

# Virginia Western Community College

## MTH 262

### Applied Calculus II

#### Prerequisites

Completion of MTH 261 or equivalent with a grade of C or better.

#### Course Description

Covers techniques of integration, an introduction to differential equations and multivariable calculus with an emphasis throughout on applications in business, social sciences and life sciences.

**Semester Credits: 3**

**Lecture Hours: 3**

#### Required Materials

##### **Textbook:**

Calculus and Its Applications, Bittinger, Ellenbogen, and Surgent, 2<sup>nd</sup> Edition, Pearson. ISBN: 9780135091685

##### **Other Required Materials:**

Scientific Calculator

#### Course Outcomes

**At the completion of this course, the student should be able to:**

- Integration and Its Applications
  - Use basic integration formulas to find indefinite integrals of algebraic, exponential, and logarithmic functions.
  - Develop the concept of definite integral using Reimann Sums.
  - Evaluate definite integrals using Fundamental Theorem of Calculus.
  - Use the method of integration by substitution to determine indefinite integrals.
  - Evaluate definite integrals using substitution with original and new limits of integration.
  - Calculate the area under a curve over a closed interval  $[a, b]$ .
  - Calculate the area bounded by the graph of two or more functions by using points of intersections.
  - Use integration to solve applications in business and economics, such as future value and consumer and producer's surplus.
- Techniques of Integration
  - Use the method of integration by parts to find antiderivatives and evaluate definite integrals.
  - Integrate using tables of integrals.
  - Approximate integrals using numerical integration (Trapezoidal and Simpson's rules).

- Evaluate improper integrals.
- Differential Equations
  - Solve basic first order differential equations.
  - Use simple integration and separation of variables to solve differential equations.
- Multivariable Calculus
  - Evaluate functions of several variables and sketch three-dimensional surfaces.
  - Calculate partial derivatives of functions of several variables.
  - Calculate maxima and minima of functions of several variables.
  - Calculate constrained maxima and minima using the Method of LaGrange Multipliers.
  - Evaluate multiple integrals.

## **Topical Description**

**Chapter 4 Integration: All sections**

**Chapter 5 Applications of Integration: Sections 5.1, 5.2, 5.3, 5.7 (Section 5.6 Optional)**

**Chapter 6 Functions of Several Variables: Sections 6.1, 6.2, 6.3, 6.5, 6.6**

**Chapter 8 Differential Equations: Section 8.3**

## **Notes to Instructors**

None.