



Chapin High School
Math Department
AP Calculus BC
2026-2027 Course Syllabus



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I. Course Catalog Description

The Advanced Placement Calculus BC course consists of a full academic year of work in calculus and related topics. The purpose of this course is to provide a study of differential and integral calculus of one variable. The course content corresponds to the topic outline established by the College Board in the course description book and equates to two semesters of college calculus. Some additional topics are covered such as Integration by Trigonometric Substitution and Volumes by the cylindrical shell method. These additional topics increase the understanding of other topics and arm students with even more approaches to problems. Students are required to take the AP Calculus Examination in May. During the course of the year, students are tested both with and without a calculator in order to prepare them for the format of the exam. The AP Calculus BC exam is **Monday, May 10, 2026 at 8:00 AM**.

II. Course Standards or Objectives

While it is expected that all students be successful on the AP Calculus BC examination, the most important goal of this course is that all students be prepared to be competitive in their first year of college mathematics study and to have the basis for the application of calculus concepts to apply to whatever specialized field the student may pursue in college. Standards may be found by clicking [here](#).

III. Instructional Goals

Students will be actively involved in AP Calculus BC. Lecture, group work, homework, and guided practice will be used regularly. Computers and graphing calculators will be integrated into the curriculum. Students will receive an assignment sheet periodically. The assignment sheet indicates what topics are to be discussed each class period and all homework assignments. It also indicates major test dates. This provides students the opportunity to keep up with their assignments when absent and to work ahead if so desired. In this course, the breadth of the application of concepts and the expected retention of topics is substantial. **It is expected, therefore, that AP Calculus BC students assume a great deal of the responsibility for their learning, actively seeking assistance if they perceive it is needed.**

IV. Course Sequence/Pacing Overview

Chapter 1: Functions and Models (6 days)

- Four Ways to Represent a Function
- Mathematical Models: A Catalog of Essential Functions
- New Functions From Old
- Graphing Calculators and Computers
 - Introduction of limits of graphing calculator, importance of understanding versus pushing buttons, what can the calculator do for you with only a set up given

Chapter 2: Limits and Rates of Change (6 days)

- The Tangent Line and Velocity Problems (begin with simple $s(t) = -16t^2 + v_0t + s_0$ motion problems from Precalculus for an intuitive approach)
- The Limit of a Function
- Calculating Limits Using the Limit Laws
- Continuity
- Tangents, Velocities and Other Rates of Change (develop local linearity concept through zooming in on calculator)

Chapter 3 Part 1: Derivatives (8 days)

- Derivatives (include where f' fails to exist, show numerically, algebraically and graphically)
 - Picture representation of water levels in an aquarium given to students and they are asked to write about what may have been occurring at the time
- The Derivative as a Function (us multiple notations $f', \frac{dy}{dx}, \frac{d}{dx}(f(x))$)
- Differentiation Formulas (product rule, quotient rule, chain rule)
- Derivatives of Trigonometric Functions
- The Chain Rule

Chapter 3 Part 2: Derivatives (8 days)

- Implicit Differentiation
- Higher Order Derivatives
- Related Rates
 - includes a group activity on filling a pool – students given a picture of the cross section of a pool, the rate at which water is flowing into the pool, students then asked to write an equation that represents level of water at any time t and to answer several questions
- Linear Approximations and Differentials

Chapter 4 Part 1: Applications of Differentiation (8 days)

- Maximum and Minimum Values (closed interval method)
- The Mean Value Theorem
- How Derivatives Affect the Shape of a Graph
 - Critical numbers
 - Increasing, decreasing, relative extrema, First derivative test
 - Second derivative test
 - concavity
- Limits at Infinity; Horizontal Asymptotes
- Recovering f from f'
- Summary of Curve Sketching

Chapter 4 Part 2: Applications of Differentiation (6 days)

- Optimization Problems
- Applications to Business and Economics (relate to current economics course to help students better understand marginal revenue and marginal cost).
- Antiderivatives (just simple thinking backwards introduction)

Chapter 5: Integrals (10 days)

- Areas and Distances (RAM and Riemann Sums)
- The Definite Integral (based upon area concept, students able to find value by graphing integrand and finding area based upon simple geometric formulas)
- The Fundamental Theorem of Calculus (develop accumulator function idea first using linear integrand and finding different values using area concept)
- Indefinite Integrals and the Net Change Theorem (integral of a rate = net change introduced)
- The Substitution Rule

Chapter 6: Applications of Integration (9 days)

- Areas Between Curves

- Volumes – Known Cross Sections, Disks and Washers
 - Lab making models from know cross sections
- Volumes by Cylindrical Shells
- Average Value of a Function

Chapter 7: Inverse Functions (10 days)

