

MATH 10A Calculus of Several Variables I

Textbook: Vector Calculus by Marsden and Tromba, 6E.

Suggested number of 50-minute lectures:

- 2.0 lectures: 1.1 Vectors in Two- and Three-Dimensional Space
- 1.0 lecture: 1.2 The inner Product, Length, and Distance
- 2.0 lectures: 1.3 Matrices, Determinants, and Cross Product (Include distance from a point to a line)
- 1.0 lecture: 1.4 Cylindrical and Spherical coordinates
- 1.0 lecture: 1.5 n-Dimensional Euclidean Space
- 1.0 lecture: 2.1 The Geometry of Real-Valued Functions
- 2.0 lectures: 2.2 Limits and Continuity
- 1.0 lecture: 2.3 Differentiation
- 1.0 lecture: 3.1 Iterated Partial Derivatives
- 1.0 lecture: 2.4 Introduction to Paths and Curves
- 1.5 lectures: 2.5 Properties of the Derivative (Chain Rule)
- 1.5 lectures: 2.6 Gradients and Directional Derivatives
- 1.5 lectures: 3.2 Taylor's Theorem
- 2.5 lectures: 3.3 Extrema of Real-Valued Functions
- 2.5 lectures: 3.4 Constrained Extrema and Lagrange Multipliers
- 1.5 lectures: 4.2 Arc Length (Include curvature, principle normal vector, binormal vector, and torsion from exercises following the section)
- 1.0 lecture: 4.3 Vector Fields
- 2.0 lectures: 4.4 Divergence and Curl

Sections Omitted:

- 3.5 The Implicit Function Theorem
- 4.1 Acceleration and Newton's Second Law