Introduction to Optimal Control Theory

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**Timetable:** 16 hrs. First lecture on February 5, 2020, 11:00 (dates already fixed, see calendar), Torre Archimede, Room 2BC/30.

**Course requirements:** Calculus for many variables and basic tools of Lebesgue measure theory. The needed functional analysis will be recalled during classes, so it not a prerequisite.\textsuperscript{*}

**Examination and grading:** The final exams will consists either of a standard oral questioning on the main parts of the program or of a shortened recognition of the program together with the dissertation on a research paper previously studied by the student.

**SSD:** MAT/05

**Aim:**
This course aims to provide the student with some basic tools of Optimal Control Theory. The latter generalizes Calculus of Variations to the case when the state trajectories are subject to differential equations with control parameters. Besides being a crucial for many mathematical subjects (e.g. Differential Geometry, Hamilton-Jacobi Pde’s, Mean Field Games, Differential games) Optimal Control Theory is quite motivated by applications like Aerospace Engineering, Medicine, Economics, Ecology.

**Course contents:**

\textsuperscript{*}Students who aim to a more detailed preparation to the course may follow the lectures by Prof. Rampazzo within the math undergraduate course “Analisi Superiore”. Contact him if interested.