- Inverse Functions
- The Natural Logarithmic Function
- The Natural Exponential Function
- General Logarithmic and Exponential Functions (bases other than e)
- Inverse Trigonometric Functions

- Indeterminate Forms and L'Hospital's Rule ($\frac{0}{0}, \frac{\infty}{\infty}, \infty - \infty, 1^{\infty}, 0^{\infty}, \infty^0$)

Chapter 8 Part 1: Techniques of Integration (8 days)

- Integration by Parts
- Trigonometric Integrals
- Integration of Rational Functions by Partial Fractions

Chapter 8 Part 2: Techniques of Integration (7 days)

- Strategy for Integration
- Improper Integrals
- Arc Length from 9.1
- Trapezoidal Rule

Chapter 10: Differential Equations (11 days)

- Modeling with Differential Equations
- Direction Fields and Euler's Method (emphasis on NAG approach to differential equations)
- Separable Equations
 - Case of the Cooling Corpse – students given the beginning of a story with mathematical facts and asked to solve the murder using calculus and write a conclusion to the story incorporating and explaining their results
- Exponential Growth and Decay
 - includes lab activity with differential equations and M&Ms
- The Logistics Equation

Chapter 11: Parametric Equations and Polar Coordinates (8 days)

- Curves Defined by Parametric Equations

$$\text{slope} = \frac{dy}{dx} = \frac{\frac{dy}{dt}}{\frac{dx}{dt}}$$

- Calculus with Parametric Equations (, arc length, vertical and horizontal tangents)
- Polar Coordinates

- $\frac{dr}{d\theta}$ meaning versus $\frac{dy}{dx}$
- Finding Areas and Lengths in Polar

Chapter 12 Part 1: Infinite Sequences and Series (11 days)

- Sequences
- Series (begin with geometric and telescoping, n^{th} term test for divergence)
 - Activity graphing sequence of partial sums using TI-89 to develop harmonic series and conclusion that it diverges)
- The Integral Test and Estimates of Sums (introduce p -series with integral test)

- The Comparison Tests (Basic and Limit)
- Alternating Series and alternating series error bound
- Absolute Convergence and the Ratio and Root Tests
- Strategy for Testing Series

Chapter 12 Part 2: Infinite Sequences and Series (9 days)

- Power Series

$$\sin x, \cos x, e^x, \frac{1}{1-x}, \ln(1+x)$$

- Representation of Functions as Power Series (
- Taylor and Maclaurin Series including LaGrange Error Bound
- Manipulation of series, including substitution, addition of series and multiplication of series by a constant and/or variable, differentiation of series, integration of series and forming new series from known series

Vectors (6 days) (supplemented through use of *Calculus: Graphical, Numerical, Algebraic*)

- Vectors in the Plane
- Vector Valued Functions
- Vectors: Velocity and Acceleration

Review for the AP Examination

V. Textbooks and Additional Resources

Textbook: *Calculus for AP: A Complete Course*, James Stewart, Stephen Kokoska, 2019 Cengage Learning

Review Workbook: *Multiple Choice & Free-Response Questions in Preparation for the AP Calculus (BC) Examination*, David Lederman, Lin McMullin, Bob Byrnes, 2016 D&S Marketing Systems, Inc.

Materials: Students will need: pencils, loose leaf notebook paper, one three-ring binder or a folder (student discretion) to keep handouts, and a graphing calculator. **The TI-Nspire CX II CAS is the recommended calculator. Since graphing calculators are required for the AP examination in May and for college calculus it is strongly recommended that students purchase their own calculator.**

VI. Course Grading Policies and Assessments

- Assessments will be designed to determine the depth of the understanding of the standards and to have students perform interpretive work rather than routine manipulations. Student progress in this course will be monitored through written major tests, announced and unannounced quizzes, class discussion and homework proficiency.
- Grades for this course will be figured using a points system. Each assignment will be assigned a total number of points depending on the difficulty and nature of the assignment. The student's grade will be figured by adding up the total number of points earned by the student for that grading period, dividing by the total number of points possible and then multiplying by a hundred to get a percentage. Quizzes may be announced or unannounced. Major tests will be given at the end of each unit of study. Quizzes and tests will be weighted according to the number of problems or degree of difficulty. All tests, quizzes and homework must be completed in pencil.
- Homework will be assigned and checked at the beginning of each class. In order to receive full credit for the assignment ***each problem must be written down and work displayed*** on the student's paper. **No late homework will be accepted.**
- Students who are absent for any reason, excused or unexcused, are reminded that it is their responsibility to make up missed work. Students who know in advance of an impending absence should arrange make-up work prior to the absence. All coursework is expected to be turned in on or before the assigned due date and completed to the best of the student's ability. All late assignments are subject to a 5% deduction per school day. No late work will be accepted after 5 school days.

