

EC 489
Selected Topics in Economics: Part II
Mathematical Economics and Statistics
Summer 2006
Syllabus

Instructor: Çağatay Kayı.

Class Hours: M T W Th 567 at Natuk Birkan Z13.

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Office Hours: Please e-mail me to arrange a mutually convenient time.

Suggested Textbook:

- “Statistical Foundations of Econometric Modelling ” by A. Spanos, Cambridge University Press, 1989. [S]
- “John E. Freund’s Mathematical Statistics” by I. Miller and M. Miller, Prentice Hall, Sixth Edition, 1999. [F]
- “Mathematics for Economists” by C. P. Simon and L. Blume, W.W. Norton and Company, [S&B] 1994.

Requirements: Evaluation will be based on surprise quizzes (30%) and a final exam (70%). The grades will be adjusted to reflect performance relative to the rest of the class. There will be problem sets. These problems and the questions in the text are good preparation for exams. The schedule is as follows:

First day of classes: June 22nd.

Last day of classes: August 2nd.

Final: Summer School Final Period, August 3-5.

Course Outline:

Part I: Mathematical Review

1. Mathematical Tools I

- The Theory of Functions of Several Variables
 - The Total Derivative: The Chain Rule, Young’s Theorem, and Leibniz Rule.
 - The Taylor Expansion.
 - Homogeneous Functions.
- Matrix Algebra.
- Quadratic Forms.

- Reading: [S&B] Chapter 14, 15, 30, 20, 8, 16.

2. Optimization

- Unconstrained Optimization.
- Constrained Optimization with Equality/Inequality.
- Envelope Theorem.
- Reading: [S&B] Chapter 17, 18, 19

Part II: Mathematical Statistics

1. Introduction.

- Probability.
- Random variables and probability distributions.
- Reading: [S] Chapter 3, 4.

2. Distributions.

- Random vectors and their distributions
- Reading: [S] Chapter 5.

3. More on Distributions.

- Functions of Random variables.
- The general notion of expectation.
- Reading: [S] Chapter 6,7.

4. Sampling Distributions Estimation.

- Sampling Distributions.
- Reading: [F] Chapter 8.

5. Estimation.

- Theory.
- Applications.
- Reading: [F] Chapter 10, 11.

6. Hypothesis Testing.

- Theory.
- Applications.

- Reading: [F] Chapter 12, 13.

7. Regression, Correlation and Analysis of Variance.

- Reading: [F] Chapter 14.

8. Analysis of Variance.

- Reading: [F] Chapter 15.

Part III : Mathematical Tools II

- Difference Equations.
- Differential Equations.
- System of Differential Equations.
- Reading: [S&B] Chapter 23, 24, 25.