# UNIVERSITY OF CAMBRIDGE

# ECONOMICS S100
# Game Theory

**Albert Banal-Estanol** **Michaelmas 2005**
**Office: 59 (4th floor)** **a.banal-estanol@econ.cam.ac.uk**
**Phone: 01223 335259**

**Lectures: Mon 3-4pm & Tues 11am–1pm**
**Office Hours: Tues 2-3pm**

**Teaching Assistant: Dominic Rohner (dr296@cam.ac.uk)**

## Description

Optimal decisions of economic agents depend on expectations of other agents' actions. Game theory is a set of analytical tools designed to help us understand behaviour in multi-person decision settings. This ten-hour course examines various models of equilibrium behaviour in various kinds of games: static and dynamic games, games of complete and of incomplete information. Besides introducing the theoretical concepts, we should analyse a wide range of applications.

## Textbooks

The main texts are:

> Mas-Colell, A., A. Whinston and J. Green (1995): *"Microeconomic Theory"*, Oxford (henceforth **MWG**).
>
> Fudenberg, D. and J. Tirole (1991), "*Game Theory*", MIT (**FT**).
>
> Osborne, M. and A. Rubinstein, "*A course in Game Theory*", MIT (**OR**).

Additional sources for particular topics include:

> X. Vives, "*Oligopoly Pricing: Old Ideas and New Tools*", MIT.
>
> Macho-Stadler, I. and D. Perez-Castrillo, "*An Introduction to the Economics of Information: Incentives and Contracts*", Oxford.

Some undergraduate textbooks include:

> Jehle, G and P. Reny, "*Advanced Microeconomic Theory*", Addison Wesley.
>
> M. Osborne, "*An introduction to Game Theory*", Oxford.

## Course Outline

1. **Introduction.**
   Monopoly, Stackelberg and oligopoly. More examples.

2. **Elements.**
   Extensive and strategic form representations. Mixed strategies.

   MWG: Chapter 7. FT: Chapter 1.1.1.

3. **Static games with complete information.**
   Dominant and dominated strategies. Rationalizable strategies. Nash equilibrium. Application: static oligopoly.

   MWG: Chapters 8.A–8.D. FT: Chapters 1 and 2. OR: Chapters 2.2-2.5, 3.1-3.2 and 4.

4. **Dynamic games with complete information.**
   - **i.** Subgame perfect equilibrium. Application: bargaining.
   - **ii.** Repeated games. Folk Theorem. Application: collusion.

   MWG: Chapter 9.B. FT: Chapters 3,4 and 5. OR: Chapters 6, 7 and 8.

5. **Static games with incomplete information.**
   Bayesian Nash Equilibrium. Application: auctions.

   MWG: Chapter 8.E. FT: Chapters 6 and 7. OR: Chapter 2.6.

6. **Dynamic games with incomplete information.**
   (Weak) Perfect Bayesian equilibrium. Sequential equilibrium. Application: cheap talk.

   MWG: Chapter 9.C. FT: Chapters 8.1-8.3. OR: Chapter 12.