Introduction to Calculus & Statistics (9450) Course Overview Curriculum Document

Course Description

This course is a preparatory component to college level mathematics, including calculus and statistics. The course reviews the functions necessary for calculus, and introduces students to differential calculus. The calculus concepts of limit, continuity, derivative, and antiderivative are applied to algebraic, exponential, logarithmic, and trigonometric functions. The statistics concepts include univariate data, bivariate data and probability.

Credits	Prerequisites
1	Pre-Calculus

Board Approved	Revised
November 2019	June 20, 2023

Required Assessments

District Common Summative Assessments

Textbooks/Resources

Sullivan, M., & Miranda, K. (2020). Calculus for the AP Course. [Third Edition]. New York: Bedford, Freeman & Worth Company ISBN: 978-1-319-24431-6

Starnes, D. S., & Tabor, J. (2020). The Practice of Statistics for the AP Exam. [Sixth Edition]. New York: Bedford, Freeman & Worth Company ISBN: 978-1-319-26929-6

Course Essential Understandings	Course Relevance Questions
As a result of successfully completing this course, students will understand that: • Limits can be determined numerically, graphically, and algebraically. • Derivatives can be used to analyze properties of functions. • Integrals can be used to find areas and volumes. • Series can converge or diverge. • Data can be graphed and summary statistics can be interpreted. • Probabilities can be calculated with a variety of methods.	• What does my data tell me? • How does infinity help us analyze functions?

Unit Overviews

Unit Name	Unit Description	Unit Relevance Question	Instructional Standards	Assessed Standards
Limits	In this unit, students will learn the concept of a limit. They will learn how to evaluate limits using tables, graphs, and algebraic manipulations.	What is the concept of a limit through the lens of graphs and tables?	G.1 Graphing M.1 Manipulating S.1 Solving	G.1 Graphing M.1 Manipulating S.1 Solving
Derivatives	In this unit, students will learn the two limit definitions of derivatives, and how to find the derivative of functions using the definitions. Students will then learn how to take derivatives using a variety of shortcut methods. Students will learn to use derivatives to analyze graphs of functions and several real-world applications.	What does the derivative tell us regarding the rates of change of functions?	G.2 Graphing M.2 Manipulating S.2 Solving	G.2 Graphing M.2 Manipulating S.2 Solving
Integrals	In this unit, students will learn the notation of integration as a tool to calculate the area under curves, and find volumes of revolution.	How can an integral be written to find areas and volumes as a collection of infinite items?	G.3 Graphing M.3 Manipulating S.3 Solving	G.3 Graphing M.3 Manipulating S.3 Solving
Series	In this unit, students will learn the nature of infinite series and examine their convergence or divergence. In particular, geometric series will be learned in order to apply them to various situations.	Does the series converge or diverge?	G.4 Graphing M.4 Manipulating S.4 Solving	M.4 Manipulating S.4 Solving
Statistics	In this unit, students will be introduced to data distributions of categorical and quantitative data and how to graph and analyze them (including bivariate data). Students will then learn how to find and compare summary statistics of these distributions. In addition, students will learn how to do calculations using the Normal curve.	How do summary statistics and the graph of data relate to each other?	G.5 Graphing M.5 Manipulating S.5 Solving	G.5 Graphing M.5 Manipulating S.5 Solving
Probability	In this unit, students will be introduced to the idea of a probability model and basic probability rules. Students will also learn the core concepts of conditional probability and independence. In addition, students will be introduced to random variables and how to calculate probabilities involving random variables.	What would happen if we repeated random phenomena many, many times?	G.6 Graphing S.6 Solving	G.6 Graphing S.6 Solving