

# MA511 — Multivariable Calculus

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Graduate Computer Science / Mathematics Department

Fall Semester, 2004

Contact Info:	Text:	Office Hours:
Phone: 603-888-1311x8531 ,5:30-6:30,	Multivariable Calculus	Monday 1:30- 2:30
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5:15-5:45		

## Brief Course Description

Calculus 111/ Multivariable Calculus is designed to bridge the gap between single variable first year calculus and its extension to higher dimensions.

The basic core material that will be covered includes:

sequences and infinite series, power series, polar coordinates — single variable calculus derivatives, multiple and iterative integrals - multi variable calculus Every effort will be made to provide numerous illustrations of the subject matter.

## Course Objectives

This course has been designed with two important goals in mind:  
the completion of material found in single variable calculus's courses  
the introduction of partial differentiation and multiple integration

A solid understanding of these topics is essential for further study in the field of mathematical analysis

## Classroom Policies

Students are expected to attend and participate in all classes. Attendance is taken at the beginning of each period. Please notify the instructor in advance of any anticipated absence whenever possible. It is your responsibility to make up any material missed whenever you are absent.. Assignments are related to material covered in class. The homework problems are always covered in a timely fashion and questions about the problems should be raised at the next class meeting. The study of mathematics/computer science requires regular work and plenty of practice. Postponed homework usually results in poor comprehension and performance.

## Teaching Strategies

Lecture format, with numerous examples chosen to illustrate theoretical concepts. Lots of drill with emphasis on practice, practice, and more practice. Questions are encouraged and discussion of material stressed.

## Course Requirements and Grading Policies

Students will be evaluated based on a midterm and a final exam as follows:

Midterms - 60%      Final - 40%

All tests are closed book and the final is comprehensive. The results will be converted to a letter grade in keeping with grading policies of the college.

Graduate students will be assigned a term project. This will count as 10% of their grade with the final counting 30%. Each graduate student will be required to meet with the instructor throughout the semester to discuss his or her term project.

## Material Covered

### I. Sequences, Series, and Limits

Sequences, Convergence and Divergence  
Formal Definition of Limit and Illustrative Examples  
Infinite Series and Tests for Convergence and Divergence  
Power Series  
Taylor Series

### 2. *Polar Coordinate System*

Polar Coordinates  
Graphs of Polar Equations  
Differentiation of Polar Equations  
Integrals in Polar Coordinates

### 3. *Derivatives*

Multivariable Functions and Surfaces in Space  
Partial Differentiation  
Higher Order Partial Derivatives and Linear and Quadratic Approximation  
Maxima and Minima  
Chain Rule

### 4. *Integration*

Multiple Integrals and Approximating Sums  
Iterative Integrals  
Integrals over Nonrectangular Regions  
Double Integrals in Polar Coordinates



