Optimisation Theory and Applications

Level: *M1*
Track: *Economics, Data and Decision Science*
Semester : 1
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, 1 long quiz, homework, and an oral presentation. 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. The oral presentation consists of presenting some of the homework exercises.

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

Bibliography / references:
- Fixed point theorems with applications to economics and game theory (Kim C. Border)
- Foundations of mathematical economics (Michael Carter)