University of Warwick Department of Economics

EC941 – MsC Game Theory

Prof. Francesco Squintani

This course provides the students with the knowledge of fundamentals of Game Theory. We aim to endow the students with the capability to analyse formally strategic interactions in Economics, Business and Politics. This will require extensive use of calculus and formal mathematical arguments in the course.

The first part of the course will cover games in strategic form. We will first introduce basic pure-strategy solution concepts such as Nash equilibrium and rationalizability, and apply them to a number of problems in industrial organization and political economy. Then, we will introduce and study mixed-strategy and correlated equilibrium. The second part of the course will cover Bayesian games, to allow for the possibility of incomplete information. We will apply the solution concept of Bayesian Nash Equilibrium to a number of problems in industrial organization and political economy. The third part of the course will cover extensive form and repeated games, so as to introduce dynamic aspects in the analysis. After developing the solution concept of subgame perfect equilibrium and perfect Bayesian equilibrium, we will apply these techniques to a number of problems. We will finally apply study of bargaining, which we will consider both axiomatically and strategically.

The module is examined by a single two-hour written exam in May (100% weight). Office hours are on Wednesday from 9:00 to 11:00. The instructor's e-mail is f.squintani@warwick.ac.uk

Lecture 1 Games in Strategic Form

Definition

Solution Concepts: Nash Equilibrium, Dominance and Rationalizability

Applications: Cournot Oligopoly, Bertrand Duopoly, Downsian Electoral Competition, Vickrey Second Price Auction

Readings: Chapter 2, 3 and 12.

Lecture 2 Mixed Strategies

Definition

Nash Equilibrium and Rationalizability

Correlated Equilibrium

Readings: Chapter 4.

Lecture 3 Bayesian Games

Definition

Information and Bayesian Games

Cournot Duopoly and Public Good Provision with Private Information

Readings: Sections 9.1 to 9.6

Lecture 4 Bayesian Game Applications
Juries and Information Aggregation
Auctions with Private Information
Readings: Sections 9.7 to 9.8

Lecture 5 Extensive-Form Games with Perfect Information
Definition
Subgame Perfection and Backward Induction
Applications: Stackelberg Duopoly and Harris-Vickers Race
Readings: Chapters 5, 6 and 7

Lecture 6 Extensive-Form Games with Imperfect Information
Definition
Spence Signalling Game
Crawford and Sobel Cheap Talk Game
Readings: Chapter 10

Lecture 7 Repeated Games
Infinitely Repeated Games
Nash and Subgame-Perfect Equilibrium
Finitely Repeated Games
Readings: Chapter 14 and 15

Lecture 8 Bargaining
Ultimatum Game and Hold Up Problem
Rubinstein Alternating Offer Bargaining
Nash Axiomatic Bargaining
Readings: Section 6.2 and Chapter 16

Lecture 8 Review Session

Reference: *An Introduction to Game Theory* by Martin J. Osborne, Oxford University Press 2003.