# Game theory and strategy

## Prof. Giovanni Ursino

***COURSE AIMS AND INTENDED LEARNING OUTCOMES***

This course is an introduction to strategic thinking applied to economics as well as managerial settings. By drawing simultaneously on the language and tools of game theory, economics and management, it develops a rigorous and coherent logical framework that helps analyse common strategic situations. It introduces the main ideas and techniques of game-theoretic analysis, focusing on archetypal strategic situations frequently occurring in real economic contexts. The examples of strategic situations used throughout the course are more stylized real-life settings than proper case studies.

The goal of the course is to provide students with the fundamental instruments needed to translate a real-world scenario into a game theoretic framework so as to facilitate its understanding from a strategic point of view. Students will learn how to frame in an analytic way a strategic situation and will be able to understand and anticipate what will be the real outcome of such a situation as well as the main forces leading to said outcome. Since it focuses on the formal and thorough analysis of fundamental principles of strategic thinking, the course requires an attitude and benefits from training in abstract reasoning and formal modelling.

***COURSE CONTENT***

– Simultaneous moves games.

– Games in strategic form, dominant strategy equilibrium, iterated deletion of strictly dominated strategies.

– Reaction functions and Nash equilibrium.

– Mixed strategies, domination by a mixed strategy, never-best-response and rationalizability.

– Games in extensive form: backward induction and information sets.

– Subgame perfect Nash equilibrium.

– Repeated games. Folk theorems. Collusion.

– Imperfect information and incomplete information. Moral Hazard.

– Bayesian Nash Equilibrium.

– Sequential rationality, beliefs consistency and perfect Bayesian Nash Eq.

– Signalling: separating equilibria and pooling equilibria.

– Adverse Selection and the Lemons problem.

***READING LIST***

Prajit K. Dutta*,* *Strategies and Games: Theory and Practice*,MIT Press, 1999.

Additional teaching material will be distributed in class.

***TEACHING METHOD***

The course is based on theoretical lectures (60 hours) and applications (14 hours). During theoretical lectures students will be invited to form groups and to engage in a significant amount of groupwork, solving (and possibly illustrating to the class) game theory problems. By the end of the course students should be able to autonomously work in groups and to illustrate their findings to a wider audience discussing them in real time with the instructor.

***ASSESSMENT METHOD AND CRITERIA***

Grading is based on a final written exam covering all the program as well as on groupwork and class participation.

***NOTES AND PREREQUISITES***

The course requires an attitude and benefits from training in abstract reasoning and formal modelling. Given the abstract modelling techniques and the deep analytical training required to successfully complete the course, it is strongly recommended that students attend all lessons and practice classes from the beginning of the course.

In case classes and exams could not be held regularly due to the COVID-19 pandemic, they will be carried out in distance learning mode. If necessary, detailed instructions will be given in due time.

*Office hours*

Office hours arrangements will be defined in class.