

Math 2413 Calculus I Course Document

Credit Hours

Four semester hours

Transferability

This course should transfer to all four year colleges and degree programs. If you are concerned about the transferability of this course you should contact the counseling center or the college / university to which you will transfer.

Prerequisites

Math 1316 Trigonometry and Math 2412 Precalculus or Instructor / Departmental Approval

Course Description

Functions, limits, continuity, differentiation and integration of algebraic and trigonometric functions, applications of differentiation and an introduction to applications of the definite integral. The student may elect to include a technology lab component at some colleges.

Materials

Required Textbook and Scientific Calculator (Graphing Calculator Recommended)

Learning Outcomes

- Evaluate limits of functions.
- Analyze and apply the notions of continuity and differentiability to algebraic and trigonometric functions.
- Use the concepts of derivative and the various formulas associated with it to investigate properties of functions.
- Use implicit differentiation to solve related rates problems.
- Construct detailed graphs of nontrivial functions using differentiation.
- Use basic integration techniques to solve simple differential equations.
- Demonstrate the connection between area and the definite integral.
- Apply the fundamental Theorem of Calculus to evaluate definite integrals.
- Use differentiation and integration to solve real world problems.

Textbook Sections

Calculus

James Stewart, 6th Edition

Thomson Brookes Cole

ISBN-10: 0495011606 | ISBN-13: 9780495011606

A Preview of Calculus

2.1 The Tangent and Velocity Problems

2.2 The Limit of a Function

2.3 Calculating Limits Using Limit Laws

2.4 The Precise Definition of a Limit

2.5 Continuity

3.1 Derivatives

3.2 The Derivative as a Function

3.3 Differentiation Formulas

3.4 Derivatives of Trigonometric Functions

3.5 The Chain Rule

3.6 Implicit Differentiation

3.7 Rates of Change in the Natural/Social Sciences

3.8 Related Rates

3.9 Linear Approximations & Differentials (optional)

4.1 Maximum and Minimum Values

4.2 The Mean Value Theorem

4.3 How Derivatives Affect the Shape of a Graph

4.4 Limits at Infinity; Horizontal Asymptotes

4.5. Summary of Curve Sketching

4.6 Graphing with Calculus and Calculators (optional)

4.7 Optimization Problems

4.8 Newton's Method (optional)

4.9 Anti-derivatives

5.1 Areas 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

6.1 Areas between Curves

6.2 Volumes

6.3 Volume by Cylindrical Shells (optional)

6.4 Work