

Optimisation Theory and Applications

Level: Master 1

Track: Economics, Data and Decision Science

Semester : 7

Teaching hours: 24 hours of lectures

Teaching language: English

Teacher: Fede Fioravanti

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Course's objectives:

The goal of the course is to develop a solid understanding of key mathematical tools commonly used in economic modelling and research, and to learn how to apply them effectively in analytical and theoretical contexts.

Lesson plan:

This course covers introductory material in real analysis and topology, with a particular emphasis on economic problems.

Skills developed:

- Develop math skills needed to work as a professional economist.
- Gain the ability to read proofs and determine whether or not they are correct. Essential to reading the models underlying mainstream theoretical, empirical, and experimental economics papers.
- Ability to write proofs; essential to writing models in mainstream theoretical, empirical, and experimental economics papers.

Grading system:

The final grade consists of a weighted sum of 3 short quizzes, and 1 long quiz. Each short quiz will last 25 minutes and will focus on the most recent topics covered in class. The long quiz covers all the topics and lasts 2 hours.

Prerequisites:

Some mathematical maturity is expected (as the one obtained by doing some Microeconomics courses).

Bibliography / references:

- M. Carter, Foundations of Mathematical Economics, MIT Press, 2001.
- K. C. Border, Fixed Point Theorems with Applications to Economics and Game Theory, Cambridge University Press, 1985.
- R. K. Sundaram, A First Course in Optimization Theory, Cambridge University Press, 1996.
- C. D. Aliprantis and K. C. Border, Infinite Dimensional Analysis, Springer, 2006.
- A. Mas-Colell, M. Whinston and J. Green, Microeconomic Theory, Oxford University Press, 1995.