MATHEMATICAL METHODS FOR ECONOMICS

The course will try a new approach to developing mathematical skills appropriate for all business students with emphasis on specific knowledge needed by students who intend to apply it to study problems in economics. This course is primarily designed to allow students to read papers that use mathematics; it will not teach students how to solve research level problems in mathematical economics or finance. The course will combine elements of algebra, analysis and topology in a "holistic" way skipping formal proofs except when these proofs are essential for understanding. Informal proofs that provide key ideas will be given in many instances and their technical inadequacies will also be mentioned.

The course will use extensive class notes rather than follow a specific text. The reason is that this course is focused on covering specific topics and it is hard to find a text that deals only with these topics. There are many good texts covering mathematics for economists. I am not particularly recommending any specific text but you might like to find one that really is accessible for you.

Assignments

Each class will have pre and post-assignments. Pre assignments will not be collected. Post-Assignments will be done in groups and collected and graded.

Prerequisites

The course will assume you have a grasp of High School algebra and calculus. If these topics are somewhat hazy in your mind, I recommend that you spend a few hours reviewing the following topics:

Arithmetic:	Prime Numbers and the manipulation of fractions
Algebra and Trig:	Quadratic Equations, Simultaneous Equations, Vectors and Matrix multiplication; Sines, Cosines and basic Trigonometric Formulae
Calculus:	Differentiation and Integration of one variable; Maxima and Minima
Analysis	Functions of several variables (but not calculus of several variables), absolute values and the triangle inequality

Grading

The grades for the course will be based on one open book in-class Final Exam, one take home final assignment and the multiple group (homework) assignments described above. Grades will NOT be based on a curve and will be based on personal assessment of each individual student.

Lecture Schedule and Topics to be covered

1. Foundations of Mathematics and Basic Mathematical Structures

2. Sequences, series and convergence

3. Functions, continuity and differentiability, Integration and Mean-Value-Theorems in one dimension

4. Lattices, Probability spaces, Measurable functions and Expectations as integrals

5. Linear Maps and Matrices in finite-dimensional vector Spaces

6. Inner Products, Eigenvalues and Eigenvectors

7. Optimization and constrained optimization in many dimensions

8. Kuhn-Tucker Conditions

9. Optimization in function Spaces (Calculus of Variations)

10. Fixed point theorems and Applications in Economics