

**Tennessee Technological University
Mathematics Department**

Mathematics 1830: Applied 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):

ACT mathematics score of 25 or above and three years of high school mathematics including algebra and geometry; or, special permission of the Mathematics Department; or, C or better in MATH 1130 or MATH 1710, 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 reasoning to analyze data and graphs. To introduce the student to concepts of elementary calculus with applications to business and other related areas.

IV. STUDENT LEARNING OUTCOMES:

Upon successful completion of the course the student will be able to evaluate and interpret limits graphically and algebraically; calculate the derivative by using the limit definition; determine and apply the appropriate differentiation technique in order to calculate the derivatives of algebraic, exponential and logarithmic functions; utilize derivatives in order to solve economic and physical optimization problems; determine and utilize appropriate integration techniques in order to evaluate indefinite integrals involving algebraic, exponential and logarithmic function; and apply the Fundamental Theorem of Calculus to evaluate definite integrals.

V. TOPICS TO BE COVERED:

- Algebra Review (Discussed when needed at the instructor’s discretion)
 - Simplifying expressions
 - Functions
 - Graphs
 - Relations
 - Fundamental Functions
 - Transformations
- Limits
 - Graphical interpretation
 - Function value vs. Limit value
 - One-sided and Two-sided limits

- Infinite limits
 - Limits at infinity
 - Continuity and discontinuity
 - Analytical interpretation
 - Function value vs. Limit value
 - Notation for evaluating limits
 - Techniques for evaluating limits
 - Continuity and discontinuity
- Slope
 - Rates of change
 - Differentiability
 - Definition
 - The Derivative Function
 - Differentiation Rules
 - Fundamental functions
 - Rules when combining functions
 - Graphing by using differentiation rules
 - Antiderivatives and Indefinite Integrals
- Area
 - Net Area between a curve and the x-axis on a bounded interval
 - Net Area calculation using integration
 - Mean Value Theorem
 - Fundamental Theorem of Calculus
 - Area between two curves
- Applications
 - Interest
 - Differentials
 - Business functions
 - Elasticity of Demand
 - Optimization
 - Income distribution (If time permits)
 - Consumer and Producer Surplus (If time permits)

VI. 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.

VII. POSSIBLE TEXTS AND REFERENCES:

Calculus for Business, Economics, Life Sciences, and Social Sciences, 14th Edition, Barnett, Ziegler, and Byleen

VIII. ANY TECHNOLOGY THAT MAY BE USED:

MyMathLab or *MathXL* for online homework applications

IX. STUDENT ACADEMIC MISCONDUCT POLICY:

Maintaining high standards of academic integrity in every class at Tennessee Tech is critical to the reputation of Tennessee Tech, its students, alumni, and the employers of Tennessee Tech graduates. The Student Academic Misconduct Policy describes the definitions of academic misconduct and policies and procedures for addressing Academic Misconduct at Tennessee Tech. For details, view the Tennessee Tech's Policy 217 – Student Academic Misconduct at [Policy Central](#).

X. DISABILITY ACCOMMODATION:

Students with a disability requiring accommodations should contact the Office of Disability Services (ODS). An Accommodation Request (AR) should be completed as soon as possible, preferably by the end of the first week of the course. The ODS is located in the Roaden University Center, Room 112; phone 372-6119. For details, view the Tennessee Tech's Policy 340 – Services for Students with Disabilities at [Policy Central](#).