- E. *In accordance with Board Policy IHCD-R, all students enrolled in Advanced Placement courses must take The College Board administered examination. **Failure to take the exam, including scheduling a makeup exam, will incur a fee of \$99 or more depending on circumstances.***

VII. Grading Procedures

Continuing in the 2026-2027 school year, grades for minor assignments must be posted within 5 school days, and major or extended assignment grades must be posted within 10 school days.

- **Major Grades** - Assignments that students are given 2 or more classes (more than 48 hours) to produce or prepare. The following will be major grades in all content areas:
 - Test
 - Project
 - Cumulative Assignments
 - Summative Assignments
- **Minor Grades** - Assignments that students are given 1 class (48 hours) to produce or on-the-spot work. The following will be minor assignments in all content areas:
 - Homework
 - Quiz
 - Classwork
 - Formative Assessments

VIII. Exam Exemptions -

Seniors can exempt final exams in semester classes and yearlong classes if they meet the following conditions:

1. Grade of 80 or higher in the course.
2. Has not had an In-School Suspension or an Out of School Suspension.

IX. Honor Code

In order to foster an environment of mutual trust and respect, we believe, within the community of School District Five of Lexington and Richland Counties, each individual should accept the personal responsibility to exhibit and promote academic and social integrity. *Students will not cheat or plagiarize.*

School District Five of Lexington and Richland Counties recognizes the potential of Artificial Intelligence (AI) to enhance teaching and learning. We acknowledge the ever-changing nature of AI and understand the need to adapt to new developments. Our commitment is to ensure that any use of AI upholds a humanistic view of teaching as a priority, while implementing technologies in a manner that is equitable, ethical, and beneficial to all of our students and staff. Here is the [District AI Position Statement](#). The district also created [Artificial Intelligence \(AI\) Guidelines for Faculty and Students](#), as well as [Artificial Intelligence \(AI\) Guidelines for Parents and Guardians](#).

X. Suggestions for Success in Course

In this course, the depth of topics, the pace at which the topics are covered, the breadth of application of concepts, and the expected retention of topics are substantial. It is expected, therefore, that AP Calculus BC students assume a great deal of the responsibility for their learning, actively seeking assistance if they perceive it is needed. It is strongly suggested that students regularly spend time daily outside of class studying. This will provide not only an opportunity to do homework assignments, but also time to reflect on the importance of

the topic or skills learned, the application of the concept and the relationship of the topic with other topics they have learned.

XI. Classroom Management Plan

A. Classroom Management Policies:

- **Be on time and be prepared.** Get to class on time, have materials ready, and be in your seat when class begins.
- **Respect the teacher and fellow students.** No student will be allowed to interfere with a fellow student's right to learn.
- **Be actively engaged.** In order to learn, you must participate and listen attentively. Always believe that you can do anything. Never be scared to ask for help. Do all assignments with effort and enthusiasm, and be creative and unique.
- **Use technology for academic purposes.** Chromebooks are instructional tools that should be used to enrich classroom discussion, aid in student academic endeavors, and to teach technological skills that you will need in the workplace. **Cell Phone use will not be tolerated.**

B. Students are expected to follow all rules and guidelines listed in the Student Handbook on the school's website.

C. Students are expected to use school and personal technology responsibly and follow the rules included in the [26-27 District 5 District Issued Device Guide](#) and the [Acceptable Use Agreement](#).

This includes:

- Having a charged mobile device (district-issued Chromebook or comparable personal device) at school EVERYDAY.
- Not using devices assigned to other students.
- Being responsible for their own devices and should keep them secured at school and off campus.
- Following all teacher directions regarding appropriate times for use of the device.

XII. Uniform Grading Scale

See [State Department of Education website](#) for complete details.

All report cards and transcripts will use numerical grades.

A=90-100; B=80-89; C=70-79; D=60-69; F=Below 60

Each final grade (numerical) will have different weighting for the basis of computing GPR. The chart included gives the weighting for each numerical value.

Extra weight is given to honors (.5) and AP (1.0) courses. This policy also establishes that courses may not be dropped after the fifth (5th) day in a semester class or after the tenth (10th) day in a yearly class without penalty.

Students may only retake a class at the same difficulty under the following conditions: Only a course in which a D or F was earned may be retaken.

The course must be retaken at the first opportunity within the next year. The student's record will reflect all courses taken and the grade earned, except for courses taken prior to the ninth grade.

