

**Tennessee Technological University  
Mathematics Department**

**MATH 1830: Concepts of Calculus**

**I. COURSE DESCRIPTION FROM CATALOG:**

A survey of limits, continuity and the differential and integral calculus, with applications in business, economics and the life sciences. Lec. 3. Cr. 3.

**II. PREREQUISITE(S):**

C or better in one of the following: MATH 1130, 1530, 1630, 1710, 1730; or equivalent.

**III. COURSE OBJECTIVE(S):**

Build on (not replicate) the competencies gained through the study of two years of high school algebra and one year of high school geometry. Use mathematics to solve problems and determine if the solutions are reasonable. Use mathematics to model real world behaviors and apply mathematical concepts to the solution of real-life problems. Make meaningful connections between mathematics and other disciplines. Use technology for mathematical reasoning and problem solving. Apply mathematical and/or basic statistical reasoning to analyze data and graphs. To introduce the student to the concepts of elementary calculus with applications business and other related areas.

**IV. TOPICS TO BE COVERED:**

**CHAPTER 11            FUNCTIONS, LIMITS, AND THE DERIVATIVE**

- 11.1    Functions and Their Graphs
- 11.2    The Algebra of Functions
- 11.3    Functions and Mathematical Models
- 11.4    Limits
- 11.5    One-sided Limits and Continuity
- 11.6    The Derivative

**CHAPTER 12            DIFFERENTIATION**

- 12.1    Basic Rules of Differentiation
- 12.2    The Product and Quotient Rules
- 12.3    The Chain Rule
- 12.4    Marginal Functions in Economics
- 12.5    Higher-order Derivatives
- 12.7    Differentials

**CHAPTER 13            APPLICATIONS OF THE DERIVATIVE**

- 13.1    Applications of the First Derivative
- 13.2    Applications of the Second Derivative
- 13.3    Curve Sketching
- 13.4    Optimization I

**CHAPTER 14            EXPONENTIAL AND LOGARITHMIC FUNCTIONS**

- 14.1    Exponential Functions
- 14.2    Logarithmic Functions
- 14.3    Differentiation of Exponential Functions
- 14.4    Differentiation of Logarithmic Functions

**CHAPTER 15            INTEGRATION (as time permits)**

- 15.1    Antiderivatives and the Rules of Integration
- 15.2    Integration by Substitution
- 15.3    Area and the Definite Integral
- 15.4    The Fundamental Theorem of Calculus
- 15.5    Evaluating Definite Integrals
- 15.6    Area between Two Curves

**V.    ADDITIONAL INFORMATION:**

This course may be used to satisfy the minimum general education requirements in mathematics. It provides an opportunity for students to address real-life problems in business and economics through strategic reasoning and application of the scientific method.

**VI.    POSSIBLE TEXTS AND REFERENCES:**

*College Mathematics*, 7<sup>th</sup> ed., S. T. Tan

**VII.    ANY TECHNOLOGY THAT MAY BE USED:**