

**Davenport University**  
**Department of Computer Information Science**

1. MATH215, Calculus I
2. 4 credits
3. Course coordinator: Tim Pennings/Gabriela Ziegler
4. Textbook Inseat Courses  
9780321888549  
Thomas' Calculus Early Transcendentals: Single Variable  
Thomas Jr., George B./ Weir, Maurice D./ Hass, Joel R.  
13th 2014 / Pearson
  - a. There are not supplemental materials
5. Specific course information
  - a. Catalog description: This is a first course in the standard calculus sequence covering differential calculus and an introduction to integral calculus. Topics include: limits and continuity, the definition of the derivative, rules and techniques of differentiation, applications of the derivative (e.g., L'Hôpital's Rule, curve sketching, optimization, etc.), antiderivatives, Riemann sums, the definition of the definite integral, and the Fundamental Theorem of Calculus. Note: A grade of C or better is required to take the next course in the sequence.
  - b. Prerequisites: MATH150
  - c. Required course
6. a. Course Learning Outcomes:
  1. Evaluate limits using a variety of methods.
  2. Determine continuity and differentiability of a function.
  3. Evaluate derivatives using limits, rules of differentiation, tables of derivatives, and implicit differentiation.
  4. Employ derivatives to solve related rates, optimization, and other application problems.
  5. Construct graphs of functions utilizing their first and second derivatives.
  6. Interpret the behavior of functions based on their first and second derivatives.
  7. Describe the behavior of the graph with respect to extrema, direction, and concavity.
  8. Evaluate antiderivatives and indefinite integrals of elementary functions.
  9. Employ antiderivatives to solve initial value problems and applications.
  10. Employ finite sums to approximate total change and the area under a curve.

11. Determine the existence of the definite integral of a function for a given interval.

b. Student Outcomes assessed by MATH215

1. To analyze a complex computing problem and to apply principles of computing and other relevant disciplines to identify solutions.

c. Mapping of Course Learning Outcomes to Student Outcomes

Course Learning Outcomes 2, 3, 5, 6, 8, 9 and 11 → ABET SO 1

7 Course Content:

Topic or Subtopic (Number of hours devoted to a topic are shown in parenthesis)

1. Functions, Inverse functions and graphing (4)
2. Trigonometric & Exponential and logarithmic functions (4)
3. Limits, One-sided limits and continuity (4)
4. Limits involving infinity & Definition of derivative (4)
5. Techniques and applications of derivatives & Derivatives of trig functions (4).
6. Chain Rule, implicit differentiation, Derivatives of log and inverse trig functions (4)
7. Related rates and differentials (4)
8. Extreme values and Mean Value Theorem (2)
9. Tests for increasing, decreasing, and concavity (2)
10. L'Hopital's Rule (2)
11. sketching curves (4)
12. Antiderivatives (4)
13. Finding the area of regions under curves (2)
14. The Fundamental Theorem of Calculus (2)
15. Antiderivatives (6)
16. Finding areas of regions (2)