Course Title: Analysis and Control of Complex Systems	**Number of Units: 1**
SSD : ING-INF/04	**CFU:** 6
Course aims: This course aims at introducing students to the key theoretical and numerical tools for the analysis and control of complex systems and networks of interconnected dynamical systems. The theoretical concepts will be illustrated via a set of representative examples from Engineering and Applied Science.	
Course Description: Introduction to complex systems and networks. Elements of graph theory and macroscopic observable of a network system. Networked dynamical systems: emerging properties. Consensus and Synchronization in Complex Networks. Stability and Convergence of network systems: the master stability function approach; contraction theory and incremental stability; Lyapunov based approaches. Observability and Controllability of a complex network. Centralized, decentralized and distributed control of complex systems. Adaptive control of networks. Applications to Engineering.	
Assumed Background: Nonlinear Systems	
Assessment methods: Oral examination and project work	