

*Montgomery College - Department of Mathematics
Rockville Campus*

**MA280 – Multivariable Calculus
4 Semester Hours**

Description Calculus of vector functions; analytic geometry of space; partial differentiation; multiple integrals; classical theorems of Green, Gauss, and Stokes.

MA280 meets for 5 hours each week.

Prerequisites A grade of C or better in MA 182 or equivalent or consent of department.

Topics

- I. Vectors and the Geometry of Space
 - 1. Three-Dimensional Coordinate Systems
 - 2. Vectors
 - 3. The Dot Product
 - 4. The Cross Product
 - 5. Equations of Lines and Planes
 - 6. Surfaces
 - 7. Cylindrical and Spherical Coordinates
- II. Vector Functions
 - 1. Vector Functions
 - 2. Space Curves
 - 3. Derivatives and Integrals of Vector Functions
 - 4. Arc Length and Curvatures
 - 5. Motion in Space
 - 6. Parametric Surfaces
- III. Partial Derivatives
 - 1. Functions of Several Variables
 - 2. Limits and Continuity
 - 3. Partial Derivatives
 - 4. Tangent Planes and Linear Approximations
 - 5. The Chain Rule
 - 6. Directional Derivatives and the Gradient Vector
 - 7. Maximum and Minimum Values
 - 8. Lagrange Multipliers

- IV. Multiple Integrals
 - 1. Double Integrals
 - 2. Iterated Integrals
 - 3. Double Integral in Polar Coordinates
 - 4. Surface Area
 - 5. Triple Integrals
 - 6. Triple Integrals in Cylindrical and Spherical Coordinates
 - 7. Change of Variables
- V. Vector Calculus
 - 1. Vector Fields
 - 2. The Fundamental Theorem of Line Integrals
 - 3. Green's Theorem
 - 4. Stokes' Theorem
 - 5. The Divergence Theorem

Text

Multivariable Calculus: Concepts & Contexts, J. Stewart, Third Edition, Brooks/Cole.