MATH 250 Calculus III Hunter College 4.0 hours, 4.0 credits

Instructor:
Office Hours:
Contact Info:

Text: Vector Calculus, Jerrold E. Marsden, Anthony Tromba, 6th edition, W.H. Freeman and company.

Prerequisites: MATH 156, MATH 155.

Desired Learning Outcomes: The student will learn to:

Perform basic vector calculations in two and three dimensional Euclidean space, such as computing the dot product, cross product, the triple product, the angle between vectors, and the projection of one vector onto another. Find limits, derivatives, and integrals of vector-valued functions. Determine if a function of several variables is continuous or differentiable. Apply approximation techniques to functions of several variables using differentials. Find the directional derivative and gradient of a function of several variables. Find the equation of the tangent plane and normal line to a surface at a point. Find the absolute extrema of a function of several variables. Solve optimization problems involving functions of several variables using the method of Lagrange Multipliers. Evaluate double and triple integrals as iterated integrals. Find the area or volume using double or triple integrals. Apply the Change of variables formula. Compute and apply multivariable Taylor series.

Homework/Exams/Grades: There will be regularly assigned homework, two midterm exams and one final exam. The exams will count for 80% of your course grade, the homework will count for 20%.

Topics: This is the third course in our calculus sequence. The subject of this course is multivariable calculus, which is the study of derivatives and integrals of functions of several variables.

Chapter 1 The Geometry of Euclidean Space

1.1 Vectors in Two and Three-dimensional Space

1.2 The Inner Product, Length, and Distance

1.3 Matrices, Determinants, and the Cross Product

1.4 Cylindrical and Spherical Coordinates

1.5 n-Dimensional Euclidean Space

Chapter 2 Differentiation

2.1 The Geometry of Real-Valued Functions

2.2 Limits and Continuity

2.3 Differentiation

2.4 Introduction to Paths and Curves

2.5 Properties of the Derivative

2.6 Gradients and Directional Derivatives

Chapter 3 Higher-Order Derivatives: Maxima and Minima

3.1 Iterated Partial Derivatives

3.2 Taylor's Theorem

3.3 Extrema of Real-Valued Functions

3.4 Constrained Extrema and Lagrange Multipliers

3.5 The Implicit Function Theorem

Chapter 4 Vector Valued Functions

4.1 Acceleration and Newton's Second Law

4.2 Arc Length

4.3 Vector Fields

4.4 Divergence and Curl

Chapter 5 Double and Triple Integrals

5.1 Introduction

5.2 The Double Integral over a Rectangle

5.3 The Double Integral over more General Regions

5.4 Changing the Order of Integration

5.5 The Triple Integral

Chapter 6 The Change of Variables Formula and Applications of Integrationi

6.1 The Geometry of Maps from $\mathbf{R}^2$ to $\mathbf{R}^3$.

6.2 The Change of Variables Theorem

6.3 Applications

6.4 Improper Integrals

Note: P/NC grading is not permitted for this course.

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intellectual honesty. The college is committed to enforcing the CUNY Policy on Academic Integrity and will pursue cases of academic dishonesty according to the Hunter College Academic Integrity Procedures.

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Changes: Except for changes that substantially affect implementation of the evaluation (grading) statement, this syllabus is a guide for the course and is subject to change with advance notice.