Course Syllabus:  
*Mathematical preparation for studying economics*

August 12—August 22, 1996, 9:00 A.M.—12:00 NOON, daily  
Economics Building room 205

**Instructor**  
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*Office hours* 1:00 P.M.—2:00 P.M., Tuesdays and Thursdays, and by appointment  
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**Course Description**  
This is a course in mathematical optimization. The tools and techniques of optimization are fundamental to virtually all economic analysis. Other important tools—such as curvature properties and homogeneity of functions, the implicit function theorem, comparative statics techniques, the envelope theorem, and approximation by Taylor’s series—will also be discussed. In addition to paper and pencil methods, the course will introduce computer software tools for both analytical (Mathematica) and numerical (GAMS) solutions to optimization problems.

**Course prerequisites**  
The most important prerequisite is intending to study graduate economics upon completion of the course. Beyond that, I will assume that students are familiar with the basics of multivariable differential calculus (partial and total differentiation), single variable integral calculus, and matrix algebra (matrix addition, multiplication, transposition, and inversion) at about the level of the undergraduate math econ book Toumanoff and Noruzad [4] (especially chapters 3, 5, and 8).

Also, I will assume that students know at least the basics of using a personal computer and that they have and know the basics of using a CU e-mail address.

If you are concerned about your weakness with respect to any of these prerequisites please let me know before the course starts.

**Textbooks**  
The material for this course is contained in the mathematical appendices of microeconomics text books and Chiang’s dynamic optimization book. Relevant references include the following.
• Mathematical Appendix of Mas-Collel, Whinston, and Green [2].

• Chapters 7–10 of Chiang [1].

• Chapters 26 and 27 of Varian [5].

• Chapters 16–22 of Simon and Blume [3].

I will not assume that you have any of these books. If you like having published material to supplement lecture notes, though, these are the books to have.

Lectures The course meets daily for three hours (less some break time) for nine days. Roughly equal time will be spent presenting new material and discussing solutions to example problems. One session might be spent in a computer room.

Suggested exercises Each day there will be a few suggested exercises. The only way to learn the material in the course is to do these exercises carefully and conscientiously each day. The exercises will not be graded, but answers will be provided.

Study room Students are strongly encouraged to work together on studying the material and doing the suggested exercises outside of lecture time. To facilitate this, a room has been reserved from 12 NOON to 5 P.M. on lecture days. This study time will be a good opportunity to meet and to start to work with the students with whom you will be studying throughout your degree program: many successful graduate students consider such collaborative study essential to cementing their understanding of course material. I will stop by the study room regularly to address any questions.

Examination Participation in this course is not a compulsory part of the graduate program in economics but passing its final exam is. The exam will consist of four or so optimization problems to solve and to answer questions about. The problems on the exam will be similar to those used as examples throughout the course. The examination will take place 9:00 A.M.–12:00 NOON on Friday August 23, 1996 in room 205 of the Economics Building.

References


