

## **Optimization and linear programming**

**Instructor: Lorenzo Bastianello**

**Course description.** This is an advanced undergraduate course in static optimization. It is useful for students who want to develop analytical skills in order to better understand advanced economic subjects taught at the master level such as Game Theory, Decision Theory, General Equilibrium Theory etc.

The course begins with some useful reminder of topology in an  $n$ -dimensional space, such as the space of commodities in microeconomics. The notions of norms, open/closed sets, continuity, differentiability and convexity are treated. The second part focuses on the proof of two important separation-hyperplane theorems. The third part uses these theorems to prove the Karush-Kuhn-Tucker Theorem, a central tool in non-linear constrained optimization. The fourth and last part is about linear programming and duality.

**References.** B. Crettez “Lecture Notes” (they will be sent by email)

N. Hayek and JP. Leca “Mathématiques pour l'économie – Analyse Algèbre”

**Grading.** Mid-term and final written exams.