## **Logic, Rationality and Decisions**

## Prof. Ciro De Florio

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

When is a decision rational? What should determine organisations’ strategic choices? What know-how contributes to form the knowledge base on which businesses can develop adaptive behaviour vis-à-vis a highly complex environment? The course provides the tools for a multidisciplinary analysis of applied rational choice theory.

At the end of the course, students will be able to build decision analysis models, both individual and aggregate, highlighting the contributions of different areas of research (from psychology to Artificial Intelligence to Bayesian Epistemiology).

***COURSE CONTENT***

The course is divided in three parts:

1. *Introduction*

 What is a decision? When is it rational?

2. Information

 Definitions

 Sources of information: memory and databases

 Information processing: logic

 Deductive logic and inductive logic

3. *Probability and inductive logic*

 Probability theory; statistical inference; Bayes’ theorem

 Probability interpretations;

4. *Decision Theory*

Decision-making under conditions of uncertainty and of risk; overview of representation theorems; individual decision-making and aggregate decision-making; risk and uncertainty.

5. *Cognitive biases*

Our reasoning and how we ought to reason; our decision behaviour and how we ought to decide; the paradoxes of Allais and Ellsberg; multiple conceptions of rationality

***READING LIST***

Compulsory reading materisl will be supplied during lessons. Some useful texts that cover course topics are listed below:

S. French, J. Maule, N. Papamichail, *Decision Behaviour, Analysis and Support*, Cambridge University Press, Cambridge 2009.

I. Hacking, *Introduzione alla probabilità e alla logica induttiva*, Il Saggiatore, Milan 2005.

D. Kahnemann, A. Tversky, *Pensieri lenti e pensieri veloci*, Mondadori, Milan 2010.

M. Peterson, *An Introduction to Decision Theory*, Cambridge University Press, Cambridge 2009.

***TEACHING METHOD***

Frontal lectures and seminars.

***ASSESSMENT METHOD AND CRITERIA***

Students will take a written exam.

The exam will last 2 hours; it will be divided in two sections. The first consists in open questions, and students’ answers will be assessed on the basis of three criteria: theoretical knowledge, conceptual accuracy and logical organisation of the text. On the other hand, the second part consists in exercises.

***NOTES AND PREREQUISITES***

Further information can be found on the lecturer's webpage at http://docenti.unicatt.it/web/searchByName.do?language=ENG, or on the Faculty notice

board.