MATH 230

Calculus and Vector Analysis (4) Three-dimensional analytic geometry; vectors in space; partial differentiation; double and triple integrals; integral vector calculus. Students who have passed either Math 231 or 232 may not schedule Math 230 or 230H for credit.

Topics

Vectors and the Geometry of Space

Three-Dimensional Coordinate Systems

Vectors

The Dot Product

The Cross Product

Equations of Lines and Planes

Cylinders and Quadric Surfaces

Vector Functions

Vector Functions and Space Curves

Derivatives and Integrals of Vector Functions

Arc Length and Curvature

Motion in Space: Velocity and Acceleration

Partial Derivatives

Functions of Several Variables

Limits and Continuity

Partial Derivatives

Tangent Planes and Differentials

The Chain Rule

Directional Derivatives and the Gradient Vector

Maximum and Minimum Values

Lagrange Multipliers

Multiple Integrals

- Double Integrals over Rectangles
- Iterated Integrals
- Double Integrals over General Regions
- Double Integrals in Polar Coordinates
- Applications of Double Integrals
- Triple Integrals
- Triple Integrals in Cylindrical Coordinates
- Triple Integrals in Spherical Coordinates

Vector Calculus

- Vector Fields
- Line Integrals
- The Fundamental Theorem for Line Integrals
- Green's Theorem
- Curl and Divergence
- Parametric Surfaces and Their Areas
- Surface Integrals
- Stokes Theorem
- The Divergence Theorem