10 Point Grading Scale				
South Carolina Uniform Grading Scale Conversions				
Numerical Average	Letter Grade	College Prep Weighting	Honors Weighting	AP/IB/Dual Credit Weighting
100	A	5.000	5.500	6.000
99	A	4.900	5.400	5.900
98	A	4.800	5.300	5.800
97	A	4.700	5.200	5.700
96	A	4.600	5.100	5.600
95	A	4.500	5.000	5.500
94	A	4.400	4.900	5.400
93	A	4.300	4.800	5.300
92	A	4.200	4.700	5.200
91	A	4.100	4.600	5.100
90	A	4.000	4.500	5.000
89	B	3.900	4.400	4.900
88	B	3.800	4.300	4.800
87	B	3.700	4.200	4.700
86	B	3.600	4.100	4.600
85	B	3.500	4.000	4.500
84	B	3.400	3.900	4.400
83	B	3.300	3.800	4.300
82	B	3.200	3.700	4.200
81	B	3.100	3.600	4.100
80	B	3.000	3.500	4.000
79	C	2.900	3.400	3.900
78	C	2.800	3.300	3.800
77	C	2.700	3.200	3.700
76	C	2.600	3.100	3.600
75	C	2.500	3.000	3.500
74	C	2.400	2.900	3.400
73	C	2.300	2.800	3.300
72	C	2.200	2.700	3.200
71	C	2.100	2.600	3.100
70	C	2.000	2.500	3.000
69	D	1.900	2.400	2.900
68	D	1.800	2.300	2.800
67	D	1.700	2.200	2.700
66	D	1.600	2.100	2.600
65	D	1.500	2.000	2.500
64	D	1.400	1.900	2.400
63	D	1.300	1.800	2.300
62	D	1.200	1.700	2.200
61	D	1.100	1.600	2.100
60	D	1.000	1.500	2.000
59	F	0.900	1.400	1.900
58	F	0.800	1.300	1.800
57	F	0.700	1.200	1.700
56	F	0.600	1.100	1.600
55	F	0.500	1.000	1.500
54	F	0.400	0.900	1.400
53	F	0.300	0.800	1.300
52	F	0.200	0.700	1.200
51	F	0.100	0.600	1.100

XIII. Student/Teacher and Parent/Teacher Communication

- A. All students should use district issued email accounts for communicating with teachers (studentnumber@stu.lexrich5.org).
- B. All students should check school email, Google Classroom and Google Calendar every school day.
- C. Parents and students should check the teachers' websites for classroom calendars/assignment sheets.
- D. Parents may contact teachers via email in order to receive invitations to Google Classroom parent/guardian signup. Parents will receive an email from Google and then need to register to receive emails from Google Classroom. Once a parent is registered to receive emails from one class, he/she will receive emails from all Google Classroom groups. It is not necessary to contact all teachers to register.
- E. Emails and phone calls to teachers will be returned within two business days.
- F. Parents and students who would like access to the parent/student PowerSchool portals should visit the CHS attendance office for login information.

XIV. School Attendance and Make-up Work Policy

Students are encouraged to attend school regularly. If, however, a student must be absent from school for any reason, it is his/her responsibility to make-up all work missed.

Students who miss more than one half of an instructional block will be marked absent for that block of instruction. See the Student Handbook on the school website for full attendance and absence policy.

Since it is in the student's best interest to make up all missed work as quickly as possible, the following guidelines have been established for make-up work:

- A. *When a student misses a class meeting*, all previously assigned work that was due the day of the absence is due no later than the beginning of the next class meeting in which the student is present. All work missed as a result of the absence is to be completed by the beginning of the second class meeting from the absence.
- B. *When a student misses two consecutive class meetings*, all previously assigned work due while the student was absent and all work missed as a result of the absence should be completed by the beginning of the second class meeting from the absence.
- C. *When a student misses three or more consecutive class meetings*, he/she must make specific arrangements for make-up work with each teacher the day he/she returns to class. The amount of time given for completion of work will be up to the teacher's discretion based on the amount of work missed and the level of difficulty of the material.
- D. Long term projects and papers are due when the teacher says they are due. In the event of an absence, the student or the student's parent should notify the teacher in advance or upon immediate return to school.
- E. Students are responsible for the work they miss while on a field trip or attending any other school event. Students should contact each of the teachers whose classes they will be missing to make specific arrangements with them regarding all make-up work. Teachers may choose for work to be submitted in advance. If the student does not follow the teacher's guidelines, the student will receive the academic penalty as assigned by the teacher.
- F. Students must make every effort to complete all make-up work according to these established guidelines. If the student has not submitted his/her make-up work within the specified timeframes outlined above or as directed by the teacher, the teacher has the option of not accepting the work. As with anything, regular communication with the teacher is encouraged.

XV. Syllabus Acknowledgement and Information Form

Parents, please fill out the Syllabus Acknowledgement Form received by your student in class.

Thank you,

Chad Boland