



**Course Syllabus for
DAUSY National Ph.D. Program in Autonomous Systems
(year 2023-24)**

Course title	Control for optimization
Scientific Discipline Sector	ING-INF/04
Hours of instruction	10 hours
CFU	1 CFU
Semester, period	November-December 2023
Goal	<p>The course aims at bridging the gap between optimization and control theory. A control-based approach to analyze the convergence of selected optimization algorithms will be presented. Topics from system theory, passivity, operator theory and consensus will be combined in an elegant and synergic way to build an analysis tool that may pave the way to further innovation in the design of optimization algorithms in large-scale systems.</p> <p>Lessons will mainly consist in frontal lectures with examples.</p>
Syllabus	<p>Preliminaries on optimization algorithms, consensus theory and passivity for dynamical systems.</p> <p>Control-based approach to the analysis of selected optimization algorithms.</p> <p>Applications to distributed optimization algorithms in large-scale systems.</p>
Bibliography	Papers, slides and supporting material from the instructor.
Examination method	End-course examination based on a project work.