

MAS348 – Game Theory Autumn 2017-18

Lecturer: Dr M. Katzman
E-mail: M.Katzman@sheffield.ac.uk
Web page: <http://www.shef.ac.uk/katzman/MAS348/MAS348.htm>
Lectures: Wednesday 11am LT2 and Friday 1pm LT1
Feedback sessions/Office hours: Monday 11am and Wednesday 3pm (room J16)
Homework: 4 sets assigned periodically

Prerequisites: MAS211

Corequisites: None

Aims:

- (1) To understand the mathematical concept of a game and to see its manifestations in various real-life settings.
- (2) To understand the various notions of stability, and in particular Nash equilibrium.
- (3) To understand the technique of backward induction and to acquire the ability to use it in the context of sequential games.
- (4) To understand the complexities of repeated games.
- (5) To understand the concept of a Bayesian Game.

Objectives:

- (1) To learn the formal definition of games both in strategic form and in sequential form.
- (2) To solve games by elimination of dominated strategies.
- (3) To find both pure and mixed Nash equilibria of games.
- (4) To solve sequential games using backward induction.
- (5) To translate games in normal form to sequential form and viceversa applying the concept of information sets and sub-game perfect Nash equilibria.
- (6) To apply game theoretical techniques to solve real-life problems, e.g., in Economics.
- (7) To understand the notion of equilibria of repeated games.
- (8) To understand the notion of Bayesian games and their equilibria.

Module Format

Lectures 20	Tutorials 0	Practicals 0
-------------	-------------	--------------

Recommended Books (A=core text, B= secondary text, C=background reading)

[B] M. J. Osborne. *An introduction to game theory* Oxford University Press (2003).

[B] K. G. Binmore. *Playing for real: a text on game theory*. Oxford University Press (2007).

Brief lecture notes and data-projector slides will be available to students in advance of lectures.

Assessment: One formal 2.5 hour, **closed-book** exam. Format: 4 out of 4 questions.

Detailed Syllabus

Cooperative games– pure strategies (3 lectures)

Nash equilibria in Economics: monopolies, duopolies and oligopolies (2 lectures)

Cooperative games– mixed strategies (3 lectures)

Sequential games (5 lectures)

Repeated games (4 lectures)

Bayesian games (3 lectures)