NORTHERN NEW MEXICO COLLEGE

Course Number Course Name	Math 1510 Calculus I
Credit Value (Breakdown of theory and lab credits)	4 Theory
Catalog Course Description	Introduces the intuitive, numerical and theoretical concepts of limits, continuity, differentiation and integration. Includes the study of extrema, curve sketching, and applications involving algebraic, exponential, logarithmic and trigonometric functions. Designed for mathematics, science and engineering majors. Prerequisite: MATH 1250. (4, 4T+0L)
Course Student Learning Outcomes/Objectives /Competencies of the Course	**Student Learning Outcomes:** 1. Limits a. Use limit notation. b. Compute limits or determine when a limit does not exist. c. Use limits to decide if a function is continuous. d. Use limits to decide if a function is differentiable. e. Use limits to determine asymptotes. 2. Derivatives a. Determine the derivative of a simple function, at a point as well as more generally, using the definition of the derivative. b. Determine the derivatives of algebraic and transcendental functions using the General Power, Product, Quotient, Chain Rules, implicit differentiation and the linearity of the differential operator. c. Describe the meaning of the derivative as a rate of change in a variety of contexts. d. Use derivatives to sketch graphs of functions with details showing critical points and their natures, inflection points, noting monotonicity, and concavity, connecting these to features found algebraically, such as intercepts and asymptotes. e. Compute local linear approximation. 3. Integrals a. Compute definite integrals using the limit definition and sigma notation. b. Approximate definite integrals using finite sums. c. Compute indefinite integrals by identifying them with antiderivatives. d. Compute definite and indefinite integrals using substitution. e. Describe the meaning of the integral in a variety of contexts. 4. Applications of calculus a. Solve optimization problems, related rate problems and motion problems involving position, velocity, speed and acceleration using differentiation and integration. b. Compute area bounded by functions and vertical lines. c. Be able to apply theorems of calculus such as the Fundamental Theorem, the Intermediate Value Theorem, the Mean Value Theorem, the Mean Value Theorem of Integration, and the Extreme Value Theorem.

College-Wide Student Learning Outcomes	Math 1510 exposes students to the following NNMC College Wide Goals: *Critical thought: Students are required to analyze and synthesize information and draw reasoned conclusions.* *Quantitative reasoning: Calculate, represent, apply, analyze, and communicate both quantitative and qualitative information.*
Program Student Learning Outcomes measured	PSLO #1: Manipulate and solve polynomial, rational, logarithmic, exponential, and trigonometric functions. PSLO #2: Compute limits and derivatives