

MISSOURI WESTERN STATE UNIVERSITY

COLLEGE OF LIBERAL ARTS AND SCIENCES

DEPARTMENT OF COMPUTER SCIENCE, MATHEMATICS, AND PHYSICS

COURSE NUMBER: MAT 166

COURSE NAME: Calculus with Analytic Geometry I: Integration

COURSE DESCRIPTION:

Includes the study of the integral, and the derivative and integral of exponential, logarithmic, and other transcendental functions.

PREREQUISITE:

A grade of C or better in MAT 165. (Not open to the student with credit in MAT 167.)

TEXT:

Calculus-w/Access(Looseleaf), Larson and Edwards, Edition 10th14, Cengage L,
ISBN 9781305718661

TECHNOLOGY:

Use of a graphing calculator having at least the capabilities of the TI-83 will be required for the student throughout the course.

COURSE OBJECTIVES:

The main goal of this course is to develop students' conceptual understanding of integral, while continuing to enhance their proficiency in computing the derivative and integral of algebraic, trigonometric, exponential, and logarithmic functions. In order to meet this goal, students will learn how to:

1. Explore exponential, logarithmic, and other transcendental functions.
2. Find derivatives of exponential, logarithmic, and other transcendental functions.
3. Use various integration techniques to compute indefinite integrals of algebraic, trigonometric, exponential, and logarithmic functions.

4. Use the limit of a Riemann Sum to approximate the area of a plane region.
5. Use the definition of a definite integral and the Fundamental Theorem of Calculus to compute definite integrals of algebraic, trigonometric, exponential, and logarithmic functions.
6. Utilize mathematical language and symbolism to communicate ideas and represent relationships.
7. Interact verbally with others to clarify and extend understanding of mathematical situations.

COURSE OUTLINE:

I. Integration

- A. Antiderivatives and Indefinite Integration
- B. Area
- C. Riemann Sums and Definite Integrals
- D. The Fundamental Theorem of Calculus
- E. Integration by Substitution
- F. Numerical Integration

II. Logarithmic, Exponential, and Other Transcendental Functions

- A. The Natural Logarithmic Function and Differentiation
- B. The Natural Logarithmic Function and Integration
- C. Inverse Functions
- D. Exponential Functions: Differentiation and Integration
- E. Bases Other Than e and Applications
- F. Inverse Trigonometric Functions and Differentiation
- G. Inverse Trigonometric Functions and Integration
- H. Hyperbolic Functions
- I. Differential Equations: Growth and Decay
- J. Differential Equations: Separation of Variables