Course Title: Nonlinear Systems	**Number of Units:** 1
CFU: 6	**SSD:** ING/INF-04
Course aims: The aim of the course is to introduce students to the foundations of the mathematical theory of nonlinear systems and illustrate the theory via some representative examples from applications.	
Course Description: Introduction: linear vs nonlinear systems; planar nonlinear systems: equilibria, limit cycles, phase portraits, existence of periodic orbits and bifurcations; Fundamental properties: well-posedness, continuous dependence on initial conditions; Lyapunov stability and applications; Nonlinear Dynamics and Bifurcation theory: local bifurcations of maps, local bifurcations of flows, introduction to global bifurcations and deterministic chaos; Perspectives on advanced topics in nonlinear systems (e.g. piecewise smooth systems, feedback linearization and control, distributed nonlinear systems)	
Assumed Background:	
Assessment methods: Oral interview and discussion of a case study	