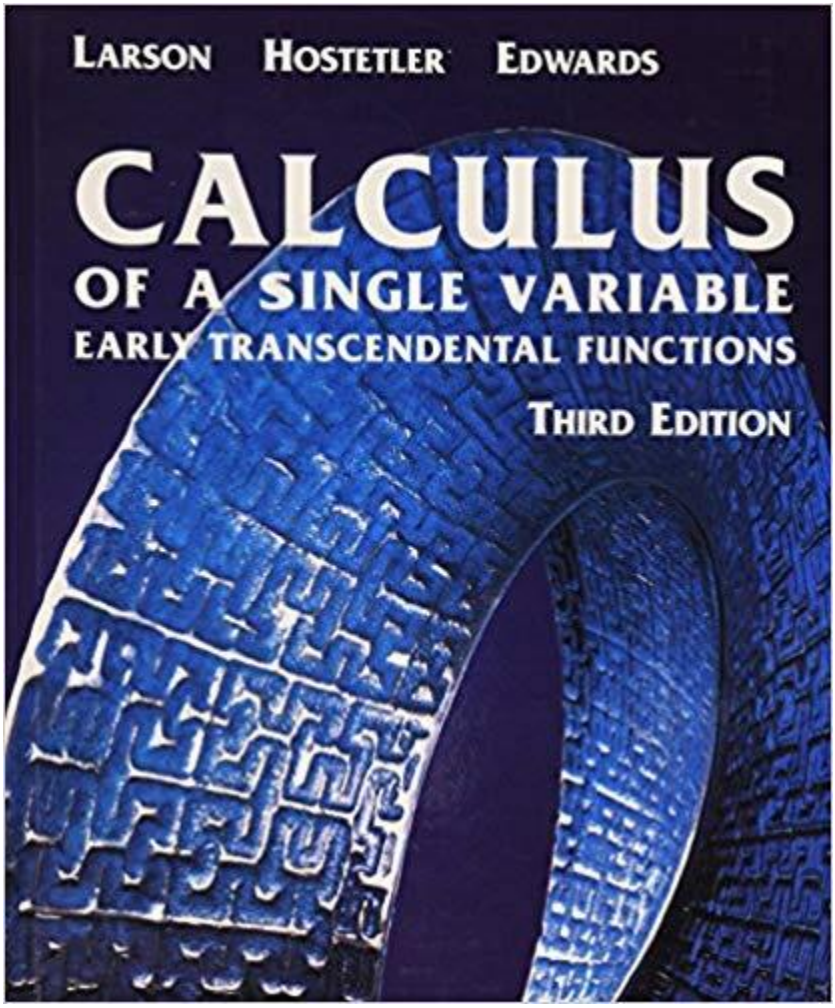
NFC ACADEMY



COURSE OVERVIEW

AP Calculus is a full-year, high school credit honor's level course that is intended for the student who has successfully mastered a minimum of four high school level mathematics courses that cover analytical and conceptual algebra (with heavy emphasis on functions), coordinate and plane geometry, and trigonometric functions. It is highly recommended that the student successfully complete pre-calculus as a prerequisite. The course primarily focuses on the skills and methods of analyzing graphical behavior of functions,

the definition of a derivative as well as applications of derivatives, integration and their relationships with the graphical function.

Advanced Calculus is a course that requires self-discipline with a firm schedule and a desire for math learning. Successful learners will be the most successful who will work independently from their own motivation.

OBJECTIVES

UPON SUCCESSFULLY COMPLETING THE COURSE, THE STUDENT SHOULD HAVE MASTERED THE FOLLOWING CONCEPTS:

- Perform operations on functions including composition and inverses.
- Using calculation and estimation to evaluate limits.
- Analyze infinite limits and the correlation between their values and the graph's behavior; estimate and understand discontinuity and continuous functions.
- Compute the derivative of a function using the power rule, product and quotient rule, chain rule and all trigonometric rules.
- Use the concept of a derivative to interpret a function's rate of change and continuity; construct the equation of a line tangent to a curve; evaluate the intervals for which a function is increasing or decreasing.
- Interpret the Mean Value Theorem.
- Evaluate the second derivative and find the points of inflection.
- Utilize the derivative through application problems involving area under a curve, velocity, acceleration and speed.
- Evaluate a definite integral using the Fundamental Theorem of Calculus, Riemann Sums, and the rate of change formula.

COURSE INTRODUCTION

Welcome to Calculus! Prior to taking this course, you should have successfully completed four years of high-school math: two years of algebra, one year of geometry, and one year of pre-calculus that includes trigonometry.

This calculus course is designed to prepare you for the Advanced Placement (AP)* Calculus AB exam and subsequent college-level math courses. Throughout the course, you will focus on a balance of skills, conceptual understanding, and the use of technology.

You will need access to the following technologies for this course:

- High-speed Internet connection (strongly recommended)
- A graphing calculator (TI-89 strongly recommended)
- A scanner (so that work can be submitted electronically)

The course requires also a textbook, *Calculus of a Single Variable* by Ron Larson, Robert Hostetler, and Bruce Edwards (Boston: Houghton Mifflin, 2002; ISBN 0-618-14916-3), which must be purchased separately from the course. The online materials are designed to work in conjunction with this textbook. The student works mainly from the textbook and uploads the required answers into the Ignitia program. The titles and organization of the online assignments follow the flow of the textbook:

- **UNIT 1**: Graphs and Limits (Chapter P, Chapter 1)
- **UNIT 2**: Derivatives (Chapter 2: Sections 2.1–2.5)
- **UNIT 3**: Related Rates (Chapter 2: Section 2.6)
- **UNIT 4**: Derivative Tests (Chapter 3)
- **UNIT 5**: Review and Semester I Exam
- **UNIT 6**: Integrals (Chapter 4)
- **UNIT 7**: Natural Logs and Functions (Chapter 5: Sections 5.1–5.6)
- **UNIT 8**: Area and Volume (Chapter 6: Sections 6.1–6.2)
- **UNIT 9**: Inverse Trig Functions (Chapter 5: Sections 5.8–5.9)
- **UNIT 10**: Review and Semester II Exam

Within the online assignments, you will encounter objectives, reading assignments, discussions containing additional examples and explanations, and practice problems to help you grasp the presented concepts. The quizzes and tests will help you to determine if you have mastered the material.

Remember that learning a new topic successfully on your own requires self-discipline. It is recommended that you set aside a specific time each day to devote to working on this course, just as you would if you were attending a regular face-to-face class. Make sure you work all of the recommended problems and check your answers.

REQUIRED RESOURCES

Some assignments in this course require the use of resources that must be supplied by the user. These outside resources are listed below by assignment.

Advanced Placement Calculus		
Unit	**Assignment Title**	**Supply List**
All	All Assignments	• Scratch Paper/Notebook • Scientific or Graphing Calculator • Graph Paper-Coordinate • Scanner, for scanning handwritten problems and solutions that student will upload for lessons • Textbook: *Calculus of a Single Variable* by Ron Larson, Robert Hostettler, and Bruce Edwards (Boston: Houghton Mifflin, 2002; ISBN 0-618-14916-3)

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GRADING INFORMATION

GRADING COMPONENTS

Lessons	40%
Quizzes	30%
Tests	30%

GRADING SCALE

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