Marshall University

College of Science

MTH 361: Vector Calculus

Course catalog description

A course in n-dimensional calculus: the derivative, the integral, and applications. Coordinate-free methods are emphasized.

Credit hours

3 hours

Prerequisites

A grade of C or higher in MTH 231

List of topics

- Algebra of Euclidean spaces, vectors
- Geometry of Euclidean spaces, the dot product and the norm
- Linear functions in Euclidean spaces
- Change of variables
- Parametric curves as vector valued functions
- Functions of *n* variables
- The gradient
- Extrema of functions of *n* variables
- Vector functions
- Derivative as a linear function; differential forms
- Integration in dimension *n*
- Vector fields and vector integrals
- Stokes theorem
- Independence of path

Learner outcomes

1. Students will state definitions of vector calculus in a mathematically correct manner.
2. Students will analyze situations to determine whether the hypotheses of definitions and theorems are satisfied.

3. Students will perform calculations of derivatives and integrals of n-dimensional functions.
4. Students will construct mathematical arguments using the definitions and theorems of vector calculus.
5. Students will interpret their results in applied problems.

Suggested textbooks

- Calculus Two. Linear and Nonlinear Functions, second edition, by F.J. Flanigan et al., 1998, Springer
- Vector Calculus, sixth edition, by Jerrold E. Marsden and Anthony Tromba, 2011, Freeman
- Mathematical Analysis I by V. A. Zorich and Roger Cooke, 2003

Last updated

December 2016