Economics 741: Advanced Mathematical Economics
Syllabus UNCG Fall 2004

INSTRUCTOR
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Office Hours: Wed. 1-3 pm or by appointment

COURSE LOCATION AND TIMES
MF 8:15-9:05 in Room 456, Bryan Building

COURSE DESCRIPTION
A PhD in economics requires an extensive familiarity with mathematical modeling. In this course and in your microeconomics courses (751 & 752), you will learn to mathematical tools necessary for economic modeling. This course is intended as a supplement to ECO 751 & 752. The course presentation is coordinated with those courses. In addition, grading and/or homework assignments may be coordinated with those courses.

TEXTBOOK
There are two required texts for this course: Mathematics for Economists by Carl Simon and Lawrence Blume (SB) and Introduction to Statistics and Econometrics by Takeshi Amemiya (A). In addition, we will use the text Microeconomic Theory by Mas-Collel, Whinston, and Green (MWG).

GRADING
Your final grade in this course will be determined based on homeworks, quizzes, and exams in coordination with ECO 751 & 752. The final exam for this course is scheduled for Wed. Dec. 15 from 8-11am.

SPECIFIC COURSE LEARNING OBJECTIVES
Students will learn about the following:
1. simple proofs.
2. the basic properties of sets and functions of several variables.
3. constrained optimization problems.
4. homogeneity, homotheticity, and (quasi-)concavity.
5. random variables and probability distributions.
6. the implicit function theorem.
7. matrix properties.
8. correspondences and fixed points.
9. linear and dynamic programming.
COURSE OUTLINE
The assigned readings from the text are given below. Read the assigned chapters before class.

A. Sets, numbers and proofs. (SB App. A1)
B. Set theory: limits, and open and closed sets. (SB #12, MWG M.F.)
C. Functions of several variables: level curves, continuity. (SB#13, MWG M.F)
D. Calculus of several variables: matrix notation and derivatives. (SB#14, MWG M.A.)
E. Unconstrained optimization (SB #17, MWG M.J.)
F. Constrained optimization (SB #18-19, MWG M.K.)
G. Homogeneous and homothetic functions (SB #20, MWG M.B.)
H. Concavity and quasi-concavity (SB #21, MWG M.C.)

Midterm
I. Probability (A #1-2)
J. Random variables and probability distributions (A #3)
K. Moments (A #4)
L. Binomial and normal random variable (A #5)
M. Large sample theory (A#6)
N. Implicit function theorem (SB #15, MWG M.E.)
O. Matrices: negative (semi)definite, etc. (SB #16, MWG M.D.)
P. Correspondences (MWG M.H.)
Q. Fixed points (MWG M.I.)
R. Linear programming (MWG M.M.)
S. Dynamic programming (MWG M.N.)