

**ECO 326 - Syllabus**  
**Advanced Economic Theory (Micro)**  
WINTER 2010

**Instructor:** Peter A. Wagner (office: GE 224, email: pa.wagner@utoronto.ca)

**Office Hours:** Please email to arrange an appointment

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**Office Hours:** F 10:00 - 12:00, Max Gluskin House (GE), Room 40

**Lectures:** M 2:00 - 4:00, University College (UC), Room 163

**Tutorials:** M 4:00 - 5:00, University College (UC), Room 163

**Website:** <http://individual.utoronto.ca/paw/Eco326.html>

**Course Outline:**

Game theory is misnomer for the analysis of strategic interaction between utility maximizing decision makers. Most of today's research in economics is based heavily on game theoretic reasoning, and as such it is a core field of economic theory. Originally, game theory emerged as a branch in mathematics, and it is still quite mathematical. While we focus on the conceptual analysis of games, you should be at ease with mathematical notation and formal arguments, and perhaps more importantly, with abstract thinking. Moreover, this class requires some knowledge in probability theory and calculus, and you should have a solid foundation in microeconomics.

**Textbooks:**

1. *"An Introduction to Game Theory"*, Martin J. Osborne
2. *"Game Theory for Applied Economists"*, Robert Gibbons
3. *"Microeconomic Theory"*, Mas-Colell, Whinston and Green
4. *"Game Theory: Analysis of Conflict"*, Roger B. Myerson
5. *"Game Theory"*, Drew Fudenberg and Jean Tirole
6. *"A Course in Game Theory"*, Martin Osborne and Ariel Rubinstein

The first book is required for this course. It is the standard undergraduate textbook for game theory. It contains all topics covered in this class, and I will follow roughly the same structure. Another commonly used book is Gibbons. Mas-Collel, Whinston & Green is not a pure game-theory book, but its game theory section is written comprehensively and covers concisely the topics taught in class. Myerson's book is more technical, but written clearly and may be suitable even for the less mathematically inclined. The last two books are graduate textbooks in game-theory and deserve mentioning, although they exceed the level at which this course is taught.

**Assignments:**

Game theory is best understood through practice. Each week a problem set will be available on the website, and the solutions will be presented in the tutorial sessions in the following week. It is expected that you solve the problem sets before the tutorial. While your solutions will not be graded, it is important that you work through the examples to learn to move easily between abstract mathematical definitions and their application to a particular game. The ability to reason logically is key for game-theoretic analysis, and best learned through discussion. I therefore urge you to collaborate on the assignments and in preparation for the test and the final exam.

**Readings:**

Every week's readings will be posted on the website. I will not hand out lecture notes for this class. Please use your class notes and the assigned chapters from Osborne's book as a reference.

## Grading:

There will be a term test and a final exam. Each will count 50% towards the grade. The dates will be posted on the website. All material covered in class and the tutorials will be relevant for the midterm and the final. The final exam is cumulative. i.e., it will cover all topics covered throughout the year.

## Prerequisites:

1. *Microeconomics (at least one of the following)*

- ECO200Y1(70%)
- ECO204Y1(70%)
- ECO206Y1

2. *Statistics (at least one of the following)*

- ECO220Y1(70%)
- ECO227Y1
- STA250H1(70%)
- STA247H1(70%) and STA248H1(70%)
- STA250H1(70%) and STA255H1(70%)
- STA257H1 and STA261H1

## Contents:

1. Introduction
  - 1.1 What is Game Theory?
  - 1.2 Preliminaries: Some Mathematical Notation
2. Strategic Games with Perfect Information (ch. 2)
  - 2.1 Strategic games
  - 2.2 Nash equilibrium
  - 2.3 Best response functions
  - 2.4 Dominated actions
  - 2.5 Illustrations: Bertrand and Cournot competition, auctions, electoral competition
3. Mixed strategy Nash equilibrium (ch. 4)
  - 3.1 Mixed or randomized strategies
  - 3.2 Mixed strategy Nash equilibrium
  - 3.3 Dominated actions when strategies are mixed
  - 3.4 Illustrations: expert diagnosis, reporting a crime
4. Extensive Games with Perfect Information (ch. 5)
  - 4.1 Extensive games with perfect information
  - 4.2 Strategies and outcomes
  - 4.3 Backwards induction
  - 4.4 Strategic-form representation and Nash equilibrium of extensive games
  - 4.5 Subgame perfect equilibrium
  - 3.3 Illustrations: ultimatum game, Stackelberg competition, bargaining (ch. 16)
5. Strategic Games with Imperfect Information (ch. 9)
  - 4.1 Beliefs and types
  - 4.2 Bayesian Nash equilibrium
  - 4.2 Illustrations: BoS and auctions with incomplete information