

**Tennessee Technological University
Mathematics Department**

MATH 1910: Calculus I

I. COURSE DESCRIPTION FROM CATALOG:

Limits, continuity, derivatives and integrals of functions of one variable with applications.
Lec. 4. Cr. 4.

II. PREREQUISITE(S):

ACT mathematics score of 27 or above and four years of high school mathematics including algebra, geometry, trigonometry and advanced or pre-calculus mathematics; or, special permission of the Mathematics Department; or, C or better in MATH 1730; or C or better in MATH 1720 and 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 mathematical reasoning and problem solving. Apply mathematical and/or basic statistical reasoning to analyze data and graphs. To study the topics of limits, continuity, and derivatives of functions of one variable and their applications in the physical and life sciences. After finishing the course students are expected to know importance of the definitions and have the ability to use them.

IV. TOPICS TO BE COVERED:

Chapter 1:

1.1, 1.2, 1.3: Brief review of functions

1.5: Exponential Functions

1.6: Inverse Functions and Logarithms

Sequences and mathematical Induction: section 11.1, Appendix E (optional)

Chapter 2:

2.1: The Tangent and Velocity Problems (optional)

2.2, 2.3, 2.4: Limits

2.5: Continuity

2.6: Limits at Infinity, Asymptotes

2.7: Derivatives and Rates of Change (optional)

2.8: The Derivative as a Function

Chapter 3:

3.1: Derivatives of Polynomials and Exponential Functions

3.2: The Product and Quotient Rules

3.3: Derivatives of Trigonometric Functions

3.4: The Chain Rule

3.5: Implicit Differentiation

3.6: Derivatives of Logarithmic Functions

- 3.8: Exponential Growth and Decay (optional)
- 3.9: Related Rates
- 3.10: Linear Approximations and Differentials
- 3.11: Hyperbolic Functions

Chapter 4:

- 4.1: Maximum and Minimum Values
- 4.2: The Mean Value Theorem
- 4.3: How Derivatives Affect the Shape of a Graph
- 4.4: Indeterminate Forms and L'Hospital's Rule
- 4.5: Summary of Curve Sketching
- 4.7: Optimization Problems
- 4.8: Newton's Method
- 4.9: Antiderivatives

Chapter 5:

- 5.1: Area and Distances
- 5.2: The Definite Integral
- 5.3: The Fundamental Theorem of Calculus
- 5.4: Indefinite Integrals and the Net Change Theorem
- 5.5: The Substitution Rule

VI. POSSIBLE TEXTS AND REFERENCES:

Calculus Early Transcendentals, 7th edition by James Stewart

Students with a disability requiring accommodations should contact the Office of Disability Services (ODS). 2
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.