Danville Area School District
Course Overview and Scope and Sequence

Course Title: AP Calculus BC
Content Area: Math
Grade Level: 11-12
Date Developed: June 2023

COURSE OVERVIEW:
AP Calculus AB and AP Calculus BC focus on students' understanding of calculus concepts and provide experience with methods and applications. Through the use of big ideas of calculus (e.g., modeling change, approximation and limits, and analysis of functions), each course becomes a cohesive whole, rather than a collection of unrelated topics. Both courses require students to use definitions and theorems to build arguments and justify conclusions. The courses feature a multirepresentational approach to calculus, with concepts, results, and problems expressed graphically, numerically, analytically, and verbally. Exploring connections among these representations builds understanding of how calculus applies limits to develop important ideas, definitions, formulas, and theorems. A sustained emphasis on clear communication of methods, reasoning, justifications, and conclusions is essential. Teachers and students should regularly use technology to reinforce relationships among functions, to confirm written work, to implement experimentation, and to assist in interpreting results.

ANCHOR STANDARDS:
BIG IDEA 1: CHANGE (CHA) Using derivatives to describe rates of change of one variable with respect to another or using definite integrals to describe the net change in one variable over an interval of another allows students to understand change in a variety of contexts. It is critical that students grasp the relationship between integration and differentiation as expressed in the Fundamental Theorem of Calculus—a central idea in AP Calculus. BIG IDEA 2: LIMITS (LIM) Beginning with a discrete model and then considering the consequences of a limiting case allows us to model real-world behavior and to discover and understand important ideas, definitions, formulas, and theorems in calculus: for example, continuity, differentiation, integration, and series bc only. BIG IDEA 3: ANALYSIS OF FUNCTIONS (FUN) Calculus allows us to analyze the behaviors of functions by relating limits to differentiation, integration, and infinite series and relating each of these concepts to the others.

KEY COURSE TEXT AND MATERIALS: College Board; Text; Supplemental Materials Selected by Teacher
KEY ASSESSMENTS: Diagnostic: AP Calculus AB Exam Formative: Progress Checks, Quizzes, Exams Summative: AP Calculus BC Exam

SCOPE AND SEQUENCE					
Unit	PRIORITY STANDARDS	SUPPORTING STANDARDS	ASSESSMENT	MATERIALS	TIMEFRAME
Unit 1: Chapters 2 and 3 - Limited Derivatives			L'Hopital's and Logarithmic Differentiation Quiz	Chapters 1-3 Powerpoint notes Textbook Whiteboards/Chalkboards Calculators Worksheets Assessments	8 Days
Unit 2: Chapters 4 and 5 - Function Analysis and Integration			Graded problems from Chapter 4 Graded Free Response on Function Analysis Chapter 5 Test	Chapters 4 and 5 Powerpoint notes Textbook Whiteboards/Chalkboards Calculators	11 Days

				Worksheets Assessments	
Unit 3: Chapter 6 - Applications of Definite Integral			Chapter 6 Test	Chapter 6 Powerpoint notes Textbook Whiteboards/Chalkboards Calculators Worksheets Assessments	9 Days
Unit 4: Chapter 7 - Integrals Beyond Substitution			Integration by Parts Multiple Choice and Free Response Packet Graded Homework: p 521 #10, 12, 14, 20, 24, 26, 28, 30 Integration by Partial Fractions Worksheet Chapter 7 Test	Chapter 7 Powerpoint notes Textbook Whiteboards/Chalkboards Calculators Worksheets	15 Days
Unit 5: Chapter 8 - Differential Equation			Graded Free Response Questions 1987 BC 1	Chapter 8 Powerpoint notes Textbook	13 Days

			Graded Worksheet of Growth Problems Differential Equations Quiz	Whiteboards/Chalkboards Calculators Worksheets Assessments	
Unit 6: Chapter 9 - Infinite Series			Sequences and Series Quiz Graded Homework: p 637 #26-40 EVEN without a calculator to be graded, #42, 44, and 46 can be completed as bonus Convergence Methods Quiz Graded Free Response Questions (1995 BC 4, 2012 BC 4) Chapter 9 Test	Chapter 9 Powerpoint notes Textbook Whiteboards/Chalkboards Calculators Worksheets Assessments	50 Days
Unit 7: Chapter 10 - Parametric and Polar Curves			Two Free Response Questions on Vectors and Parametric Equations	Chapter 10 Powerpoint notes Textbook Whiteboards/Chalkboards Calculators	22 Days

			Vectors and Parametric Equations Quiz Two Free Response Questions on Polar Curves Polar Curves Quiz Chapter 10 Test	Worksheets Assessments	