by stressing four different approaches to topics - graphical, numerical, analytical, and verbal. I feel that understanding these connections is the key to understanding Calculus. As far as the verbal component is concerned, I often have questions on assignments, tests, and quizzes where students must explain concepts or justify solutions by writing in full sentences. I often have students working together in small groups (especially on large review assignments) where I encourage discussion and explanation of procedures and solutions. I spend a considerable amount of time going over previous AP Exams so students become familiar with the question types and the grading methods.

## Student Evaluation

Quarter grades are computed using homework, quizzes, and tests as individual categories. Each quarter grade represents 40 percent of the semester grade with the final exam representing the remaining 20 percent. Homework is generally graded based on effort with the exception of review assignments where students are strongly encouraged to use one another as resources. Quizzes and tests often have both calculator and non-calculator sections.