Economics 741: Advanced Mathematical Economics
Syllabus UNCG Spring 2009

INSTRUCTOR
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Office Hours: WF 11 am -12 pm or by appointment

COURSE LOCATION AND TIMES
TR 1-2:15 in Bryan 456
Final Exam: Thursday May 7, 12:00-3:00, Bryan 456

COURSE DESCRIPTION
A PhD in economics requires an extensive familiarity with mathematical modeling. In this course, you will learn the mathematical tools necessary for economic modeling including the mathematical theory of probability and statistics.

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
Grading will be determined by homework assignments (10%), a modeling project (20%), one take-home midterm exam (30%), and an in-class final exam (40%).

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.
10. choice under uncertainty.
11. expected utility theory.
12. stochastic dominance.
COURSE OUTLINE
The assigned readings from the text are given below. Please read the assigned chapters before class.

A. Probability (A #1-2)

B. Sets, numbers and proofs. (SB App. A1)

C. Limits and open sets. (SB #12, MWG M.F.)

D. Functions of several variables. (SB#13, MWG M.F)

E. Calculus of several variables. (SB#14, MWG M.A.)

F. Implicit functions and their derivatives. (SB #15, MWG M.E.)

G. Quadratic forms and definite matrices. (SB #16, MWG M.D.)

H. Unconstrained optimization (SB #17, MWG M.J.)

I. Constrained optimization (SB #18-19, MWG M.K.)

J. Homogeneous and homothetic functions (SB #20, MWG M.B.)

K. Concave and quasi-concave functions (SB #21, MWG M.C.)

Midterm exam

L. Random variables and probability distributions (A #3)

M. Moments (A #4)

N. Binomial and normal random variable (A #5)

O. Large sample theory (A#6)

P. Choice under uncertainty (MWG Chapter 6)

Q. Correspondences (MWG M.H.)

R. Fixed points (MWG M.I.)

S. Linear & dynamic programming (MWG M.M. & M.N.)