



## Course Outline (Winter Term 2008-2009)

### Economics 255 Introduction to Mathematical Economics

An introduction to the use of mathematics in economic analysis. The first half of the course will concentrate on matrix algebra and examine production and allocation problems in interdependent economies. The second half of the course will examine techniques for constrained and unconstrained optimization. These techniques will be applied to problems of firm and consumer behaviour.

This year, our plan is to cover the first four parts of Chiang and Wainwright's book. If time allows, we will cover selected chapters in Part Five as well. Part One is a general introduction to mathematical economics. Part Two is on matrix algebra. Part Three is exclusively on derivatives, and Part Four is on maximization and minimization. I expect that we will have time to cover at most two more chapters in Part Five, which contains integrals, differential and difference equations.

The purpose of this course is to provide students with the basic mathematical tools that are widely used in various fields of economics. Assignments are assigned regularly. Students are expected to complete their assignments independently, as it is the most effective way of learning the material.

#### Midterm Exam: Friday, February 6, 2009, in class

**Grading:** class participation -- 10%  
homework -- 20%  
midterm exam -- 30%  
final exam -- 40%

*Prerequisites: ECON 110 or 111\*+112\*; MATH 126 or MATH 121 or equivalent*

#### Required textbook:

*Fundamental Methods of Mathematical Economics, 4th edition, by Alpha C. Chiang and Kevin Wainwright, McGraw-Hill, 2005.*

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Course Website: <http://www.econ.queensu.ca/pub/faculty/wang/c255W09.html>

## Details

The following is an approximation of what we are going to cover in this course. It may be updated later on.

### **PART ONE INTRODUCTION**

- 1 The Nature of Mathematical Economics
- 2 Economic Models

### **PART TWO STATIC (OR EQUILIBRIUM) ANALYSIS**

- 3 Equilibrium Analysis in Economics
- 4 Linear Models and Matrix Algebra
- 5 Linear Models and Matrix Algebra(Continued)

### **PART THREE COMPARATIVE-STATIC ANALYSIS**

- 6 Comparative Statics and the Concept of Derivative
- 7 Rules of Differentiation and Their Use in Comparative Statics
- 8 Comparative-Static Analysis of General-Function Models

### **PART FOUR OPTIMIZATION PROBLEMS**

- 9 Optimization: A Special Variety of Equilibrium Analysis
- 10 Exponential and Logarithmic Functions
- 11 The Case of More Than One Choice Variable
- 12 Optimization with Equality Constraints
- 13 Further Topics in Optimization

### **PART FIVE DYNAMIC ANALYSIS** *(If time allows)*

- 14 Economic Dynamics and Integral Calculus
- 15 Continuous Time: First-Order Differential Equations
- 16 Higher-Order Differential Equations
- 17 Discrete Time: First-Order Difference Equations
- 18 Higher-Order Difference Equations
- 19 Simultaneous Differential Equations and Difference Equations
- 20 Optimal Control Theory

### **Statement on Academic Integrity**

Academic integrity is constituted by the five core fundamental values of honesty, trust, fairness, respect and responsibility (see [www.academicintegrity.org](http://www.academicintegrity.org)). These values are central to the building, nurturing and sustaining of an academic community in which all members of the community will thrive. Adherence to the values expressed through academic integrity forms a foundation for the "freedom of inquiry and exchange of ideas" essential to the intellectual life of the University (see the Senate Report on Principles and Priorities)

Students are responsible for familiarizing themselves with the regulations concerning academic integrity and for ensuring that their assignments conform to the principles of academic integrity. Information on academic integrity is available in the Arts and Science Calendar (see Academic Regulation 1), on the Arts and Science website (see <http://www.queensu.ca/calendars/artsci/pg532.html>), and from the instructor of this course.

Departures from academic integrity include plagiarism, use of unauthorized materials, facilitation, forgery and falsification, and are antithetical to the development of an academic community at Queen's. Given the seriousness of these matters, actions which contravene the regulation on academic integrity carry sanctions that can range from a warning or the loss of grades on an assignment to the failure of a course to a requirement to withdraw from the university.